Courses listed in this catalog are current as of December 12, 2014. For up-to-date information, visit www.catalogs.umn.edu

Check the University Catalogs website at www.catalogs.umn.edu for the most current course information. The courses in this catalog are not offered every semester. To find out whether a course is offered during a particular semester, consult the online Class Schedule at onestop.umn.edu/registrar/registration/courses.html.

Course Designators

In conjunction with course numbers, departments and programs are identified by a 2-, 3-, or 4-letter designator prefix (e.g., CE for Civil Engineering, POL for Political Science, ECON for Economics). When no designator precedes the number of a course listed as a prerequisite, that prerequisite course is in the same department as the course being described.

Course Numbers

0xxx Courses that do not carry credit toward any University degree.

1xxx Courses primarily for undergraduate students in their first year of study.

2xxx Courses primarily for undergraduate students in their second year of study.

3xxx Courses primarily for undergraduate students in their third year of study.

4xxx Courses primarily for undergraduate students in their fourth year of study; graduate students may enroll in such courses for degree credit. 4xxx courses can be counted for a Graduate School degree if the course is taught by a member of the graduate faculty or an individual appointed to Limited Teaching Status (LTS).

5xxx Courses primarily for graduate students; undergraduate students in their third or fourth year may enroll in such courses.

Course Symbols

The following symbols are used throughout the course prerequisites of most University catalogs to denote common and recurring items of information.

* Credit will not be granted if credit has been received for the course listed after this symbol.

& Concurrent registration is required (or allowed) in the course listed after this symbol.

# Approval of the instructor is required for registration.

% Approval of the department offering the course is required for registration.

@ Approval of the college offering the course is required for registration.

.. In prerequisite listings, comma means “and.”

1-4 cr [max 6] The course can be taken for 1 to 4 credits and may be repeated for up to 6 credits.

Abbreviations

The following abbreviations are used throughout the course prerequisites of most University catalogs to denote common and recurring items of information.

Prereq Course prerequisites.

cr Credit.

div Division.

DUS Director of undergraduate studies.

equiv Equivalent.

fr, soph, jr, sr Freshman, sophomore, junior, senior.

H Honors. Courses with an H following the course number satisfy honors requirements.

V Honors and Writing Intensive. Courses with a V following the course number satisfy both honors and liberal education writing intensive requirements.

W Writing Intensive. Courses with a W following the course number satisfy the writing intensive requirement for liberal education.

A-F only A-F grade basis only; course may not be audited or take pass/fail

A-F or Aud A-F grade basis, or course may be audited for no grade

S-N only S-N grade basis only (pass/fail), course may not be audited or taken A-F

S-N or Aud S-N grade basis (pass/fail), or course may be audited for no grade

No Grade No grade will be given for the course; typically used for laboratory components of courses

OPT No Aud Student selects the grading option; course may not be audited

Stdtnt Opt Student selects the grading option; course may be audited

Course Listing Sample

Xology (Xolo)

Xology and Diometrics

College of Liberal Education

Xolo 5101. Methods in Xology. (3-4 cr [max 8 cr]; A-F only. Prereq-3578 or #) Historical, numerical, sociological, and Freudian methods of research in xology with applications to contemporary problems.

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(1.0 cr.; Student Option No Audit; =AHS 1102; fall, spring, every year)  
Interest/personality assessment, health-related academic majors/professions, professionalism/ethics in health care. Students integrate information about self and about careers to move toward major/career choice.

AHS 1102. Orientation to Health Careers.  
(1.0 cr.; Student Option No Audit; =AHS 1101; fall, spring, every year)  
Web course. Fall/spring=1cr, summer=2cr. Interest/personality assessment, health-related academic majors/professions, professionalism/ethics. Integrating self-/career-related information.

AHS 1104. Experiences in Health.  
(2.0 cr.; prerequisite AHS 1101 or AHS 1102 or AHS 1600; fall, spring, summer, every year)  
Non-physician roles in health care from traditional to alternative and complementary roles. Minimum 35 hour volunteer experience with instructor approval.

(1.0 cr.; A-F only; fall, every year)  

AHS 1601. The Future Physician II.  
(1.0 cr.; prerequisite Permission number; 1600 recommended; fall, spring, every year)  
A career in medicine. Life/work of physicians, what it takes to be successful. Issues/trends including Institute of Medicine core competencies, medical ethics, concept of health teams, multiculturalism, global issues, disparities in accessing medical care.

(2.0 cr.; prerequisite [1600 or 1601]; #; fall, spring, every year)  
Online course for students confident in decision to prepare for medical school. Exercises designed to learn about/prepare for career in medicine. Community-based volunteer experience (35 hours) in setting that employs physicians/serves patients.

AHS 2300. Orientation to Clinical Research.  
(1.0 cr.; A-F only; fall, spring, every year)  

AHS 2400. Writing a Personal Statement.  
(1.0 cr.; S-N only; fall, spring, every year)  
Develop competitive personal statement. Designed for students applying to health professional program in coming year.

AHS 2707. Global Health Challenges for Future Health Professionals.  
(2.0 cr. [max 4.0 cr.]; A-F only; spring, every year)  
Global health issues. Challenges/opportunities in choosing a career as a health professional. Students hear from health professionals regarding their work relation to each health challenge.

AHS 2707H. Global Health Challenges for Future Health Professionals.  
(2.0 cr. [max 8.0 cr.]; A-F only; fall, offered periodically)  
Global health issues. Challenges/opportunities choosing a career as health professional. Students hear from health professionals regarding their work relation to each health challenge.

AHS 4300. Directed Study.  
(1.0-3.0 cr. [max 6.0 cr.]; prerequisite #; fall, spring, summer, every year)  
Students complete project under supervision of instructor from Health Careers Center. Students provide written update at end of each term. A written progress report is required at end of project.

AHS 5100. HIV Drug Discovery.  
(3.0 cr.; A-F only; prerequisite One year of organic chemistry, [CHEM 2301 and 2302] or equivalent, [one semester of biochemistry], [BIOC 3021 or equivalent]; fall, every year)  

(4.0 cr.; A-F or Audit; =APEC 1251; prerequisite Soph; fall, spring, summer, every year)  
Introduction to financial accounting for U.S. organizations. Reading financial statements.

(4.0 cr.; A-F or Audit; fall, spring, every year)  
Introduction to financial accounting for U.S. organizations. Reading financial statements.

ACCT 3001. Introduction to Management Accounting.  
(3.0 cr.; A-F or Audit; prerequisite 2050; fall, spring, summer, every year)  
Costing techniques, including activity-based costing. Applying costing methods to determine costs of products, services, and production processes. Use of costs in operating/strategic decisions.

ACCT 3150. Role of the Accountant in Today’s Finance Function.  
(1.0 cr.; S-N only; prerequisite 2050, [accounting major or accounting certificate student]; fall, spring, every year)  
How to interact with financial, tax, audit and IT personnel. How to be an accountant. Critical support role accountants play among market leading companies. Students define their vision for their accounting career.

ACCT 3199. Internship in Public Accounting.  
(2.0 cr.; S-N or Audit; prerequisite 3001, acct or finance major; fall, spring, every year)  
Full-time work for a public accounting firm plus a written report on the work experience.

ACCT 3201. Intermediate Management Accounting.  
(2.0 cr.; A-F or Audit; prerequisite 3001, #; fall, spring, every year)  
Full-time work in general accounting, cost accounting, or internal auditing in an industrial or governmental organization plus a written report analyzing the work experience.

ACCT 5101. Intermediate Accounting I.  
(4.0 cr.; A-F or Audit; prerequisite Grade of at least B- in 2050, mgmt major or mgmt grad student, accounting certificate, select non mgmt students; fall, spring, every year)  
Valuation, measurement, reporting issues related to selected assets/liabilities of firm. Theory underlying accounting issues. Applying accounting principles.

ACCT 5102W. Intermediate Accounting II.  
(4.0 cr.; A-F or Audit; prerequisite 5101 [mgmt or grad mgmt student]; fall, spring, every year)  
Basic valuation problems encountered in financial reporting. Focuses on valuation of liabilities. Accounting for leases, pensions, and deferred taxes. Introduces consolidated financial statements.

ACCT 5125. Auditing Principles and Procedures.  
(4.0 cr.; A-F or Audit; prerequisite [3101 or 5101 or 5100 or 6100], [acct major or grad mgmt student]; fall, spring, summer, every year)  
Concepts of auditing internal control/financial statements in accordance with generally accepted auditing/professional standards established by Public Company Oversight Board (PCAOB) and American Institute of Certified Public Accountants (AICPA).

ACCT 5126. Internal Auditing.  
(2.0 cr.; A-F or Audit; prerequisite 2050; fall, spring, every year)  
Financial/operational auditing. Standards. Managing the function.

(4.0 cr.; A-F or Audit; prerequisite 2050; fall, spring, summer, every year)  
State and federal income taxation. Income tax planning and compliance. Tax research.


ADDS 5031. Applied Psychopharmacology. (2.0 cr.; A-F or Audit; fall, spring, every year) Categories of psychoactive drugs. Medicines to treat mental disorders. Substances such as alcohol, nicotine, cocaine, and marijuana. What occurs physiologically when someone takes a psychoactive drug.

ADDS 5041. Methods and Models I: Motivational Counseling. (2.0 cr.; A-F or Audit; prereq 5021; fall, spring, summer, every year) Concepts of motivational interviewing. Spirit of MI. Primary counseling skills. Working with resistance. Identifying/elicit change talk. Transitioning into change, negotiating treatment plan. Strengths/shortcoming of MI. 

ADDS 5051. Methods and Models II: Cognitive Behavioral Therapy. (2.0 cr.; A-F or Audit; prereq 5021; fall, spring, summer, every year) Components of cognitive model. Assessment, case formulation, automatic thoughts, core beliefs, cognitive restructuring, behavior change elements, therapeutic relationship. Learn, practice, master key concepts.

ADDS 5061. Foundations of Group Work. (3.0 cr.; A-F or Audit; prereq ADDS 5021; fall, spring, every year) Designing/facilitating therapy groups. Intra-/inter-personal dynamics, leadership skills, developmental aspects, ethical issues. Application to therapy of chemically addicted individuals. Lectures, discussion, experiential exercises, small groups, readings.

ADDS 5071. Foundations of Co-occurring Disorders. (2.0 cr.; A-F or Audit; fall, spring, summer, every year) Understanding mentally ill/chemically abusive or dependent client. Intervention: advocacy, education, support for client/those part of his/her environment. Social, environmental, multicultural factors that contribute resources for these clients.

ADDS 5081. Multicultural Foundations of Behavioral Health. (3.0 cr.; A-F or Audit; fall, spring, every year) What is culture? How might culture, cultural practices, and history be significant in the use/abuse of substances? How is culture relevant to the attitudes/practices in the prevention/treatment of substance use/abuse? Multicultural counseling and cultural competence in addiction counseling. People as individuals. Clinician’s own cultural worldview/other cultural worldviews.

ADDS 5901. Assessment and Treatment Planning I. (3.0 cr.; A-F or Audit; prereq [5001 or 5011], 5021, [5003 or 5031]; fall, spring, summer, every year) Core addictions counseling. Clinical assessment, case management, documentation, treatment planning, ethical issues. Students begin process of securing internship.

ADDS 5911. Professional Seminar 1. (1.0 cr.; S-N only; prereq ADDS 5121 is only open to individuals who have completed or are in the process of completing the Addiction Studies prerequisites (ADDS 5011- ADDS 5091) and intending to intern. %; fall, spring, summer, every year) Prepares students for successful entry into the field of substance use disorder counseling by focusing on facets that are critical to their professional development. Through discussions, experiential learning activities, guest lectures and site visits, students gain further understanding of the internship placement process and requirements, settings that fit their individual training and career goals, requirements for initial licensing and renewal, the testing process, models of professional development, the importance of professional advocacy and associations, self-care and requirements and benefits of clinical supervision. Professional ethics, including state rules, statutes, codes of conduct and regulations for practitioners and agencies are also addressed. Students will also develop their job search skills and apply them to secure a field placement for the internship seminar.

ADDS 5924. Integrating Spirituality in Counseling Practice. (2.0 cr.; A-F only; fall, spring, summer, every year) Knowledge/skills of counseling students/practitioners in professional competencies for addressing spiritual/religious issues. Lecture, discussion, experiential exercises/readings to advance cognitive, interpersonal/practical skills. Treatment of persons with co-occurring disorders.

ADDS 5950. Special Topics. (1.0-4.0 cr. [max 12.0 cr.]; A-F or Audit; prereq %; fall, spring, summer, every year) Special topics in addiction studies.

ADDS 5993. Directed Study. (1.0-3.0 cr. [max 9.0 cr.]; prereq %; fall, spring, summer, every year) Directed study.

ADDS 5994. Directed Research. (1.0-3.0 cr. [max 9.0 cr.]; A-F only; prereq %; fall, spring, summer, every year) Directed research.

ADDS 5996. Internship in Substance Abuse Counseling. (1.0-8.0 cr.; S-N or Audit; prereq [5001 or 5011], [5021, 5003 or 5031], [5002 or 5041], [4001 or 5091]; %; fall, spring, summer, every year) Supervised field work experience. Practical application of substance abuse counseling. Assessment, treatment planning, case management.
AEM 1905. Freshman Seminar: Aircraft and Spacecraft. (2.0 cr. [max 4.0 cr.]; Student Option No Audit; prereq Fr; fall, spring, offered periodically)
Topics related to air and space travel with an emphasis on hands-on projects and activities.

AEM 2011. Statics. (3.0 cr.; A-F or Audit; prereq PHYS 1301W, [&MATH 2374 or equiv], CSE; fall, spring, summer, every year)

AEM 2012. Dynamics. (3.0 cr.; A-F or Audit; prereq 2011, [&MATH 2373 or equiv], CSE student; fall, spring, summer, every year)

AEM 2021. Statics and Dynamics. (4.0 cr.; A-F or Audit; prereq Phys 1301W, [&MATH 2374 or equiv], CSE; fall, spring, every year)

AEM 2301. Mechanics of Flight. (3.0 cr.; A-F or Audit; prereq PHYS 1301W, [&MATH 2373 or equiv], CSE; spring, every year)

AEM 3031. Deformable Body Mechanics. (3.0 cr.; A-F or Audit; prereq [2011 or 2021 or [BME 3011, BMEN major], [MATH 2374 or equiv], [&MATH 2373 or equiv], CSE; fall, spring, summer, every year)

AEM 3100. Software Applications in AEM. (1.0 cr. [max 4.0 cr.]; S-N only; prereq [CSCI 1113 or equiv], [BAEM upper division; fall, spring, every year])
Topics covering software applications for problems of interest.

AEM 3101. Mathematical Modeling and Simulation in Aerospace Engineering. (2.0 cr.; A-F only; prereq [MATH 2373 or equiv], AEM major; fall, every year)
Mathematical modeling of engineering systems/numerical methods for their solution. Use of MATLAB. Focus on systems found in aerospace engineering/mechanics.

AEM 3391. Independent Design Project. (3.0 cr.; A-F only; prereq %; spring, every year)
Independent design project construction/testing under guidance of faculty member. Group projects allowed. Students responsible for finding faculty adviser for project. Final project report (written or oral).

AEM 4000H. Honors Research Seminar. (0.0 cr.; S-N only; prereq Honors student, permission of University Honors Program, AEM major; fall, spring, every year)
Research seminars in aerospace engineering and mechanics, given by faculty members and visiting scholars.

AEM 4201. Fluid Mechanics. (4.0 cr.; A-F or Audit; prereq 2012, [MATH 2373 or equiv], [MATH 2374 or equiv], [CSE upper div or grad student]; fall, every year)

AEM 4202. Aerodynamics. (4.0 cr.; A-F or Audit; prereq upper div CSE or grad, 4201; spring, every year)

AEM 4203. Aerospace Propulsion. (4.0 cr.; A-F or Audit; prereq 4202, [CSE upper div or grad student]; spring, every year)
Basic one-dimensional flows: isentropic, area change, heat addition. Overall performance characteristics of propellers, ramjets, turbojets, turbofans, rockets. Performance analysis of inlets, exhaust nozzles, compressors, burners, and turbines. Rocket flight performance, single-/multi-stage chemical rockets, liquid/solid propellants.

AEM 4295. Problems In Fluid Mechanics. (1.0-3.0 cr. [max 6.0 cr.]; prereq %; fall, spring, summer, every year)
Topics of current interest. Individual projects with consent of faculty sponsor.

AEM 4301. Orbital Mechanics. (3.0 cr.; A-F only; prereq [2012 or equiv], [MATH 2373 or equiv], [CSE upper div or grad student]; spring, every year)

AEM 4303W. Flight Dynamics and Control. (3.0 cr.; A-F or Audit; prereq [2012; 2301, 3101, [WRIT 1301 or equiv], [CSE upper div or grad student]] or #; spring, every year)

AEM 4305. Spacecraft Attitude Dynamics and Control. (3.0 cr.; A-F or Audit; prereq [4301, [3101 or ME 3281 or EE 3015], CSE upper div or grad student; spring, every year)
Kinematics/dynamics for six-degree of freedom rigid body motions. Euler's angles/equations. Torque free motion, spin stabilization, dual-spin spacecraft, nutation damping, gyroscopic attitude control, gravity gradient stabilization. Linear systems analysis, Laplace transforms, transfer functions. Linear control theory. PID controllers.

AEM 4321. Automatic Control Systems. (3.0 cr.; A-F only; [EE 4231]; prereq [3101 or ME 3281 or EE 3015], CSE upper div or grad student; fall, every year)

AEM 4331. Aerospace Vehicle Design. (4.0 cr.; A-F only; prereq [2301, 4202, AEM sr] or #; fall, every year)
Multidisciplinary student teams perform conceptual designs of aerospace vehicles, components, missions, or systems that incorporate realistic constraints/applicable engineering standards. Papers on professional ethics/contemporary aerospace issues. Oral preliminary/critical design reviews.

AEM 4333. Aerospace Design: Special Projects. (3.0 cr. [max 6.0 cr.]; prereq 4331 or #; spring, every year)
Student groups design, build, and test aerospace projects. Projects include designs from 4331 or projects such as microgravity experiments. Students keep design log/ notebook, prepare status reports, and give final oral presentation.

AEM 4371. Helicopter Aerodynamics. (3.0 cr.; prereq 2301, 3101, 4202, [CSE upper div or grad student]; fall, offered periodically)
Review of basic aerodynamics, unique features of helicopters, momentum theory in axial flight/rotor flow states, momentum theory in non-axial flight, blade-element theory, vortex theory, helicopter equations of motion. Design project.

AEM 4391. Independent Design Project. (3.0 cr.; A-F only; prereq 4331, %; spring, every year)
AEM 4495. Problems in Aerospace Systems. (3.0 cr.; A-F only; prereq CSE upper division, %; fall, spring, summer, every year) Topics of interest or individual projects.

AEM 4501. Aeropropulsion Laboratory. (3.0 cr.; A-F or Audit; prereq CSE upper div or grad, 4331 and group projects are allowed. Students are responsible for finding a faculty adviser for their project. Final project report (written or oral).

AEM 4602W. Aerodynamics Laboratory. (4.0 cr.; A-F or Audit; prereq 4201, 4501, 4601, WRIT 1301 or equiv), [CSE upper div or grad]; fall, every year) Experimental methods/design in fluid/solid mechanics, Wind tunnel/water channel experiments with flow visualization, pressure, velocity, force measurements. Measurement of stresses/strians/displacements in solids/structures: stress concentrations, materials behavior, structural dynamics. Computerized data acquisition/analysis, error analysis, data reduction. Experiment design. Written/oral reports. Lab ethics. Writing intensive.

AEM 4796. Professional Experience. (3.0 cr.; A-F or Audit; prereq CSE upper div, AEM major, %; fall, spring, summer, every year) Work experience with substantive engineering component. Written report.

AEM 4894H. Senior Honors Thesis. (3.0 cr.; A-F only; prereq Honors student, permission of University Honors Program, AEM major; spring, every year) Writing thesis under direction of AEM faculty member.

AEM 4896. International Professional Experience. (3.0 cr.; A-F only; prereq CSE upper div, AEM major, %; fall, spring, summer, every year) International work experience with substantive engineering component. Written report.


AEM 5251. Computational Fluid Mechanics. (3.0 cr.; A-F or Audit; prereq [4201 or equiv], [CSE upper div or grad student]; fall, every year) Introductory concepts in finite difference and finite volume methods as applied to various ordinary/partial differential model equations in fluid mechanics. Fundamentals of spatial discretization and numerical integration. Numerical linear algebra. Introduction to engineering and scientific computing environment. Advanced topics may include finite element methods, spectral methods, grid generation, turbulence modeling.

AEM 5321. Modern Feedback Control. (3.0 cr.; prereq 4321 or EE 4231 or ME 5281 or equiv; fall, every year) State space theory for multiple-input-multiple-output aerospace systems. Singular value decomposition technique, applications to performance/robustness. Linear quadratic gaussian and eigenstructure assignment design methods. Topics in H[infinity symbol] Applications. (3.0 cr.; A-F only; prereq [[4202, &4303W, 4601] or equiv], %; spring, offered periodically)

AEM 5401. Intermediate Dynamics. (3.0 cr.; A-F or Audit; prereq CSE upper div or grad, 2012, Math 2243; fall, every year) Three-dimensional Newtonian mechanics, kinematics of rigid bodies, dynamics of rigid bodies, generalized coordinates, holonomic constraints, Lagrange equations, applications.


AEM 5451. Optimal Estimation. (3.0 cr.; A-F or Audit; EE 5251; [MATH 2243 or STAT 3021 or equiv], [4321 or EE 4231 or ME 5281 or equiv] or #; fall, even years) Basic probability theory. Batch/recursive least squares estimation. Filtering of linear/nonlinear systems using Kalman and extended Kalman filters. Applications to sensor fusion, fault detection, and system identification.

AEM 5495. Topics in Aerospace Systems. (1.0-4.0 cr.; A-F or Audit; prereq %; fall, spring, summer, every year) Topics of current interest. Individual projects with faculty sponsor.

AEM 5501. Continuum Mechanics. (3.0 cr.; prereq CSE upper div or grad, Math 2243 or equiv or #; spring, every year) Concepts common to all continuous media; elements of tensor analysis; motion, deformation, vorticity; material derivatives; mass, continuity equation; balance of linear, angular momentum; geometric characterization of stress; constitutive equations.

AEM 5503. Theory of Elasticity. (3.0 cr.; A-F or Audit; prereq 4501 or equiv, Math 2263 or equiv or #; spring, every year) Introduction to the theory of elasticity, with emphasis on linear elasticity. Linear and nonlinear strain measures, boundary-value problem for linear elasticity, plane problems in linear elasticity, three dimensional problems in linear elasticity. Topics from nonlinear elasticity, micromechanics, contact problems, fracture mechanics.

AEM 5561. Aeroelasticity. (3.0 cr.; A-F or Audit; prereq 4202, 4301, [grad student or CSE upper div]; fall, every year) Static aeroelastic phenomena, torsional divergence of a lifting surface, control surface reversal. Aeroelastic flutter, unsteady aerodynamics. Problems of gust response, buffetting. Design project.
AIR 1000. Leadership Laboratory. (1.0 cr. [max 10.0 cr.]; S-N or Audit; fall, spring, every year) Air Force customs and courtesies, drill and ceremonies, military commands, the environment of the Air Force officer, and learning about areas of opportunity available to commissioned officers. Interviews, guidance, and information to increase the understanding, motivation, and performance of other cadets.

AIR 1104. Introduction to the Air Force Today I. (1.0 cr.; A-F or Audit; fall, every year) Mission and organization of the Air Force, officerhood and professionalism, military customs and courtesies, Air Force officer opportunities, group leadership problems, and introduction to communication skills.

AIR 1105. Introduction to the Air Force Today II. (1.0 cr.; A-F or Audit; spring, every year) Structure and missions of Air Force organizations. Communicative skills. How cadets are selected for the Professional Officer Course, categorization into specific career areas (pilot and navigator) occurs in the AFROTC junior year, and selection for specific career fields is made in a cadet's senior year.

AIR 1204. History of Airpower and Communication Skills. (1.0 cr.; A-F or Audit; fall, spring, every year) Air Force heritage and leaders, Quality Air Force, and introduction to ethics and values, introduction to leadership, group leadership problems, and continuing application of communication skills.

AIR 1205. Quality Air Force, Group Leadership Problems, and Presentation Techniques. (1.0 cr.; A-F or Audit; spring, every year) Leadership and followership. Officerhood, ethics, and values; Air Force's core values. Air Force heritage and leaders, Quality Air Force, group leadership problems, and continuing application of communicative skills.

AIR 3301. Air Force Leadership, Quality, and Communication. (3.0 cr.; A-F or Audit; fall, every year) Air Force leadership, management, writing, conflicts. Opportunity to present Air Force briefing.

AIR 3302. Air Force Officerhood, Quality, and Communication. (3.0 cr.; A-F or Audit; prereq 3301 recommended; spring, every year) Focus on completing Quality Air Force training, the Officer Professional Development system, exploring leadership styles, ethics, core values, character development, and standards of conduct. Improve written and oral communication skills. Case studies.

AIR 3401. National Security Policy. (3.0 cr.; A-F or Audit; fall, every year) National security process, regional studies, advanced leadership ethics, Air Force doctrine, and military justice. Military as a profession, officerhood, civilian control of the military, preparation for active duty, and current issues affecting military professionalism. Focus on refining communication skills.

AIR 3402. Preparation for Active Duty. (3.0 cr.; A-F or Audit; prereq 3401 recommended; spring, every year) National security process, regional studies, advanced leadership ethics, Air Force doctrine. Military law, current issues affecting military professionalism. Preparation for active duty as second lieutenant in U.S. Air Force.

AFRO 1011. Introduction to African American Studies. (4.0 cr.; spring, every year) The study of peoples of African descent including the evolution of African American culture, comparative race relations, feminism and social policy change.


AFRO 1021. Introduction to Africa. (4.0 cr.; fall, spring, every year) Diverse themes and disciplines in African Studies from prehistory to post-colonial period. Introduction to methodologies of inquiry.


AFRO 1902. Freshman Seminar. (3.0 cr.; prereq Fr; fall, spring, offered periodically) Topics specified in Class Schedule.

AFRO 1904. Freshman Seminar. (3.0 cr.; A-F or Audit; prereq Fr or less than 30 cr.; fall, every year) Topics specific in Class Schedule.

AFRO 1909W. Freshman Seminar. (3.0 cr. [max 6.0 cr.]; A-F or Audit; prereq Fr with no more than 30 cr.; fall, spring, offered periodically) Topics specified in Class Schedule.

AFRO 3001. West African History: Early Times to 1800. (3.0 cr.; = [HIST 3454]; fall, every year) West Africa from early times to establishment/ histories of states. Relations with North African, Mediterranean, Asian, and American worlds. Non-centralized political authority.

AFRO 3002. West African History: 1800 to Present. (3.0 cr.; = [HIST 3455]; fall, spring, summer, every year) West African history from late 18th century to present. Past/profund changes including new 19th century state formation, European colonialism, post-colonial issues.


AFRO 3072. Racism: Social and Psychological Consequences for Black Americans. (3.0 cr.; fall, spring, summer, every year) Racism and its effects on African Americans: definitions, determinants, and dynamics. Examined in an experiential context to reflect individual and institutional racism.

AFRO 3103. World History and Africa. (3.0 cr.; A-F or Audit; = [AFRO 5103]; fall, even years) Contributions of African American thinkers to making of African history/strategies to rework theoretical/analytical foundations of world history. Writings/intellectual networks of major thinkers whose historical/ethnographic works on Africa spanning nineteenth to twentieth century.

AFRO 3108. Black Music: A History of Jazz. (3.0 cr.; spring, every year) The development of jazz in America and in the world, with special emphasis given to the roots or jazz in the African American experience.


AFRO 3131. Contemporary Issues in Africa. (3.0 cr.; fall, odd years) Why peace has been elusive throughout history of Africa, from period of slave raids...
through colonialism and until today. Intractable conflicts in Great Lakes Region, Horn of Africa, South Africa, Nigeria, Liberia/Sierra Leone, Mauritania, Sudan. Why no peaceful resolution despite multiple mediation efforts. Case studies.

AFRO 3141. Africa. (3.0 cr.; = [GEOS 3141]; fall, every year)
The regional differentiation of human groups and environments; cultural contact and problems of underdeveloped countries south of the Sahara.

AFRO 3204. History of South Africa to 1910. (3.0 cr.; = [HIST 3244]; fall, every year)
Introduction to the history of South Africa from early humans to the arrival of the first European settlers. The Cape of Good Hope in 1652 to the formation of the Union of South Africa in 1910.

AFRO 3205. History of South Africa from 1910. (3.0 cr.; = [HIST 3245]; fall, offered periodically)
The history of South Africa from the Union to the present. Focus on such issues as African and Africaner nationalisms, structures of apartheid, forced population removals, divestment and sanctions, and the post-apartheid era.

AFRO 3251W. Sociopolitical Perspectives on Race, Class, and Gender. (3.0 cr.; A-F or Audit; = [SOC 3251W, AAS 3251W]; fall, spring, every year)
Analytical overview of three major forms of inequalities in the United States today: race, class, and gender. Focus on these inequalities as relatively autonomous from one another and as deeply connected/intertwined with one another. Intersectionality key to critical understanding of these social forces. Social change possibilities.

AFRO 3301. The Music of Black Americans. (3.0 cr.; fall, spring, summer, every year)
Musical contributions of African American artists/innovators from 1619 to present. Artistic, blues, ragtime, gospel, art music, jazz.

AFRO 3426. African Americans, Social Policy, and the Welfare State. (3.0 cr.; spring, every year)

AFRO 3431. Early Africa and its Global Connections. (3.0-4.0 cr.; = [HIST 3431]; fall, every year)
Socioeconomic, political, and cultural development in precolonial Africa, from ancient Egypt through era of trans-Atlantic slave trade.

AFRO 3432. Modern Africa in a Changing World. (3.0-4.0 cr.; = [HIST 3432]; fall, spring, summer, every year)
Socioeconomic, political, and cultural development in Africa, from abolition of trans-Atlantic slave trade through postcolonial era.

AFRO 3433. Economic Development in Contemporary Africa. (3.0 cr.; = [APEC 3061]; prereq: APEC 1101 or ECON 1101; spring, every year)

AFRO 3436. Contemporary African Conflicts: From Somalia to South Africa. (3.0 cr.; = [HIST 3436]; fall, offered periodically)
Historical contexts in which specific contemporary political conflicts developed. Slave trade, colonial conquest, indirect rule, forced labor, discriminatory justice. Patterns of human rights violations/socio-political conflict. Cases studies might include Somalia, Democratic Republic of Congo, Rwanda.

AFRO 3543. Psychology and the Black American Experience. (3.0 cr.; fall, spring, every year)
Historical and contemporary perspectives of the relationship between the area of psychology and African Americans in research and practice.

AFRO 3592W. Introduction to Black Women Writers in the United States. (3.0 cr.; = [ENGL 3592W]; fall, spring, every year)
The literature of African American women writers explored in novels, short stories, essays, poetry, autobiographies, and drama from the 18th to the late-20th century.

AFRO 3593. The African American Novel. (3.0 cr.; = [AFRO 5593, ENGL 4593]; spring, every year)

AFRO 3597W. Introduction to African American Literature and Culture I. (4.0 cr.; = [ENGL 3597W]; fall, every year)
African American oral tradition, slave narrative, autobiography, poetry, essay, fiction, oratory, and drama from colonial era through Harlem Renaissance.

AFRO 3598W. Introduction to African American Literature and Culture II. (4.0 cr.; = [ENGL 3598W]; spring, every year)
African American oral tradition, autobiography, poetry, essay, fiction, oratory, drama. From after Harlem Renaissance to end of 20th century.

AFRO 3601W. African Literature. (3.0 cr.; fall, spring, summer, every year)
Overview: written literature of 19th/20th centuries. Emphasizes literature written in English/French. All readings in English.

AFRO 3625W. Black Women Writers in the Diaspora. (3.0 cr.; spring, odd years)
Works of black women writers from Europe, Africa, South America, and the Caribbean. Novels, drama, films, and essays.

AFRO 3626. Literature of African American Men: Sex, Family, and Relationships. (3.0 cr.; A-F or Audit)
African American male fiction writers’ approach to subject of family and relationships. Social, economic, and psychological consequences of racism/oppresion, and effect on African American men writing about themselves within context of family/relationships. Manhood/masculinity as interpreted/articulated in fiction.

AFRO 3627. Seminar: Harlem Renaissance. (3.0 cr.; = [AFRO 5627, ARTH 3627, ENGL 5597]; fall, every year)

AFRO 3654. African Cinema. (4.0 cr.; spring, summer, offered periodically)
Films by African filmmakers from West, Central, and Southern Africa. Aesthetic, theoretical, and sociocultural issues will be explored through class screenings and critical readings.

AFRO 3655. African American Cinema. (3.0 cr.; = [ARTH 3655, ARTH 5655, AFRO 4655]; spring, odd years)
African American cinematic achievements from silent films of Oscar Micheaux through contemporary Hollywood and independent films. Class screenings, critical readings.

AFRO 3864. African American History: 1619 to 1865. (3.0-4.0 cr.; = [HIST 3864]; spring, offered periodically)
Importance of dynamics of class, gender, region, and political ideology. Changing nature of race/racism.

AFRO 3865. African American History: 1865 to the Present. (3.0-4.0 cr.; = [HIST 3865]; fall, spring, summer, every year)
Internal migrations, industrialization/unionization, the Great Depression, world wars, large scale movements for social/political change.

AFRO 3866. The Civil Rights and Black Power Movement, 1954-1984. (3.0 cr.; = [AFRO 5866, HIST 3856]; fall, every year)

AFRO 3868W. Race, War, and Race Wars in American History. (3.0 cr.; A-F only; = [HIST 3868W]; fall, odd years)
Role that race has played in American war history. Impact that wars have had on race and race relations in the U.S. and the world.
AFRO 3910. Topics in African American and African Studies. (1.0-3.0 cr. [max 9.0 cr.]; fall, spring, offered periodically) Topics specified in Class Schedule.

AFRO 3920. Topics in African Studies. (3.0 cr. [max 6.0 cr.]; fall, spring, offered periodically) Topics specified in Class Schedule.

AFRO 3993. Directed Study. (1.0-3.0 cr. [max 5.0 cr.]; fall, spring, summer, every year) Guided individual research and study. Prerequisite: consent of instructor, department consent, college consent.

AFRO 4105. Ways of Knowing in Africa and the African Diaspora. (3.0 cr.; A-F only; fall, every year) Impact of European knowledge systems on African world. How peoples on African continent and across African diaspora have produced/defined knowledge. Continuity/change in the way African peoples have thought about and left their epistemological imprints on the world.


AFRO 4231. Color of Public Policy: African Americans, American Indians, Asian Americans & Chicanos in the U.S.. (3.0 cr.; = [AMIN 4231, CHIC 4231, AAS 4231]; fall, offered periodically) Examination of structural or institutional conditions through which people of color have been marginalized in public policy. Critical evaluation of social theory in addressing the problem of contemporary communities of color in the United States.

AFRO 4406. Black Feminist Thought. (3.0 cr.; = [AFRO 5406]; spring, offered periodically) Critically examine spatiality of African descendant women in Americas/larger black diaspora. Writings from black feminist/queer geographies, history, contemporary cultural criticism. Recent black feminist theorizing.


AFRO 4910. Topics in African American and African Studies. (1.0-3.0 cr. [max 9.0 cr.]; fall, spring, offered periodically) Topics specified in Class Schedule.

AFRO 4991W. Thesis Research and Writing. (3.0 cr.; A-F or Audit; prereq: %; fall, spring, summer, every year) Preparing a research paper that satisfies major project requirement. Defining a research problem. Collecting/analyzing data. Writing the research paper.


AFRO 5103. World History and Africa. (3.0 cr.; A-F or Audit; = [AFRO 3103]; prereq Grad student or #; fall, every year) Contributions of African American thinkers to making of African history/strategies to rework theoretical/analytical foundations of world history. Writings/intellectual networks of major thinkers whose historical/ethnographic works on Africa spanning nineteenth to twentieth century.


AFRO 5181W. Blacks in American Theatre. (3.0 cr.; = [TH 5181W]; spring, offered periodically) Historical survey of significant events in the development of American black theater traditions. Essays, plays, playwrights, and theaters from early colonial references to the Black Arts Movement.

AFRO 5182W. Contemporary Black Theatre: 1960-Present. (3.0 cr.; = [TH 5182, TH 5182W]; spring, odd years) Essays, plays, playwrights, theses that have contributed to contemporary Black theatre from beginning of Black Arts Movement to present.

AFRO 5191. Seminar: The African American Experience in South Africa. (3.0 cr.; = [HIST 5438]; fall, spring, offered periodically) Ideological, political, religious, and cultural ties that have informed African American and black South African relations from late 18th century to present.

AFRO 5406. Black Feminist Thought. (3.0 cr.; = [AFRO 4406]; spring, offered periodically) Critically examine spatiality of African descendant women in Americas/larger black diaspora. Writings from black feminist/queer geographies, history, contemporary cultural criticism. Recent black feminist theorizing.

AFRO 5551. Methods: Use of Oral Traditions as Resources for History. (3.0 cr.; ) Use of spoken information through time as a source for writing history. Use of canons of history to analyze and critique oral traditions and integrate them into written history.


AFRO 5627. Seminar: Harlem Renaissance. (3.0 cr.; = [AFRO 3627, ARTH 3627, ENGL 5597]; prereq Grad student or #; fall, every year) Review Harlem Renaissance from variety of perspectives. Literary, historical, cultural, political, international. Complex patterns of permeation/interdependency between worlds inside/outside of what W.E.B. Du Bois called "the Veil of Color."


AFRO 5876. Proseminar: Approaches to African Development. (3.0 cr.; fall, spring, offered periodically) Study, critical analysis, and comparison of primary documents relevant to African development.

AFRO 5910. Topics in African American and African Studies. (3.0 cr. [max 9.0 cr.]; fall, spring, summer, every year) Topics vary by instructor.

AFRO 5932. The Production of Knowledge, Negotiating the Past, and the Writing of African Histories. (3.0 cr.; A-F or Audit; = [HIST 5932]; prereq Grad student or #; fall, spring, offered periodically) Recent scholarship on social history of Africa. Focuses on new literature on daily lives of ordinary people in their workplaces, communities, households.

AFRO 5993. Directed Study. (1.0-3.0 cr. ; prereq #; fall, spring, summer, every year) Guided individual reading/study for qualified seniors and graduate students.

Agricultural Industries and Marketing (AIM)

College of Food, Agricultural and Natural Resource Sciences

AIM 4011. Student Project/Field Investigation. (3.0 cr.; fall, spring, every year) Application of marketing knowledge that involves building a complete marketing plan for an agricultural product or device. Team projects are used.
AFEE 1001. Introduction to Agricultural Education and Extension. (1.0 cr.; fall, spring, every year) Historical development of the discipline of agricultural education; orientation to career opportunities; areas and expectations of specialization; issues in the field.

AFEE 1002. Principles of Career Planning for Agricultural Professionals. (1.0 cr.; =[AGUM 1111]; fall, spring, every year) Self assessment and analysis of interests, skills, and abilities. Analyses of occupations, employment potential, employee expectations for work. Use informational interviews to examine career options and employment portfolio for career planning.

AFEE 2051. Current Technical Competencies. (3.0 cr.; fall, every year) Prepares agricultural education teachers and other agricultural professionals to use technology. Develop basic skills and knowledge to plan, implement, operate, and maintain agricultural structural and mechanical systems. Experiential learning principles and applied problem solving.

AFEE 2096. Professional Practicum in Agricultural Education: Early Experience. (1.0-3.0 cr.; A-F or Audit; spring, every year) Observes schools, extension offices, and agricultural oriented businesses to learn about the work and workplaces in agricultural education.

AFEE 2221. People Skills for Leadership. (3.0 cr.; A-F or Audit; ) How to be an effective leader in profit/non-profit agricultural settings. Roles, responsibilities, knowledge, attitudes, and skills to hire staff, set goals, coach, mentor/manage teams, and improve communication.


AFEE 3096. Experiential Learning: Production and Business. (1.0-8.0 cr. [max 12.0 cr.]; prereq AgEd major, #; fall, spring, summer, every year) Experiential learning in agricultural production and business. Planned, organized, monitored, and evaluated based on a per-experience diagnosis of learning prerequisite to higher level courses in technical agriculture and agricultural business.

AFEE 3112. Building Construction Technology. (3.0 cr.; A-F or Audit; =[OLPD 3412]; fall, every year) Instructional/lab exercises in light frame building construction. Site layout, foundations, framing, plumbing, insulating, sheathing, roofing. Emphasizes safety and use of modern tools, materials, and prefabricated components.


AFEE 3430. Communicating Food, Agriculture & Environmental Science to the Public. (3.0 cr.; A-F or Audit; prereq Sophomore standing or 30 cr; fall, spring, every year) Planning/strategy for communication campaigns related to food/agriculture. Student-centered, relies on interaction/participation.

AFEE 3480. Special Topics in Agricultural Education. (1.0-4.0 cr.; = [max 16.0 cr.]; fall, spring, summer, every year) Lectures by visiting scholar or regular faculty member. Topics specified in Class Schedule.

AFEE 4221. Rural Leadership Development. (3.0 cr.; spring, every year) Understanding the role, function, and features of leadership in rural communities; importance of personal involvement, personal leadership qualities, and vision for individuals and rural community organizations.

AFEE 5111W. Agricultural Education: Methods of Teaching. (4.0 cr.; fall, every year) Use of teaching resources; principles of teaching and learning; problem-solving techniques, lesson plan construction for large group, small group and individual investigations; student management; and assessment.

AFEE 5112. Agricultural Education Program Organization and Curriculum for Youth. (3.0 cr.; spring, every year) Development of community school program in agriculture, agribusiness, and environmental science. Program to meet graduation outcomes and determine student needs.

AFEE 5114. Special Topics in Agriculture and Extension. (2.0 cr.; = [AFEE 3361]; prereq Grad students only; fall, spring, every year) New developments in methodology; assessment of innovations and procedures; consideration of various levels of instruction.

AFEE 5212. Agricultural Education Program Organization and Curriculum for Youth. (3.0 cr.; spring, every year) Development of community school program in agriculture, agribusiness, and environmental science. Program to meet graduation outcomes and determine student needs.

AFEE 5220. Special Topics in Agriculture Education and Extension. (1.0-3.0 cr.; = [max 12.0 cr.]; fall, spring, summer, every year) Content varies by offering.

AFEE 5231. Agricultural Education Curriculum K-12. (2.0 cr.; A-F or Audit; ) Philosophy, organization, and administration of instruction in agricultural education programs at the elementary, middle, and high school levels.

AFEE 5233. Advanced Procedures in Teaching Agricultural Education. (2.0 cr.; A-F or Audit; ) New developments in methodology; assessment of innovations and procedures; consideration of various levels of instruction.

AFEE 5235. Advanced Supervised Agricultural Experience Programs. (2.0 cr.; ) The organization and administration of agricultural experience programs for middle and secondary level students: career exploration, improvement projects, experiments, placement in production/business/community settings, entrepreneurship. Current state and national programs and resource material.

AFEE 5280. Current Issues for the Beginning Agricultural Education Teacher. (1.0-3.0 cr.; spring, every year) Reflection, analysis on current problems and issues confronting beginning teachers of agricultural education. Issues in teaching methods, classroom and program management, discipline, curriculum, FFA and SAE development, school-to-work relationships.

AFEE 5290. Seminar: Current Issues in Agricultural Education and Extension. (1.0-3.0 cr.; = [max 6.0 cr.]; fall, spring, offered periodically) Exploration of current issues in agricultural education and extension, strategies of response, implications of response actions, and related leadership roles.


AFEE 5697. Teaching Internship: School and Classroom Setting. (2.0 cr.; prereq WHRE 5696 for initial licensure program; fall, every year) Part-time supervised teaching experience in a school. Seminars on managing student’s learning in context of work and human resource education programs in contemporary schools and on becoming a reflective educator.

AFEE 5698. Teaching Internship. (3.0-8.0 cr. ; prereq Admission to initial licensure program; spring, every year)
Teaching experience in a school system that provides programs to grades 5-12.

AFEE 5993. Directed Study in Agricultural Education and Extension. (1.0-9.0 cr.; fall, spring, summer, every year) Topics may be chosen to permit study of areas within education or to supplement areas of inquiry not provided in the regular course structure.

AFEE 5995. Integrating Paper—Master of Education: Agricultural and Extension Education. (1.0-4.0 cr.; A-F or Audit; fall, spring, summer, every year) Students prepare paper dealing with issues in agricultural education applied to professional responsibilities.

Agronomy and Plant Genetics (AGRO)

College of Food, Agricultural and Natural Resource Sciences

AGRO 1007. Horse in Your Backyard. (2.0 cr.; A-F or Audit; =[ANSC 1007]; fall, offered periodically) Role of horses in society. How to keep a horse well fed and healthy. Fundamentals of horse nutrition, feedstuffs, pasture, and horse health. How to seek/interpret information to make decisions on vaccination, worming, nutrition, grazing management, hay selection, manure handling, and use of dietary feed additives/enhancers.

AGRO 1093. Directed Studies. (1.0-4.0 cr.; [max 12.0 or cr.]; prereq 4 cr in agronomy; #; fall, spring, summer, every year) Allows study of agronomy in greater depth or in areas not currently offered in formal courses. Tutorial instruction under staff guidance.

AGRO 1101. Biology of Plant Food Systems. (4.0 cr.; fall, spring, every year) Fundamental concepts of biology at the molecular, cellular, organismal, and ecosystem levels. Plants and plant use by humans. Lab, greenhouse, field, and classroom discussions.

AGRO 1103. Crops, Environment, and Society. (4.0 cr.; =AGRO 2222; fall, every year) Plants that supply food, fiber, beverages, and medicine to humans. Plant identification, plant physiology, plant breeding/biotechnology, plant ecology, crop culture/management.

AGRO 1660W. First-Year Colloquium/Experience in Agroecosystems Analysis. (2.0 cr.; A-F or Audit; prereq 1st yr in major hosted by Department of Agronomy and Plant Genetics; fall, every year) Agroecosystems and their impacts on the environment, landscapes, and rural communities. Students develop a course plan within their major, explore career options, and increase their familiarity with the department, its history, and its faculty/staff. Field trips, discussions, readings, reflective writings.

AGRO 1901. Topics: Freshman Seminar. (1.0-3.0 cr.; A-F or Audit; prereq Fr; fall, spring, every year) Interdisciplinary seminar. Topics specified in Class Schedule.

AGRO 1942. Topics: Freshman Seminar. (3.0 cr.; A-F or Audit; prereq Fr; fall, spring, every year) Interdisciplinary seminar. Topics specified in Class Schedule.

AGRO 2501. Plant Identification for Urban and Rural Landscapes. (2.0 cr.; =AGUM 2240; prereq Biol 1009 or equiv; fall, offered periodically) Plant/weed species important in turf, horticulture, forestry, and crop production systems. Emphasizes identification of native grasses/forbs, field crops, and weed species in Minnesota and Upper Midwest. Plant life cycles, habitats, and relationships to humans.

AGRO 3203W. Environment, Global Food Production, and the Citizen. (3.0 cr.; =[AGUM 3203W, AGUM 2224]; spring, every year) Ecological/ethical concerns of food production systems in global agriculture: past, present, and future. Underlying ethical positions about how agroecosystems should be configured. Decision cases, discussions, videos, other media.

AGRO 3305. Agroecosystems of the World. (3.0 cr.; fall, every year) Explore four different areas of world (Minnesota, Morocco, Nepal, Costa Rica) by networking with locals on ground in each region through online interactions. Food, agriculture, environment. Biophysical/socio-cultural aspects of agroecosystems through unique multi-disciplinary lens.


AGRO 4005. Applied Crop Physiology and Development. (4.0 cr.; [max 8.0 or cr.]; prereq [Chem 1011 or Chem 1021 or equiv], 8 cr in [biol or plant science]; fall, spring, every year) Applications of plant physiology processes of water relations, photosynthesis, mineral uptake/function, transpiration, translocation, and their relationships to plant growth/development from seed germination to maturation and dry down for harvest. Emphasizes inquiry, field problems, and group activity. Lecture, laboratory.

AGRO 4093. Directed Studies for Advanced Students. (1.0-4.0 cr.; [max 12.0 or cr.]; prereq 15 cr in agronomy; #; fall, spring, summer, every year) Allows study of agronomy in greater depth or in areas not currently offered in formal courses. Tutorial instruction under staff guidance.

AGRO 4096. Professional Experience Program: Internship. (1.0-3.0 cr.; [max 6.0 cr.]; prereq CFANS undergrad, #, completed internship contract from CFANS; fall, spring, summer, every year) Supervised professional experience in agribusiness firms or government agencies. Evaluative reports/consultations with faculty advisers and employers.

AGRO 4097. Undergraduate Research Thesis. (1.0-6.0 cr.; [max 12.0 or cr.]; A-F only; prereq Jr or Sr; fall, spring, summer, every year) Research/thesis conducted under supervision of CFANS faculty member. Written thesis describing research results.

AGRO 4103. World Food Problems. (3.0 cr.; =[APEC 4103, CV 6060, FSCN 4103]; prereq Jr or Sr or grad; fall, every year) Multidisciplinary look at problems and possible solutions affecting food production, storage, and utilization in developing countries. Presentations/discussions introduce conflicting views on population, technology, and ethical and cultural values of people in various parts of the world.

AGRO 4401. Plant Genetics and Breeding. (4.0 cr.; =[HORT 4401]; prereq [Biol 1009 or equiv or grad]; #, spring, every year) Principles of plant genetics and environmental variation. Applications of genetics to crop evolution and breeding of self-pollinated, cross-pollinated, and asexually propagated crops. Lab experiments in hybridization, variation, and selection.

AGRO 4505. Biology, Ecology, and Management of Invasive Plants. (3.0 cr.; prereq 4005, [Bio 3002 or equiv], Soil 2125, [Agro 2501 or Hort 1011]; fall, spring, offered periodically) Ecology/biology of invasive plant species (weeds). Principles of invasive plant management in agricultural/horticultural, urban, wetland, aquatic, and other non-cropland landscape systems, utilizing biological, cultural, and chemical means. Management strategies to design systems that optimize invasive plant management in terms of economic, environmental, and social impacts.

AGRO 4605. Strategies for Agricultural Production and Management. (3.0 cr.; prereq 1101 or equivalent, [CHEM1015/17 or equivalent], SOIL1125 or equivalent, [jr or sr or grad student or #]; fall, every year) Information/tools necessary to make informed land management decisions in ever-evolving economic, policy, climate environments. Evaluate hows, whats, whys of crop management by solving real-world problems that agricultural professionals face. State-of-the-art production/management practices for major agricultural crops in Minnesota. Lectures feature agricultural professionals/experts. Lab component provides hands-on experience with modern equipment/data interpretation.

AGRO 4660. Senior Capstone. (2.0 cr.; A-F or Audit; fall, every year) Complexities of agricultural issues. Exercises/discussions integrating previous educational situations. Linked to undergrad internships/experiential learning opportunities such as thesis or directed studies or service learning. Written/oral assignments.
AGRO 4888. Issues in Sustainable Agriculture. (2.0 cr.; prereq 1103, Soil 1125 or 2125 or equiv; fall, spring, summer, every year) Agroecology, sustainable practices, production economics, environmental quality, holistic resource management, healthy food/water, rural communities. Meet sustainable-agriculture advocates, including farmers, faculty, and representatives of non-profit sustainable-agriculture organizations.

AGRO 5121. Applied Experimental Design. (4.0 cr.; =ENT 5121; prereq Stat 5021 or equiv or #; spring, every year) Principles of sampling methodologies, experimental design, and statistical analyses. Methods/procedures in generating scientific hypotheses. Organizing, initiating, conducting, and analyzing scientific experiments using experimental designs and statistical procedures.

AGRO 5311. Research Methods in Crop Improvement and Production. (1.0 cr.; S-N or Audit; prereq applied plant sciences grad; fall, summer, every year) Demonstrations and discussions of techniques in crop improvement and/or production research. Presentations integrate biotechnology with traditional breeding methods; production sessions emphasize ecologically sound cropping systems.

AGRO 5321. Ecology of Agricultural Systems. (3.0 cr.; A-F or Audit; =ENT 5321; prereq [3xxx or above] course in [Agro or AnSc or Ent or Hort or PiPa or Soil] or #; fall, every year) Ecological approach to problems in agricultural systems. Formal methodologies of systems inquiry are developed/applied.

AGRO 5431. Applied Plant Genomics and Bioinformatics. (3.0 cr.; prereq Grad student or [genetics course, #]; fall, every year) Analysis, interpretation, visualization of large plant genomic datasets. Basic computer programming, applying large-scale genomics to answer basic/applied biological questions, understanding limitations of each application, presenting concise visual findings from large-scale datasets.

AGRO 5980. Publishing in Plant Science Journals. (2.0 cr.; S-N only; prereq #; fall, every year) Organizational/writing skills for reporting research results in a peer-reviewed journal manuscript. Publication process; choosing your journal; characteristics of good scientific writing; ethics, plagiarism, and authorship; stating your objectives; writing the different components of a manuscript; citing literature; use of tables and figures; proofreading. Written manuscript ready for submission to a plant science journal.

AGRO 5999. Special Topics: Workshop in Agronomy. (1.0-6.0 cr.; prereq Jr or sr or grad student; fall, spring, summer, every year) Workshops on various topics in agronomy and plant genetics. Presenters/faculty may include guest lecturers/experts. Topics specified in Class Schedule.

AKKA 5011. Elementary Akkadian I. (3.0 cr.; prereq Adv undergrads with # or grad; ) Introduction to cuneiform script. Basics of Old Babylonian morphology and syntax. Written drills, readings from Hammurabi laws, foundation inscriptions, annals, religious and epic literature.

AKKA 5012. Elementary Akkadian II. (3.0 cr.; prereq 5011; ) Continuation of 5011. Readings include The Gilgamesh Epic, The Descent of Ishtar, Mari Letters, Annals of Sennacherib and Essarhaddon, Sargon II.

AKKA 5300. Readings in Akkadian. (3.0 cr. [max 18.0 cr.; prereq 5011, 5022; ] Survey of Akkadian literature, including literary, legal, historiographical, and sacred texts. Topics specified in Class Schedule.

American Indian Studies (AMIN) College of Liberal Arts

AMIN 1001. American Indian Peoples in the United States. (3.0 cr.; fall, spring, every year) Introduction to how voices/visions of indigenous peoples have contributed to history of cultural expression in North America. Historic contexts/varieties of this expression by region, tribal cultures. Emphasizes contributions in literature, philosophy, politics, fine arts.

AMIN 1002. Indigenous Peoples in Global Perspective. (3.0 cr.; A-F or Audit; =POL 1019; fall, spring, every year) Colonial experiences of selected indigenous peoples in Americas, Eurasia, Pacific Rim.

AMIN 1003. American Indians in Minnesota. (3.0 cr.; A-F or Audit; fall, spring, every year) History, culture, and lived experience of American Indian people in Minnesota. Self-representation and histories of Anishinaabe (Ojibwe) and Dakota peoples through film, music, oral traditions, and written texts. Work by non-Indian scholars focuses on cultural, philosophical, and linguistic perspectives of Anishinaabe and Dakota peoples.


AMIN 1902. Freshman Seminar. (3.0 cr.; A-F or Audit; prereq Fr; fall, spring, offered periodically) Topic specified in Class Schedule.

AMIN 1905. Freshman Seminar. (3.0 cr.; A-F only; prereq Fr; fall, spring, offered periodically) Topics specified in Course Guide.

AMIN 1908W. Freshman Seminar. (3.0 cr. [max 6.0 cr.; A-F or Audit; prereq freshman; fall, every year] Topics specified in Class Schedule.

Topics specified in Class Schedule.

AMIN 3107. Structure of Anishinaabemowin, the Ojibwe Language. (3.0 cr.; A-F or Audit; =AMIN 5107; prereq 3103;) Analysis of grammatical structures of Anishinaabemowin.

AMIN 3108. History of Anishinaabemowin, the Ojibwe Language. (3.0 cr.; A-F or Audit; =AMIN 5108; prereq 3107;) Historical development of Anishinaabemowin.

AMIN 3109. Anishinaabe Literature. (3.0 cr.; A-F or Audit; =AMIN 5109; prereq 3103;) Readings in Anishinaabe oral literature.


AMIN 3143. Language in American Indian Culture and Society. (3.0 cr.; A-F or Audit; =ANTH 3143;) Survey of North American indigenous languages in social/cultural contexts, from before European contact to present.

AMIN 3201W. American Indian Literature. (3.0 cr.; fall, spring, every year) Comparative studies of oral traditions, modern literature from various tribal cultures.

AMIN 3205. Introduction to Aztec, Maya, and Inka Art, from Ancient Times to the Colonial Period. (3.0 cr.; =ARTH 3205, RELS 3322, ANTH 3205) fall, even years) Art/architecture of native peoples of Americas from twelfth century B.C. until arrival of Europeans in sixteenth century. Ways that people living in diverse areas of South America/Mesoamerica used art/architecture. Tools to investigate Pre-Columbian art at more advanced levels.

AMIN 3301. American Indian Philosophies. (4.0 cr.; fall, spring, summer, every year) World views of indigenous people of Americas. Topics include native medicines/healing practices, ceremonies/ritual, governance, ecology, humor, tribal histories, status of contemporary native people.

AMIN 3303. American Indians and Photography. (3.0 cr.; =AMIN 5303; fall, odd years) Historical/comparative overview of photos in which American Indian people are central subjects. Primary features of images in American Indian photos. Relationships among those involved in making/viewing photos. Ways in which photos are interpreted. Relation of photos to social contexts in which they are produced and to agencies of those who stand behind their making.

AMIN 3304. Indigenous Filmmakers. (3.0 cr.; spring, every year) Analysis of film/video made by American Indian writers, directors, producers within contexts of tribally specific cultures/histories, as well as within context of US culture/film history.


AMIN 3402. American Indians and the Cinema. (3.0 cr.; A-F or Audit; spring, summer, every year) Representations of American Indians in film, historically/contemporarily. What such representations assert about Native experience and cultural viability. What they reflect about particular relationships of power.

AMIN 3409. American Indian Women: Ethnographic and Ethnohistorical Perspectives. (3.0 cr.; =AMIN 5409; fall, even years) Comparative survey of ethnographic/ethnohistorical writings by/about American Indian women.


AMIN 3602. Archaeology and Native Americans. (3.0 cr.; =ANTH 3601, ANTH 5601; fall, even years) Pre-European contact/contact period archaeology of American Indians north of Mexico.

AMIN 3701. Ojibwe Culture and History. (3.0 cr.; fall, spring, every year) Ojibwe culture, history, and traditions, including philosophy, religion, and lifestyle. Students develop an appreciation for the values and belief systems of traditional Indian people.

AMIN 3711. Dakota Culture and History. (3.0 cr.; fall, spring, every year) Dakota culture, language, history, literature. Contemporary issues, the arts.

AMIN 3713. Lands and Homelands in the American Indian Great Lakes. (3.0 cr.; =AMST 3713; fall, every year) Tribes that have strong historic ties to Minnesota region, such as the Ojibwe, Dakota, and Ho-Chunk Nations. Integrity/viability of American Indian societies. Conflict of cultures that occurred with Native American and Euroamerican contact in Minnesota and the Great Lakes.

AMIN 3870. Topics in American Indian History. (3.0 cr.; =HIST 3870; fall, offered periodically) Topics may include social history, oral history, history of particular regions, political systems, education, and policy. Designed for undergraduates.

AMIN 3871. American Indian History: Pre-Contact to 1830. (3.0 cr.; =HIST 3871; fall, spring, every year) American Indian history from the era of ancient Native America to the removal era. Social, cultural, political, and economic diversity of Native American peoples and Native American experiences with European colonialism.

AMIN 3872. American Indian History: 1830 to the Present. (3.0 cr.; =HIST 3872; fall, spring, summer, every year) American Indian history from 1830 to the present. Impact of federal Indian policy on American Indian cultures and societies.

AMIN 3876. American Indian Education. (3.0 cr.; spring, offered periodically) Educational processes in American Indian cultures. History of school programs established for tribes by missionaries/U.S./Canadian governments. Importance of boarding schools in shaping the lives, families, communities, educational expectations of Indian people in late-19th/early-20th centuries.

AMIN 4231. Color of Public Policy: African Americans, American Indians, Asian Americans, & Chicanos in the U.S. (3.0 cr.; =AFRO 4231, CHIC 4231, AAS 4231; fall, offered periodically) Structural or institutional conditions through which people of color have been marginalized in public policy. Critical evaluation of social theory in addressing the problem of contemporary communities of color in the United States.

AMIN 4501. Law, Sovereignty, and Treaty Rights. (3.0 cr.; prereq 1001; fall, spring, summer, offered periodically) History of American Indian law and the post-contact effects of colonial and U.S. law on American Indians through the 20th century.

AMIN 4511. American Indian Political Economy. (3.0 cr.; prereq 1001; fall, spring, summer, offered periodically) Sources, nature, consequences of social/economic development/change in Indian communities. Precontact Indian communities. Effect of European contact. Social movements into 20th century, including phenomenon of urban Indian communities.

AMIN 4525W. Federal Indian Policy. (3.0 cr.; =POL 4525W, POL 4473W; fall, spring, summer, offered periodically) Formulation, implementation, evolution, comparison of Indian policy from pre-colonial times to self-governance new millennium. Theoretical approaches to federal Indian policy. Major federal Indian policies. Views/attitudes of policy-makers, reactions of indigenous nations to policies. Effect of bodies of literature related to policies.

AMIN 4820W. Senior Seminar. (3.0 cr.; A-F only; fall, every year) Seminar for preparation/completion of American Indian Studies Senior Project requirement.

AMIN 4990. Topics in American Indian Studies. (1.0-4.0 cr. [max 8.0 cr.]; fall, spring, summer, every year) Topics specified in Class Schedule.

AMIN 4991. Independent Study. (1.0-12.0 cr.; prereq Prereq-instr consent, dept consent; college consent.; fall, spring, summer, every year) tbd

AMIN 4994. Directed Research. (1.0-12.0 cr. [max 18.0 cr.; prereq Prereq-instr consent, dept consent, college consent.; fall, spring, summer, every year) Individually arranged research with faculty to meet student needs and interests.

AMIN 4996. Field Study. (1.0-12.0 cr. [max 18.0 cr.; fall, spring, every year) Opportunities for experiential learning in a variety of American Indian community settings. Consult department faculty at least one term before enrolling. Prereq-instr consent, dept consent, college consent.

AMIN 5107. The Structure of Anishinaabemowin, the Ojibwe Language. (3.0 cr.; A-F or Audit; =AMIN 3107; prereq 3104; ) Analysis of grammatical structures of Anishinaabemowin.

AMIN 5108. History of Anishinaabemowin, the Ojibwe Language. (3.0 cr.; A-F or Audit; =AMIN 3108; prereq 3107 or #; ) Historical development of Anishinaabemowin.

AMIN 5109. Anishinaabe Literature. (3.0 cr.; A-F or Audit; =AMIN 3109; prereq 3107 or 5107 or #; ) Readings in Anishinaabe oral literature.

AMIN 5141. American Indian Language Planning. (3.0 cr.; A-F or Audit; =AMIN 3141; prereq 3103 or 3123 or #; ) Planning for maintenance/revitalization of North American indigenous languages. Condition/status of languages. Documentation, cultivation, literacy, education.

AMIN 5303. American Indians and Photography. (3.0 cr.; =AMIN 3303; fall, odd years) Historical/comparative overview of photos in which American Indian people are central subjects. Primary features of images in American Indian photos. Relationships among those involved in making/viewing photos. Ways in which photos are interpreted. Relation of photos to social contexts in which they are produced and to agencies of those who stand behind their making.

AMIN 5402. American Indians and the Cinema. (3.0 cr.; A-F or Audit; spring, summer, every year)
Representations of American Indians in film, historically/contemporarily. What such representations assert about Native experience and cultural viability. What they reflect about particular relationships of power.

AMIN 5409. American Indian Women: Ethnographic and Ethnohistorical Perspectives. (3.0 cr.; [AMIN 3409]; fall, even years) Comparative survey of ethnographic/ethnohistorical writings by/about American Indian women.


AMIN 5890. Problems in American Indian History. (3.0 cr.; [HIST 5890]; prereq #; fall, spring, offered periodically) Intensive consideration of topics in American Indian history. Possible topics include social history, Indian history of particular regions, political systems, education, and American Indian policy.

AMIN 5920. Topics in American Indian Studies. (3.0 cr. [max 12.0 cr.]; A-F or Audit; fall, spring, every year) Various topics in American Indian studies, depending upon instructor/semester.

AMIN 5991. Graduate Level Directed Studies. (1.0-6.0 cr. [max 9.0 cr.; A-F or Audit; prereq %; spring, every year] Contact department for further information.

American Sign Language (ASL)

College of Education and Human Development

ASL 1701. American Sign Language I. (5.0 cr.; fall, spring, summer, every year) First of a 4-course sequence. American Sign Language (ASL), cultural values/rules of behavior of Deaf community in the United States. Receptive/expressive readiness activities, sign vocabulary, grammatical structure, receptive/expressive fingerspelling, aspects of Deaf culture. Lab sessions.

ASL 1702. American Sign Language II. (5.0 cr.; prereq 1701 with grade of at least [S or C-] or %; fall, spring, summer, every year) Second of four-course sequence. American Sign Language (ASL), cultural values/rules of behavior of U.S. deaf community. Receptive/expressive readiness activities, sign vocabulary, grammatical structure, receptive/expressive fingerspelling, aspects of Deaf culture. Lab.

ASL 3703. American Sign Language III. (5.0 cr.; prereq 1702 with grade of at least [S or C-] or %; fall, spring, summer, every year) Third of a four-course sequence. American Sign Language (ASL), cultural values/rules of behavior of U.S. deaf community. Receptive/expressive readiness activities, sign vocabulary, grammatical structure, receptive/expressive fingerspelling, aspects of Deaf culture. Lab.

ASL 3704. American Sign Language IV. (5.0 cr.; prereq 3703 with grade of at least [S or C-] or %; fall, spring, summer, every year) Fourth of a four-course sequence. American Sign Language (ASL), cultural values/rules of behavior of U.S. deaf community. Receptive/expressive readiness activities, sign vocabulary, grammatical structure, receptive/expressive fingerspelling, aspects of deaf culture. Lab.

ASL 3705. Cultural Perspectives of Deafness. (3.0 cr.; fall, spring, every year) Introduction to the deaf community as a linguistic and cultural minority group. Role of deaf people in the larger society; political activism; laws; access to information; educational philosophies and methods; and communication systems.

ASL 3800. ASL Independent Study: Extended Study. (1.0-3.0 cr. [max 6.0 cr.]; S-N only; prereq Completion of or &3704; fall, spring, every year) Tutoring/supporting ASL instruction. Social/academic situations. Trained in tutoring by SMART Learning Commons.

American Studies (AMST)

College of Liberal Arts

AMST 1011. Religions and American Identity in the United States from World War II to the Present. (3.0 cr.; [RELICS 1011]; fall, every year) Immigration to the United States at various historical periods and across geographical/political terrains. How immigration, as a historical and national/racial project, is shaped by legal norms have been institutionalized in media, aesthetics, politics, and commerce.

AMST 1907W. Freshman Seminar. (3.0 cr. [max 6.0 cr.]; prereq freshman; fall, every year) Topics specified in Class Schedule.

AMST 1908W. Freshman Seminar. (3.0 cr.; prereq freshman; fall, spring, every year) Topics specified in Class Schedule.

AMST 1909W. Topics: Freshman Seminar. (3.0 cr.; prereq freshman; fall, every year) Topics specified in Class Schedule.

AMST 2021. Bodies and Their Discontents. (3.0 cr.; fall, every year) Aesthetic/cultural ideal of the beautiful/normal body as it has developed as a marker of citizenship in the U.S. and been shaped by ideas of race, gender, sexuality and class. Ways that institutions, governments, social groups, and individuals have produced norms and assumptions about "the good," "the beautiful," and "the healthy." How these norms have been institutionalized in media, aesthetics, politics, and commerce.


AMST 3003. Public History. (4.0 cr.; A-F or Audit; [CLA 3003, HIST 3001]; prereq Soph or jr or sr or #; fall, spring, offered periodically) Interpretations of collective past as produced in public venues, including museum exhibitions, films, theme parks, websites. Intellectual/political issues in history produced for public audiences. Career opportunities.

AMST 3113W. America’s Diverse Cultures. (3.0 cr.; fall, spring, summer, every year) Diverse cultural (racial, ethnic, class) groups in America. Institutions/processes that shape their relations and create domination, resistance, hybridity, nationalism, racism, alliance. Specific content may vary.

AMST 3114. America in International Perspective. (3.0 cr.; fall, spring, every year) The nature of international cultural exchange. The impact of U.S. cultures and society on other countries of the world as well as the impact of other cultures and societies on the United States.

AMST 3117. Latinos in America’s Global Cities. (3.0 cr.; spring, odd years) Relationship between Latina/o immigration and development of America’s global cities. Theoretical foundation for understanding global cities. Similarities/differences among socio-
political trajectories and cultural practices of Latina/o communities.

AMST 3212. Dissident Sexualities in U.S. History. (3.0 cr.; A-F or Aud; =HIST 3212, GLBT 3212; fall, every year) History of sexuality in United States. Emphasizes sexualities that have challenged dominant social/cultural norms. Development of transgender, bisexual, lesbian, gay identities/communities. Politics of sex across lines of race/ethnicity. Historical debates over controversial practices, including sex work.

AMST 3252W. American Popular Culture and Politics: 1900 to 1940. (4.0 cr.; fall, summer, every year) Historical analysis of how popular arts represent issues of gender, race, consumerism, and citizenship. How popular artists define boundaries of citizenship and public life: inclusions/exclusions in polity and national identity. How popular arts reinforce/alter political ideologies.


AMST 3632W. Jewish Women in the United States. (3.0 cr.; =JWST 3632W; fall, spring, every year) History of American Jewish women. Uses religious texts, primary documents, films, and histories to analyze Jewish women's experiences in the United States and their transformation of Judaism, political activism, and their role in the bourgeois family. How they are represented, how they represent themselves. Interdisciplinary approach.

AMST 3713. Lands and Homelands in the American Indian Great Lakes. (3.0 cr.; =AMIN 3713; fall, every year) Tribes that have strong historic ties to Minnesota region, such as the Ojibwe, Dakota, and Ho-Chunk Nations. Integrity/viability of American Indian societies. Conflict of cultures that occurred with Native American and Euroamerican contact in Minnesota and the Great Lakes.

AMST 3920. Topics in American Studies. (1.0-5.0 cr. [max 6.0 cr.]; fall, spring, every year) Topics specified in Class Schedule.

AMST 3993. Directed Studies. (1.0-9.0 cr.; prereq #; fall, spring, summer, every year) Guided individual reading or study.

AMST 4101. Gender, Sexuality, and Politics in America. (3.0 cr.; fall, every year) Ways public and private life intersect through the issues of gender, sexuality, family, politics, and public life; ways in which racial, ethnic, and class divisions have been manifest in the political ideologies affecting private life.


AMST 4962W. Second Proseminar in American Studies. (3.0 cr.; prereq AmSt sr or #) Problem related to representative theme, figure, or period. Students research/write senior theses.

Anatomy (ANAT) Medical School

ANAT 3001. Human Anatomy. (3.0 cr.; =ANAT 3601, ANAT 3611; prereq [BIOL 1002W or BIOL 1009 or BIOL 2002 or equiv], at least soph; fall, every year) Anatomical relationships. Function based upon form. Clinical applications. Gross (macroscopic) anatomy, histology (microscopic anatomy). Neuroanatomy (nervous system), embryology (developmental anatomy).

ANAT 3011. Principles of Human Anatomy Laboratory. (2.0 cr.; =ANAT 3602; prereq 3001 or 3301 or INMD 3001 or 3301 or &3601 or &3611; spring, every year) Complements 3001 or 3611.

ANAT 3611. Principles of Human Anatomy. (3.0 cr.; =ANAT 3601, ANAT 3601; prereq [BIOL 1002 or BIOL 1009 or BIOL 2002 or equiv], at least soph; [&3602 or &3612] recommended; spring, every year) Anatomical relationships. Function based upon form. Clinical applications. Gross (macroscopic) anatomy, histology (microscopic anatomy). Neuroanatomy (nervous system), embryology (developmental anatomy).

ANAT 3612. Principles of Human Anatomy Laboratory. (2.0 cr.; =ANAT 3602; prereq 3001 or 3301 or INMD 3001 or 3301 or &3601 or &3611; spring, every year) Complements 3001 or 3611.

ANAT 4900. Directed Studies in Anatomy. (1.0-6.0 cr.; max 18.0 cr.; S-N only; prereq #: spring, every year) x

ANAT 5095. Advanced Problems in Anatomy. (1.0-6.0 cr.; max 12.0 cr.; A-F only; prereq one or more ANAT classes; fall, spring, summer, every year) Exceptional projects that do not easily fit within confines of other ANAT offerings. Examples include but not limited to individual teaching or research projects.

ANAT 5150. Human Gross Anatomy. (5.0 cr.; A-F only; prereq #: For Medical Students, or Graduate students enrolled in an appropriate graduate program as determined by instructor; fall, every year) Human cadaveric dissection based on traditional preparation, lab dissection, review sections, radiographic analysis, clinical correlations. Taught by regions. Extremities, torso, head/neck. Assessment by midterm/final written/practical examinations.

ANAT 5525. Anatomy and Physiology of the Pelvis and Urinary System. (1.0-2.0 cr.; A-F only; =PHLS 5525; prereq One undergrad anatomy course, one undergrad physiology course; spring, every year) Two-day intensive course. Pelvis, perineum, and urinary system with cadaveric dissection. Structure/function of pelvic and urinary organs, including common dysfunction and pathophysiology. Laboratory dissections, including kidneys, ureters, urinary bladder, pelvic viscera and perineum (male or female), pelvic floor, vascular and nervous structures. Grand rounds section.

ANAT 5999. Head and Neck Anatomy. (3.0 cr.; A-F or Audit; prereq #: summer, every year) Cellular mechanisms underlying systems physiology. Cellular physiology, physiology.
of excitatory tissues, renal physiology, cardiovascular physiology, hemostasis.

ANES 5588. Advanced Clinical Physiology for Nurse Anesthetists. (3.0 cr.; A-F or Audit; prereq Advanced Clinical Physiology I for Nurse Anesthetists; spring, every year) Respiratory physiology, acid-base physiology, gastrointestinal physiology, metabolism, endocrinology, reproductive physiology, physiology of pregnancy/labor.

ANES 5686. Chemistry and Physics for Nurse Anesthetists. (3.0 cr.; A-F or Audit; prereq General chemistry or #; summer, every year) Chemical equilibrium, organic chemistry, physics of fluids/gases, anesthetic applications.

Animal Science (ANSC)
College of Food, Agricultural and Natural Resource Sciences

ANSC 1001. Orientation to Animal Science. (1.0 cr.; A-F or Audit; fall, every year) Current issues, career planning, professional development. Interviews with faculty and other resource persons.


ANSC 1101. Introductory Animal Science. (4.0 cr.; spring, every year) Fundamental concepts of animal breeding, physiology, nutrition, and management as they apply to the production of beef, dairy, horses, poultry, sheep, swine, and other livestock.

ANSC 1403. Companion Animal Nutrition and Care. (3.0 cr.; spring, every year) For those without animal or nutrition training who have an interest in animal care. Nutrition of healthy animals and factors including behavior, environmental conditions, food type and availability. Focus on companion animals.

ANSC 1511. Food Animal Products for Consumers. (3.0 cr.; 111: fall, every year) Introduction to the compositional variation, processing, selection, storage, cookery, palatability, nutritional value, and safety of red meat, poultry, fish, and dairy products.

ANSC 1701. Historical Influence of the Horse on Society. (3.0 cr.; fall, every year) Concepts of historical inquiry using the powerful/changing relationship between Man and horse. Students function as historians: framing questions, searching for appropriate sources, developing explanation model with reasoned arguments, and finally, write/defend interpretation.

ANSC 2011. Dairy Cattle Judging. (2.0 cr.; house, every year) Evaluation of dairy animals on the basis of physical appearance, including classes of heifers and cows from the six major dairy breeds. Held in conjunction with the Minnesota State Fair. Training in oral reasons.


ANSC 2013. Beginning Livestock Judging. (2.0 cr.; prereq [Soph or jr or sr]; #; 2012 recommended; fall, odd years) Visual evaluation of beef cattle, swine, and sheep for type, muscling, degree of finish, structure, and soundness. Short oral presentations. Preparation for collegiate livestock judging competition.

ANSC 2055. Horse Management. (2.0 cr.; fall, every year) Develop theoretical knowledge and practical skills related to horse health/management through lecture, class discussion, group projects, presentations, and hands-on skill development. Best management practices for horse husbandry. Horse industry. Strategies for prevention of disease. Environmental hygiene, principles of good nutrition, parasite control, prevention of infectious disease through vaccination. Hands-on sessions develop practical skills such as identifying anatomy, body condition scoring, estimation of body weight, intramuscular injections, bandaging methods, and basic physical examination techniques.

ANSC 2056. Horse Management Practicum. (2.0 cr.; prereq 2055 or #; fall, every year) Best management practices. Daily care (in small groups, weekends included) of horses. Volunteer day at local equine nonprofit. Applied equine management research project. Two group presentations.

ANSC 2401. Animal Nutrition. (3.0 cr.; fall, every year) Classification/function of nutrients. Use of nutrients for body maintenance, growth, egg production, gestation, and lactation. Comparative study of digestive systems of farm animal species.


ANSC 3011. Statistics for Animal Science. (4.0 cr.; 1009 or STAT 2012; fall, spring, every year) Basic statistical concepts. Develop statistical reasoning/critical thinking skills. Descriptive statistics, probability, sampling and sampling distributions, hypothesis testing, experimental design, linear correlation, linear regression and multiple regression. How to make sound arguments/decisions based on statistics when reviewing news articles or scientific publications with statistical content. Explore/draw conclusions from data using a basic statistical software package.

ANSC 3092. Undergraduate Research in Animal Science. (1.0-3.0 cr. [max 6.0 cr.]; A-F only; fall, spring, every year) Students conduct research project under supervision of faculty member.

ANSC 3141. Advanced Dairy Judging. (1.0 cr.; prereq 2011 or #; spring, every year) Training in presentation of oral reasons in dairy cattle judging. Selected students from this course participate in fall intercollegiate dairy judging contest.


ANSC 3203W. Environment, Global Food Production, and the Citizen. (3.0 cr.; [AGRO 3203W, AGUM 2224]; spring, every year) Ecological/ethical concerns of food production systems in global agriculture: past, present, and future. Underlying ethical positions about how agroecosystems should be configured. Interactive learning using decision cases, discussions, videos, other media.

ANSC 3221. Animal Breeding. (4.0 cr.; fall, every year) Application of qualitative and quantitative genetics to animal breeding. Concepts of livestock improvement through selection and mating programs.


ANSC 3302. Human and Animal Physiology Laboratory. (1.0 cr.; prereq 3301 or #3301; fall, spring, every year) Companion course to 3301. Physiological principles are demonstrated using active learning approaches. Nervous system, muscles, cardiovascular, respiration, renal, endocrinology/metabolism, blood, immunology, reproduction.

ANSC 3305. Reproductive Biology in Health and Disease. (4.0 cr.; prereq Biol 1009 or equiv; fall, every year) Reproductive organ functions, fertilization, estrous cycle and endocrine control.

ANSC 3307. Artificial Insemination Techniques. (1.0 cr.; S-N or Audit; prereq #: spring, every year)
Hands-on training/techniques of artificial insemination at an off-campus laboratory setting. Techniques of AI and semen handling. Criteria for selection of bulls.

ANSC 3403. Companion Animal Hot Button Issues. (3.0 cr.; fall, every year)
Various issues that affect companion animals in our society. Students debate pros/cons of each issue and formalize their own opinions based on information presented by debate teams.

ANSC 3509. Animal Biotechnology. (3.0 cr.; prereq GCD 3022 or #: spring, every year)
Scientific, social, and ethical issues related to current topics in animal biotechnology. Introduction to molecular genetics. Use of animals as biological reagents/tools, topics in reproductive biotechnology, methods for genetic modification of animals.

ANSC 3511. Animal Growth and Development. (3.0 cr.; prereq College-level biology course; spring, every year)

ANSC 3609. Business Planning for Animal Enterprises. (2.0 cr.; fall, every year)

ANSC 3801. Livestock Merchandising. (3.0 cr.; prereq Jr or Sr or #: spring, every year)
Promotion/merchandising of purebred livestock. Hands-on training in advertising, livestock photography, showing/fitting, sale organization. Field trips to seed stock operations/auctions. Presentations by industry and breed association leaders. Students conduct annual sale.

ANSC 4009W. Undergraduate Research Thesis. (1.0-6.0 cr.; [max 12.0 cr.]; A-F or Audit; prereq Jr or Sr major in AnSc, #: fall, spring, summer, every year)
Usually one full year. Research/thesis experience under supervision of CFANS faculty member. Written bound thesis, oral presentation of research results.

ANSC 4011. Dairy Cattle Genetics. (3.0 cr.; prereq 3221; spring, every year)

ANSC 4092. Special Problems in Animal Science. (1.0-4.0 cr. [max 12.0 cr.]; prereq #: fall, spring, summer, every year)
Independent study in an area of animal science, under supervision of faculty member.

ANSC 4093. Tutorial in Animal Science. (1.0-4.0 cr.; [prereq #: fall, spring, summer, every year)
Informally structured to encourage in-depth study of specific disciplines in animal science. Pertinent readings; preparation of written essays of high quality required.

ANSC 4094. Directed Research in Animal Science. (1.0-3.0 cr.; fall, spring, summer, every year)
Research in an area of animal science, under supervision of faculty member. Written report on the research is required.

ANSC 4096. Professional Experience Program: Internship. (1.0-3.0 cr., [max 6.0 cr.]; A-F only; prereq CFANS undergrad, #: agreement form; fall, spring, summer, every year)
Supervised professional experience in animal industries and farm enterprise systems. Various aspects of the industry and related fields. Evaluative reports. Consultations with faculty advisers and employers.

ANSC 4099. Special Workshop in Animal Science. (1.0-4.0 cr. [max 24.0 cr.]; fall, spring, every year)
Workshops on a variety of topics in animal science. Consult Class Schedule or department for offerings. Topics may use guest lecturers/experts.

ANSC 4305. Companion & Wild Species Reproduction. (2.0 cr.; A-F only; prereq ANSC 3305; spring, every year)
Reproductive physiology specific to domesticated companion canine and feline species as well as avian species. Management of breeding and reproductive diseases in companion species as well as conservation management in wild species.

ANSC 4401. Swine Nutrition. (3.0 cr.; prereq 2401, 3511 recommended; fall, every year)
A comprehensive review of major considerations in providing optimum, cost-effective nutrition to swine in all stages of production.

ANSC 4403. Ruminant Nutrition. (3.0 cr.; prereq 2401; spring, every year)
Nutrient requirements of ruminants, physiology of digestion in ruminants, nutrient content of feedstuffs, primarily forages; energy utilization, protein and nonprotein nitrogen utilization; nutritional disorders; formulation of adequate rations.

ANSC 4404. Applied Dairy Nutrition. (2.0 cr.; prereq AnSc 4403 recommended; )

ANSC 4601. Pork Production Systems Management. (4.0 cr.; prereq 4611; spring, every year)
Interrelationships of business, marketing, and biological performance of pigs in various types of production systems.

ANSC 4602. Sheep Production Systems Management. (4.0 cr.; spring, every year)

ANSC 4603. Beef Production Systems Management. (4.0 cr.; prereq 4613; fall, every year)
How to resolve problems and manage cattle, stocker, or feedlot operations. Segments of beef industry, challenges. Nutrition, reproduction, genetics, and health in beef cattle production. Students evaluate a beef cattle enterprise and contribute in marketing, selection, reproduction, nutrition, or health management.

ANSC 4604. Dairy Production Systems Management. (4.0 cr.; prereq Concurrent registration is not allowed in 4614; spring, every year)
Practical applications of principles of animal breeding, nutrition, physiology, reproduction, housing, and economics in a problem solving context. Decision-cases, farm visits, field diagnostic techniques labs.

ANSC 4613. Advanced Beef Production Systems Management. (2.0 cr.; prereq 4603; fall, every year)
Half semester course. Student enterprise-analysis teams evaluate a beef cattle enterprise and solve problems in marketing, selection, reproduction, nutrition, or health management.

ANSC 4614. Advanced Dairy Production Systems Management. (4.0 cr.; prereq 4604; spring, every year)

ANSC 5099. Special Workshop in Animal Science. (1.0-6.0 cr. [max 12.0 cr.]; A-F or Audit; prereq #: spring, every year)
Topics vary. See Class Schedule or department. Topics may use guest lecturers/experts.

ANSC 5200. Statistical Genetics and Genomics. (4.0 cr.; prereq [Stat 3021 or equiv], [Bioi 4003 or equiv]; fall, even years)

ANSC 5305. Companion & Wild Species Reproduction. (2.0 cr.; A-F only; prereq #: spring, every year)
Principles of reproductive physiology specific to domesticated companion canine and feline species as well as avian species. These principles discussed in the context of the management of breeding and reproductive
ANTH 1001. Human Evolution. (4.0 cr.; fall, spring, summer, every year) From ancestors of chimpanzees and humans to origins of modern humans. Principles of evolutionary theory, behavioral biology, and comparative anatomy used to reconstruct the major events in human evolution and the behavior of ourselves and our ancestors.

ANTH 1001H. Honors: Human Evolution. (4.0 cr.; A-F only; prereq Honors; fall, spring, every year) From ancestors of chimpanzees/humans to origins of modern humans. Principles of evolutionary theory, behavioral biology, comparative anatomy used to reconstruct the major events in human evolution, behavior of ourselves/our ancestors.

ANTH 1002. Cultural Heritage and Archaeology. (4.0 cr.; fall, every year) Archaeology/archaeological epistemology as scholarly research, cultural heritage, and subject of competing claims. Students compare media about archaeology for different interpretations of the past.


ANTH 1003W. Understanding Cultures. (4.0 cr.; fall, spring, summer, every year) Introduction to social and cultural anthropology. Comparative study of societies and cultures around the world. Topics include adaptive strategies; economic processes; kinship, marriage, and gender; social stratification; politics and conflicts; religion and ritual; personality and culture.

ANTH 1005W. Introduction to Cultural Diversity and the World System. (4.0 cr.; fall, spring, every year) Anthropology of cultural diversity, in the United States and around the world. Comparative study of relationship between local cultures and global processes. Race/ethnicity, economic/social organization, political/religious systems, gender, social change.

ANTH 1902. Freshman Seminar. (3.0 cr.; A-F or Audit; prereq freshman; fall, every year) Topics specified in Class Schedule.

ANTH 1903. Freshman Seminar. (3.0 cr.; A-F or Audit; prereq Fr; spring, every year) Topics specified in Class Schedule.

ANTH 1904. Freshman Seminar. (3.0 cr.; A-F or Audit; prereq freshman; fall, spring, offered periodically) Topics specified in Class Schedule.

ANTH 1905. Freshman Seminar. (3.0 cr.; A-F or Audit; prereq Fr; fall, every year) Topics specified in Class Schedule.

ANTH 1906W. Freshman Seminar. (3.0 cr.; A-F or Audit; prereq freshman; fall, every year) Topics vary. See Course Guide.

ANTH 1907W. Freshman Seminar. (3.0 cr.; max 6.0 cr.; A-F or Audit; prereq freshman; fall, every year) Topics specified in Class Schedule.

ANTH 1908W. Freshman Seminar. (3.0 cr.; A-F or Audit; prereq freshman; spring, every year) Topics specified in Class Schedule.

ANTH 1909W. Freshman Seminar. (3.0 cr.; A-F or Audit; prereq freshman; fall, every year) Topics specified in Class Schedule.

ANTH 2004. Great Controversies in Anthropology. (3.0 cr.; A-F or Audit; spring, every year) Notable controversies in anthropology: Is human "reason" the same in all cultures? What makes up evidence/truth when we study people? Whose "voices" should be heard? Should anthropologists support contemporary attempts at economic "development"? Is it possible to agree on a set of universal individual or cultural rights? Can we make qualitative judgments about cultures? What civic/political responsibilities does the anthropologist have at home and with the people whom she or he studies? In-class debates.

ANTH 3006. Humans and Aliens: Learning Anthropology through Science Fiction. (3.0 cr.; =ANTH 2006; spring, every year) Pairs anthropology texts with science fiction stories to illustrate how our future is more dependent on how humanity works anthropologically than what next technological invention has to offer.

ANTH 3008. Introduction to Flintknapping. (3.0 cr.; A-F or Audit; ) Hands-on experience in replication of prehistoric stone tools, as basis for archaeological analysis and as art form in itself.

ANTH 3009. Rise of Civilization. (3.0 cr.; =HIST 3066; spring, every year) How archaeologists/historians analyze/interpret artifacts of complex societies, from early hunter-gatherer groups, through settled agricultural villages to rise of towns, cities, and civilizations.

ANTH 3015W. Language, Culture, and Power. (4.0 cr.; spring, every year) Studying language as a social practice, students transcribe and analyze conversation they record themselves, and consider issues of identity and social power in daily talk.

ANTH 3016. Humans and Aliens: Learning Anthropology through Science Fiction. (3.0 cr.; =ANTH 3006; spring, every year) Pairs anthropology texts with science fiction stories to illustrate how our future is more dependent on how humanity works anthropologically than what next technological invention has to offer.

ANTH 3020. Topics in the Anthropology of Africa. (3.0-6.0 cr.; ) Perspectives on Africa using ethnographic methods and theories. Topics such as kinship
and gender; ecological adaptations; economic systems; belief systems; political organization; art and aesthetics; Islamicization; colonization; liberation movements and nationalism; culture change.

ANTH 3021W. Anthropology of the Middle East. (3.0 cr.; A-F or Audit; =ANTH 5021W; fall, even years) Anthropological methods of analyzing/interpreting Middle Eastern cultures/societies.

ANTH 3022W. Anthropology of Dreaming and Myth. (3.0 cr.; A-F or Audit; spring, even years) What is universal in dreaming/myth, how they vary in different cultures. Influence of dreams on myths. Appearance of folk narratives and cultural symbols in dreams. Relationship between individual and culture. Symbolism, metaphor, metonymy, other tropes common to dreaming/myth. Underlying psychological processes. Papers by anthropologists, case studies, cultural examples.

ANTH 3023. Culture and Society of India. (3.0 cr.; =GLOS 3961, ALL 3676; spring, odd years) Contemporary society and culture in South Asia from an anthropological perspective with reference to nationalism; postcolonial identities; media and public culture; gender, kinship and politics; religion; ethnicity; and the Indian diaspora.

ANTH 3025. Pacific Island Societies. (3.0 cr.; prereq 1003 or 1005 or 3003 or #; fall, summer, offered periodically) Geography, prehistory, and Western exploration of Pacific Islands from Hawaii to Papua New Guinea. Culture change as these peoples become incorporated into the modern world system. Topics in regional ethnology. Relationship of societies to major issues in anthropological thought.

ANTH 3027W. Archaeology of Prehistoric Europe. (3.0 cr.; =HIST 3067W, ANTH 5027W; fall, every year) How archaeologists analyze/interpret artifacts to develop knowledge about formation of European society, from earliest evidence of human occupation to Roman period.

ANTH 3028. Introduction to Historical Archaeology. (3.0 cr.; A-F or Audit; fall, spring, offered periodically) Emphasizes research approaches. Documentary research, oral history, probate inventories/acculturation, integration of documents/archaeological data, analysis of community patterning, social analysis of architecture, foodways, artifact identification, mean ceramic dating, industrial archaeology, estimation of social status with cemetery data, sampling, report writing.

ANTH 3034. Roots Music in American Culture and Society. (3.0 cr.; spring, every year) Southern American vernacular music that came to public attention in the 1920s and 1930s. Issues of race, class, and historical context.


ANTH 3036. The Body in Society. (3.0 cr.; spring, even years) Body-related practices throughout the world. Readings, documentaries, mass media.


ANTH 3043. Art, Aesthetics and Anthropology. (3.0 cr.; summer, even years) The relationship of art to culture from multiple perspectives including art as a cultural system; the cultural context of art production; the role of the artist in different cultures; methodological considerations in the interpretation of art across cultural boundaries.

ANTH 3046W. Romance and Culture. (3.0 cr.; A-F only; spring, every year) Romance, aspects of this kind of love relationships from different perspectives in social/biological sciences. Draws on cross-cultural materials.

ANTH 3049W. Anthropology of Social Class. (3.0 cr.; A-F only; fall, odd years) Anthropological concept of culture. Theories of class difference. Investigate comparative ethnographic about experience of class difference. Classic texts, mass media/full-length ethnographic accounts will be used.

ANTH 3143. American Indian Languages and Cultures. (3.0 cr.; =AMIN 3143; fall, offered periodically) Survey of cultural developments among native peoples of North American from historic times to present.

ANTH 3205. Introduction to Aztec, Maya, and Inka Art, from Ancient Times to the Colonial Period. (3.0 cr.; =ARTH 3205, AMIN 3205, RELS 3222; fall, every year) Art/architecture of native peoples of Americas from twelfth century B.C. until arrival of Europeans in sixteenth century. Ways that people living in diverse areas of South America/Mesoamerica used art/architecture. Tools to investigate Pre-Columbian art at more advanced levels.

ANTH 3221. Archaeology Field School. (6.0 cr.; prereq #; summer, every year) Archaeological field excavation, survey, and research. Intensive training in excavation techniques, recordation, analysis, and interpretation of archaeological materials.

ANTH 3242W. Hero, Savage, or Equal? Representations of NonWestern Peoples in the Movies. (3.0 cr.; A-F only; fall, even years) Images of non-Western peoples and cultures as they have appeared in movies and in other popular media.

ANTH 3306W. Medical Anthropology. (3.0 cr.; A-F or Audit; prereq 1003 or 1005 or entry level soc sci course recommended; fall, every year) Relates among human affliction, health, healing, social institutions, and cultural representations cross-culturally. Human health/affliction. Medical knowledge/power. Healing. Body, international health, colonialism, and emerging diseases. Reproduction. Aging in a range of geographical settings.

ANTH 3401. The Human Fossil Record. (3.0 cr.; A-F only; =ANTH 5401; prereq 1001 or #; fall, even years) Fossil evidence paleoanthropologists use to reconstruct human evolutionary history. Taxonomy, phylogeny, behavior, ecology, tool use, land use, biogeography. Hands-on examination of fossil casts, readings from primary/secondary professional sources.

ANTH 3402. Zooarchaeology Laboratory. (3.0 cr.; A-F only; fall, every year) How archaeologists reconstruct past societies, diets, and environments. Bones and bone fragments to skeletal element (e.g., femur, humerus, tibia), side, age, and taxon (e.g., horse, bison, antelope, hyena). Adaptations and functional morphology of animals, anatomy. Tool marks, tooth marks, burning, and types of bone breakage. Past societies' hunting, sharing, cooking practices as well as environmental reconstruction using vertebrates.

ANTH 3405. Human Skeletal Analysis. (3.0 cr.; A-F only; =ANTH 5405; prereq 1001 or #; spring, every year) Structure, design, and variability of modern human skeleton. Anatomy, functional morphology, development, evolutionary history. Bone histology/biology, excavation/preservation, taphonomy, pathology, forensic analyses. Differentiating between males/females, adults/sub-adults, and humans/non-humans.

ANTH 3601. Archaeology and Native Americans. (3.0 cr.; =AMIN 3602, ANTH 5601; fall, even years) Pre-European contact/contact period archaeology of American Indians north of Mexico.

ANTH 3913. Senior Project Planning. (1.0 cr.; A-F only; prereq [Jr or sr] anth major; #; fall, spring, summer, every year) Evaluation of work to date. Planning future course work and prospectus for senior research project. Defining senior project, finding an adviser, developing preliminary bibliography.

ANTH 3980. Topics in Anthropology. (3.0 cr. [max 6.0 cr.]; fall, spring, summer, offered periodically) Topics specified in Class Schedule.

ANTH 4001. Advanced Method and Theory in Archaeology. (3.0 cr. [max 9.0 cr.]; prereq 3001; spring, every year)
ANTH 4003W. Contemporary Perspectives in Cultural Anthropology. (3.0 cr.; A-F or Audit; prereq [1003 or 1005], jr or #; fall, spring, offered periodically) Concept of culture, practice of fieldwork as they relate to various social institutions. Anthropological perspectives on race, ethnicity, gender.

ANTH 4007. Laboratory Techniques in Anthropology. (1.0-4.0 cr. [max 12.0 cr.]; prereq #; fall, spring, summer, every year) Plant remains, material culture, faunal remains, human osteology. Emphasizes lab experience.

ANTH 4009W. Warfare and Human Evolution. (3.0 cr.; A-F or Audit; fall, even years) Is warfare universal? Are there truly peaceful societies? Why war occurs more often at some times/places. How/when/why warfare evolved. Warfare and intergroup aggression in other animals. Role of warfare and its primitive antecedents in evolution of our species.

ANTH 4013. Senior Project. (3.0 cr.; prereq sr major, #; fall, spring, summer, every year) Independent research project fulfilling the senior project; directed by a faculty member.

ANTH 4013H. Senior Honors Thesis Project. (3.0 cr.; A-F only; prereq Sr major, honors student, #; fall, spring, every year) Independent research project fulfilling the senior option and the honors thesis requirement; directed by a faculty member.

ANTH 4019. Symbolic Anthropology. (3.0 cr.; ANTH 8211; prereq 1003 or 1005 or grad student or #; fall, spring, summer, every year) Pragmatic/structural aspects of social symbolism cross-culturally. Focuses on power, exchange, social boundaries, gender, and rituals of transition/reversal.

ANTH 4025. Studies in Ethnographic Classics. (3.0 cr.; A-F or Audit; prereq 1003 or 1005; ) Five types of explanations employed in ethnographic research: diffusionism and theory of survival; functionalist response; British structuralists; French structuralism; interpretive turn. Problems in ethnographic practice, analysis, and writing. Focuses on several classic monographic examples and associated theoretical writing.

ANTH 4031W. Anthropology and Social Justice. (4.0 cr.; prereq 1003 or 1005 or 4003 or grad student or #; spring, even years) Practical application of theories/methods from social/cultural anthropology. Issues of policy, planning, implementation, and ethics as they relate to applied anthropology.

ANTH 4035. Ethnographic Research Methods. (3.0 cr.; prereq 1003 or 1005 or grad student; spring, every year) History of and current issues in ethnographic research. Research projects, including participant observation, interviewing, research design, note taking, life history, and other ethnographic methods.

ANTH 4045. Gender and Power in South Asia. (3.0 cr.; ) Analysis of the politics of gender in South Asia, especially India, focusing on colonial and nationalist constructions of gender and "tradition"; kinship, class and gender; gender and women's speech; feminism in India; fundamentalism and postcolonial identities; gender and violence.


ANTH 4049. Religion and Culture. (3.0 cr.; prereq 1003 or 1005 or #; ) Religious beliefs and world views cross-culturally. Religious dimensions of human life through theories of origins, functions, and forms (e.g. myth, ritual, symbolism) of religion in society.

ANTH 4053. Economy, Culture, and Critique. (3.0 cr.; ANTH 8205; fall, every year) Systems of production/distribution, especially in nonindustrial societies. Comparison, history, critique of major theories. Cross-cultural anthropological approach to material life that subsumes market/nonmarket processes.

ANTH 4065. The Anthropology of Development. (3.0 cr.; fall, every year) Anthropological contributions to development practice/theory. Anthropological analysis of development institutions. Theories of development. Case studies from several parts of world explore relation of global forces and local cultures.

ANTH 4071. Race, Culture, and Vision. (3.0 cr.; A-F or Audit; prereq 1003 or 1005 or 3003 or #; fall, spring, summer, offered periodically) Evaluation of main trends in study of racism. Psychological, sociological, symbolic, and "critical" approaches that treat racism as a socidiscursive phenomenon. Racist discourse as a practice that defines an "other" and subjugates that other to strategies of exclusion.

ANTH 4075. Cultural Histories of Healing. (3.0 cr.; A-F or Audit; spring, odd years) Introduction to historically informed anthropology of healing practice. Shift to biologically based medicine in Europe, colonialist dissemination of biomedicine, political/cultural collisions between biomedicine and "ethnomedicine," traffic of healing practices in a transnationalist world.

ANTH 4077. Neanderthals: Biology and Culture of Humanity's Nearest Relative. (3.0 cr.; prereq 1001 or 3001 or 3002 or #; fall, offered periodically) Paleontological/archaeological record. Students reconstruct behavioral similarities/differences between Neanderthals and modern humans. Why humans alone survived end of Pleistocene.

ANTH 4101. Archival Analysis for Anthropologists. (3.0 cr.; fall, every year) Methods for anthropological archival research. Preservation, curation, and organizational bias in archives. Analytic scale, voice, historical texts as material culture. Students engage in archival research.

ANTH 4121. Business Anthropology. (3.0 cr.; ANTH 5121; spring, every year) Anthropological/ethnographic understandings/research techniques.

ANTH 4329. Primate Ecology and Social Behavior. (3.0 cr.; A-F or Audit; prereq 1001 or BIOL 1009 or BIOL 2002 or BIOL 3411 or #; fall, every year) Primates as model system to explore animal/human behavior. Factors influencing social/group composition. Mating systems. Prevalence of altruistic, cooperative, and aggressive behavior. Strength of social bonds in different species. Evolution of intelligence/culture.

ANTH 4344. Europe and its Margins. (3.0 cr.; ANTH only; GLOS 4344; prereq One course in ANTH or GLOS; fall, every year) Europe and its margins, an anthropological/ethnographic perspective. Key topics in the study of Europe and European Societies. Ethnography, fiction, film.

ANTH 4980. Topics in Sociocultural Anthropology. (3.0 cr. [max 6.0 cr.]; fall, spring, offered periodically) Topics specified in Class Schedule.

ANTH 4991. Independent Study. (1.0-6.0 cr.; prereq #; fall, spring, summer, every year) Under special circumstances and with the approval of the instructor, qualified students may register for a listed course on a tutorial basis.

ANTH 4992. Directed Readings. (1.0-6.0 cr.; prereq #; fall, spring, summer, every year) Allows students to pursue special interests in anthropology through reading materials under the guidance of a faculty member.

ANTH 4993. Directed Study. (1.0-6.0 cr.; prereq #; fall, spring, summer, every year) Allows students to pursue special interests in anthropology under the guidance of a faculty member.

ANTH 4994W. Directed Research. (1.0-6.0 cr.; prereq #; fall, spring, summer, every year) Qualified students may conduct a well-defined research project under the guidance of a faculty member.

ANTH 5008. Advanced Flintknapping. (3.0 cr.; A-F or Audit; prereq [3008 or 5269] or #; ) Hands-on training in techniques of advanced stone tool production, artifact reproduction, and lithic experimental design for academic/artistic purposes.

ANTH 5009. Human Behavioral Biology. (3.0 cr.; A-F or Audit; spring, every year) In-depth introduction to, and critical review of, human behavioral biology, examining the approaches in anthropology and related fields. Classic texts/recent empirical studies of humans and other species. Theoretical underpinnings of this new discipline/how well theoretical predictions have been supported by subsequent research.

ANTH 5021W. Anthropology of the Middle East. (3.0 cr.; =ANTH 3021W; fall, every year) Anthropological field methods of analyzing/interpreting Middle Eastern cultures/societies.

ANTH 5027W. Archaeology of Prehistoric Europe. (3.0 cr.; =HIST 3067W, ANTH 3027W; fall, every year) How archaeologists/historians analyze/interpret artifacts to develop knowledge about formation of European society, from earliest evidence of human occupation to Roman Period. Interpreting archaeological evidence from specific sites to understand broad trends in human past.

ANTH 5031W. Ethnographies of Science. (3.0 cr.; A-F only; prereq Sr or grad student or #: spring, odd years) Ethnographic, historical, and sociological accounts of scientific practice. How facts are constructed/negotiated. Social, cultural, and political influences on scientific methods. How scientific projects articulate with hierarchies of race/gender. International differences in scientific practice.

ANTH 5033. Feminist Anthropology. (3.0 cr.; prereq 3047 or grad or #: ) Advanced introduction to the development of feminist theory in anthropology. Theoretical and methodological shifts in feminist anthropology and ethnography. Feminist ethnography within the discipline as a whole; current debates concerning the reading and writing of ethnography.

ANTH 5041. Ecological Anthropology. (3.0 cr.; =ANTH 3041, ANTH 8213; prereq grad or #: fall, offered periodically) Concepts, theories, and methods of ecological anthropology (cultural ecology) show how humans interact with the biophysical environment. Compare biological and cultural interactions with the environment; examine adaptive strategies cross-culturally.

ANTH 5112. Reconstructing Hominin Behavior. (3.0 cr.; A-F or Audit; =ANTH 8112; prereq Previous coursework in Biological Anthropology or Archaeology; spring, odd years) Major hypotheses regarding evolution of human behavior. Combine evidence from realm of biological anthropology as we consider link between bone biology/behavior. Archaeological record. Hypotheses about biocultural evolution regarding tool-use, hunting, scavenging, food sharing, grandmothers, cooking, long distance running.

ANTH 5113. Primate Evolution. (3.0 cr.; A-F only; =ANTH 8113; prereq Anthropology major, junior or senior; fall, odd years) Evolutionary history of primates. Particular focus on origin/diversification of apes/Old World monkeys.

ANTH 5121. Business Anthropology. (2.0 cr.; =ANTH 4121; prereq MBA student; spring, every year) Anthropological/ethnographic understandings/research techniques.

ANTH 5128. Anthropology of Education. (3.0 cr.; =OLPD 5128; spring, even years) Cross-cultural perspectives in examining educational patterns. Implicit/explicit cultural assumptions. Methods/approaches to cross-cultural studies in education.

ANTH 5221. Anthropology of Material Culture. (3.0 cr.; A-F or Audit; ) Material culture as a social creation, studied from multiple perspectives (e.g., social anthropology, archaeology, primatology). Conceptions of how humans articulate with material world they construct.

ANTH 5244. Interpreting Ancient Bone. (4.0 cr.; A-F or Audit; =ANTH 6244; prereq 1001; fall, every year) How anthropologists use fossil bones to answer questions of past human diet, behavior, and environments. Basics of skeletal-element/species identification of humans and large mammals. Project where students analyze a small assemblage of bones. Emphasizes scientific method, data analysis using computers.

ANTH 5269. Analysis of Stone Tool Technology. (4.0 cr.; A-F or Audit; prereq 1001 or 3001 or #: ) Practical lab experience. How to analyze archaeological collections of stone tools to learn about human technological behavior in past. Students analyze archaeological/experimental collections, make stone tools themselves.

ANTH 5325. The Art of the Aztec Empire. (3.0 cr.; =ARTH 5325, RELS 5325; spring, every year) Art/architecture of Nahua-speaking Aztecs of Central Mexico, from their first appearance in archaeological record until Spanish invasion of Central Mexico in 1521. Theoretical/methodological approaches. Critical analysis of scholar's writing and what constitutes "evidence."

ANTH 5401. The Human Fossil Record. (3.0 cr.; A-F only; =ANTH 3401; prereq 1001 or #: fall, even years) Fossil evidence paleoanthropologists use to reconstruct human evolutionary history. Taxonomy, phylogeny, behavior, ecology, tool use, land use, and biogeography. Examination of fossil casts, readings from primary/secondary professional sources.

ANTH 5402. Zooarchaeology Laboratory. (3.0 cr.; A-F only; fall, every year) How archaeologists reconstruct the past through the study of animal bones associated with artifacts at archaeological sites. Skeletal element (e.g., humerus, femur, tibia), and taxon (e.g., horse, antelope, sheep, bison, hyena) when confronted with bone. Comparative collection of bones from known taxa.

ANTH 5403. Quantitative Methods in Biological Anthropology. (4.0 cr.; A-F or Audit; prereq Basic univariate statistics course or #: fall, spring, even years) Quantitative methods used by biological anthropologists. Applying these methods to real anthropometric data. Lectures, complementary sessions in computer lab.

ANTH 5405. Human Skeletal Analysis. (3.0 cr.; A-F only; =ANTH 5405; prereq 1001 or #: spring, every year) Structure, design, and variability of modern human skeleton. Anatomy, functional morphology, development, evolutionary history. Bone histology/biology, excavation, preservation, taphonomy, pathology, forensic analyses. Differentiating between males/females, adults/sub-adults, and humans/non-humans. Quizzes, exams, research paper, project.

ANTH 5422. Anthropologies of Citizenship and Nationalism. (3.0 cr.; A-F only; prereq 3xxx course in [anthropology or related discipline]; spring, odd years) Why/how citizenship and nationalism have been constructed over time as a force of cultural identity/belonging. Key theories, recent developments in citizenship theory. Defining an anthropological approach to citizenship.


ANTH 5444. Archaeological Ceramics. (4.0 cr.; A-F only; prereq 3001 or #: spring, every year) Ceramics as material, technology, and cultural/social trace. Methods of assessing technology/use. Research, design, and interpretation of ceramic analyses. Students work with collections and propose/answer a research question about a ceramic assemblage. Readings, discussion.

ANTH 5446. Archaeology of Representation as Communication. (3.0 cr.; A-F only; spring, every year) Seminar. Uses of paintings, sculptures, drawings, and photographs as means of communication, from earliest representations of 30,000 years ago to present day.

ANTH 5448. Applied Heritage Management. (3.0 cr.; A-F only; spring, every year) Contexts of cultural heritage applicable to federal/state protection. Approaches to planning/management. Issues of heritage/stakeholder conflict.

ANTH 5601. Archaeology and Native Americans. (3.0 cr.; =ANTH 3601, AMIN 3602; fall, even years) Pre-European contact/contact period archaeology of American Indians north of Mexico.

ANTH 5802. Art of the Inka and their Ancestors. (3.0 cr.; =ARTH 5802, AMIN 5802, RELS 5326; spring, every year) Art/architecture of people of Andes, from first appearance in archaeological record until Spanish invasion in 16th century. Problems,
theoretical/methodological approaches. Analysis of scholarly writing, focusing on evidence.

ANTH 5980. Topics in Anthropology. (3.0 cr.; max 6.0 cr.; fall, spring, every year)
Topics specified in Class Schedule.

ANTH 5990. Topics in Archaeology. (3.0 cr.; max 9.0 cr.; A-F or Audit; prereq #; fall, spring, summer, every year)
Topics specified in Class Schedule.

**Apparel Design (ADES)**

**College of Design**

ADES 1221. Apparel Assembly Fundamentals. (3.0 cr.; A-F or Audit; prereq Pre-apparel design major or #; fall, every year)
Methods/applications of apparel assembly, from micro to macro perspective.

ADES 2196. Work Experience in Apparel Design. (1.0-4.0 cr. [max 8.0 cr.]; S-N only; prereq Plan submitted/approved by [adviser, internship supervisor], written approval of supervisor; #; fall, spring, summer, every year)
Supervised work experience in business, industry, or government, related to student's area of study. Integrative paper or project.

ADES 2211. Fashion Illustration and Portfolio Development. (4.0 cr.; A-F or Audit; prereq Apparel Design Major or Pre-Major; spring, every year)
Illustration skills specific to garments/textiles. Traditional media/CAD applications. Critique/analysis of visual communication of apparel design concepts.

ADES 2213. Textile Analysis. (4.0 cr.; A-F or Audit; prereq DHA major or pre-major or #; fall, every year)
Physical, chemical, and biological characteristics of fibers, yarns, textile structures, and finishes. Their effect on performance/appearance of textile products, including apparel, interior, and industrial textiles.

ADES 2214. Softlines Analysis. (3.0 cr.; A-F or Audit; prereq DHA major or minor or #; spring, every year)
Physical characteristics of softline products related to function for target market. Class experiences based on methods of analysis, including visual inspection, quality, construction, costing, and fit/sizing.

ADES 2221. Apparel Design Studio I. (4.0 cr.; A-F or Audit; prereq [DHA 1201 or RM 1201], [1221 or DHA 1221], apparel design premajor; spring, every year)
Theories/methods in designing apparel for various user groups. Relation of two-dimensional pattern shape to three-dimensional body. Introduction to flat-pattern draping.

ADES 2222. Apparel Design Studio II. (4.0 cr.; A-F or Audit; prereq [2221 or DHA 2221] with a grade of at least C-, Apparel Design major, pass portfolio review; fall, spring, every year)
Design process in developing apparel for specific user group. Advanced principles/methods of developing patterns for body, including flat pattern, draping, fitting. Computer-aided design tools for illustration, pattern making.

ADES 3196. Field Study: National or International. (1.0-10.0 cr.; A-F or Audit; prereq #; fall, spring, summer, every year)
Faculty-directed field study in a national or international setting.

ADES 3217. Fashion: Trends and Communication. (3.0 cr.; A-F or Audit; fall, every year)
Relation of fashion trends to visual analysis of apparel. Application to design/retail.

ADES 3223. Apparel Design Studio III. (4.0 cr.; A-F or Audit; prereq [2223 or DHA 2223] with grade of at least C-, Apparel Design major, pass portfolio review; spring, every year)
Study tailored/non-tailored apparel structures. Experiment with various materials/structures using traditional/innovative methods. Principles of manipulating materials/structures applied to series of garments.

ADES 3244. Apparel Design Studio IV. (4.0 cr.; A-F or Audit; prereq [2213 or DHA 2213], [3223 or DHA 3223] with grade of at least C-, apparel design major; spring, every year)
Principles/theory of functional apparel design. Conduct/apply research in designing apparel for situations requiring thermal or impact protection, accommodation for mobility, or facilitation for bodily function.

ADES 3225. Apparel Design Research. (1.0 cr.; A-F only; prereq 3324 or &DHA 3224; spring, every year)
Market/visual research to support development of apparel line directed at specific audience.

ADES 3227. Technical Design Studio. (4.0 cr.; A-F only; prereq 2213, [3223 with grade of C or above]; fall, every year)
Technical development of sewn product for production. Variability in human physical sizes, and grading and fit across a population. In team-based projects, you will develop a sewn product pattern; generate prototypes and technical specifications; source materials; and plan, execute, and evaluate a production run for a sewn product.

ADES 4121. History of Costume. (4.0 cr.; A-F or Audit; spring, every year)
Survey of apparel/appearances in Western cultures, from 18th century to present. Role of gender, race, and class with respect to change in dress within historical moments and social contexts. Research approaches/methods in study/interpretation of dress.

ADES 4160H. Honors Capstone Project. (2.0 cr. [max 4.0 cr.]; A-F only; prereq DHA honors; fall, spring, every year)
Individualizes honors experience by connecting aspects of major program with special academic interests.

ADES 4193. Directed Study in Apparel Design. (1.0-4.0 cr. [max 8.0 cr.]; A-F or Audit; prereq Undergrad; #; fall, spring, summer, every year)
Independent study in Design, Housing, and Apparel under tutorial guidance.

ADES 4196. Internship in Apparel Design. (1.0-4.0 cr.; S-N or Audit; [GDES 4196, HSG 4196]; prereq Completion of at least one-half of professional sequence, plan submitted and approved in advance by adviser and internship supervisor, written consent of faculty supervisor; #; fall, spring, summer, every year)
Supervised work experience relating activity in business, industry, or government to student's area of study. Integrative paper or project may be required.

ADES 4215. Product Development: Softlines. (4.0 cr.; A-F or Audit; prereq 2213 or DHA 2213 or apparel design major or clothing design major or retail merchandising major or #; spring, every year)
Product development for apparel and other sewn products. Developing products in a lab studio for effectiveness, reliability, and marketability. Team approach using merchandising/design principles to develop products for specific markets.

ADES 4218W. Fashion, Design, and the Global Industry. (3.0 cr. [max 6.0 cr.]; A-F only; prereq Upper level undergraduate or grad student; fall, every year)
Relationship of fashion, dress, and culture to fashion industry. Globalization, fashion centers, design, time/place. Focuses on Chinese fashion industry.

ADES 4225. Apparel Design Studio V. (4.0 cr.; A-F or Audit; prereq [3224 or DHA 3224], [3225 or DHA 3225] with grade of at least C-, apparel design major; fall, every year)
Market research information/implementation. Designing for specific audience, market, user group. Applying market research to design line of apparel. Research of promotional methods for design project.

**Apparel Studies (APST)**

**College of Design**

APST 5117. Retail Environments and Human Behavior. (3.0 cr.; A-F or Audit; prereq Grad student or #; fall, every year)
Theory/research related to designed environment across retail channels.

APST 5121. History of Costume. (4.0 cr.; A-F only; spring, every year)
Analysis/interpretation of primary data about 19th/20th centuries based on historical methods. Critique of cultural, social, economic, technological, political, and artistic data presented through lens of dress in film/literature.

APST 5123. Living in a Consumer Society. (3.0 cr.; A-F only; prereq Sr or grad student; fall, odd years)
APST 5124. Consumers of Design. (3.0 cr.; A-F only; prereq 5123 or DHA 5123 or equiv or #: spring, odd years) Contemporary approaches to consumer behavior.

APST 5193. Directed Study in Apparel Studies. (1.0-4.0 cr. [max 8.0 cr.]; A-F or Audit; prereq #: fall, spring, summer, every year) Independent study in apparel studies under tutorial guidance.

APST 5218. Fashion, Design, and the Global Industry. (3.0 cr.; A-F only; fall, every year) Relationship of fashion, dress, and culture to time, place, and design. Focuses on fashion centers, fashion industry, and globalization. Chinese fashion industry as case study.

Applied Business (ABUS)  
College of Continuing Education


ABUS 4012. Strategic Decision Making and Problem Solving. (3.0 cr.; A-F or Audit; prereq 45 cr; fall, every year) Frameworks/processes for decision-making. Analyzing causes, effects of problems, and solutions in organizations. Creativity, team building. Case studies, final real-world project, online presentation.

ABUS 4013. Legal, Ethical, and Risk Issues for Managers. (3.0 cr.; A-F or Audit; prereq CMgt 4011 recommended for CMgt students, 45 semester credits; fall, spring, every year) Key legal, ethical, risk frameworks in business activity/civic life. Best practices to minimize legal liability/manage risk. Techniques to navigate ethical challenges in work/personal life.


ABUS 4023W. Communicating for Results. (3.0 cr.; A-F or Audit; prereq 45 cr completed; fall, spring, summer, every year) Aspects of communication essential for being persuasive/influential. Organizing/presenting ideas effectively, strategies for audience analysis, choosing communication methods, making appropriate use of informal influence methods, handling dissent. Processes for intercultural communication.

ABUS 4031. Strategic Use of Business Information Systems. (3.0 cr.; A-F or Audit; prereq Basic proficiency with ‘office’ software, 45 cr; spring, every year) Relationship of information systems and decision making. Databases, decision management tools, customer relationship management, e-business, trends, information security. Database and web page development, case studies, final empirical project.

ABUS 4041. Dynamics of Leadership. (3.0 cr.; A-F or Audit; prereq 45 cr completed; fall, spring, summer, every year) Successful leadership via flexible approach. Knowledge, skills, and abilities that leaders develop from eight leadership strategies: academic, bureaucratic, eclectical, economic, fellowship, military, political, social. Ways to lead diverse populations in a global environment.

ABUS 4043. Project Management in Practice. (3.0 cr.; A-F or Audit; prereq 45 cr completed; fall, spring, summer, every year) Introduction to project management. Tools/techniques to support project leader in scheduling, coordinating, allocating resources. Develop/conduct field project. Requires use of MS Project (bundled w/textbook), Word, PowerPoint.


ABUS 4104. Management and Human Resource Practices. (3.0 cr.; A-F or Audit; prereq 45 cr completed; fall, spring, every year) Providing day-to-day leadership. Organizing work, motivating employees. Delegating, coordinating, and achieving results. Front line human resource practices, including selection, induction, and training of new employees; employee appraisal. Handling grievances/discipline.

ABUS 4151. Innovation for Leaders and Organizations. (3.0 cr.; A-F or Audit; prereq 45 cr; spring, every year) Innovation as cornerstone of knowledge economy. History of innovation process, importance to individuals/organizations. Strategies to foster innovation. Responsibilities in innovation skill-building/leadership.

ABUS 4217. Real Estate Development and Finance. (2.0 cr.; A-F or Audit; prereq 45 credits; fall, spring, every year) Overview of the fundamentals of real estate development, including process(es), means to finance and acquire real estate, due diligence procedures, legal transfer and title issues, conditions precedent to closing and governmental development approvals.

ABUS 4321. Evaluating Performance Excellence in Organizations. (3.0 cr.; S-N or Audit; prereq Submit MNQA evaluator application; fall, spring, summer, every year) Systematic processes for leadership, quality improvement, performance excellence. Analyze strengths/improvements using Baldrige National Quality Award and MNQA criteria. Students join MNQA board of evaluators and complete team evaluation of group seeking MNQA.

ABUS 4509. New Product Development. (3.0 cr.; A-F or Audit; prereq [4103 or 4701 or Mkgt 3001], at least 45 cr) or #: spring, every year) How new consumer, industrial, and service products are planned/developed. Idea generation, concept/buyer testing, pricing, sales/profit strategies, product positioning, promotion, packaging/distribution. Marketing case histories. Student projects.


ABUS 4571. Introduction to Grant Writing for Health Care and Nonprofit Organizations. (3.0 cr.; A-F or Audit; prereq 45 credits; fall, spring, every year) Research/write grants. Identify potential funding sources. Respond to Request for Proposal by creating needs assessment, goal statement, budget/grant funding plans. Trends.
in public/private health care. Social services funding.

**ABUS 4701. Introduction to Marketing.** (3.0 cr.; A-F or Audit; prereq [Macroeconomics or microeconomics], 45 cr; fall, spring, every year) Conceptual tools for creating a marketing plan. How marketing relates to other functional areas of business. Importance of an ethical, global view.

**ABUS 4703. Marketing for the Professional Practice.** (3.0 cr.; A-F or Audit; prereq 45 semester cr; summer, every year) Principles of marketing applied to the management of the professional practice. Internal and external environment, market segmentation, positioning, differentiation, branding, and formulating a marketing plan with goals, strategies, and financial considerations.

**ABUS 4705. Leadership and Management for the Professional Practice.** (3.0 cr.; A-F or Audit; prereq 45 semester cr; summer, every year) Foundation needed for successful leadership or management of a professional practice including recruitment, motivation, and compensation of employees, leadership of effective teams, choosing an appropriate organizational structure, understanding and leveraging diversity, developing a healthy culture, managing change, negotiations, and business ethics. Real-world examples to highlight successful and unsuccessful practices. Apply these principles to their own specific professional interests to become more effective leaders and managers.

**ABUS 4707. Financial Management for the Professional Practice.** (3.0 cr.; A-F or Audit; prereq 45 semester cr; summer, every year) Foundation knowledge to understand financial principles and apply them to investment, organizational, and operational decisions in a professional practice. Case studies using Excel to model common scenarios in practice.

**ABUS 4709. Managing the Professional Practice I: Business Design.** (3.0 cr.; A-F or Audit; prereq 45 cr; summer, every year) Factors/challenges involved in designing structure of professional practice. Core values/mission, design of services, physical design, risk management, equipment/IT, partners/staffing. Exercises in applied practice development/management.

**ABUS 4711. Managing the Professional Practice II: Operations.** (3.0 cr.; A-F or Audit; prereq 4709, 45 cr; summer, every year) Factors/challenges in day-to-day operations of professional practice. Marketing, human resources, finance, entrepreneurial spirit, inventory management, operational quality, transitions. Exercises in applied operations.

**ABUS 4901. Special Topics in Applied Business.** (3.0 cr.; A-F or Audit; prereq At least 45 cr; fall, offered periodically) Management issues in a changing workplace. Topics vary.

**ABUS 4993. Directed Study.** (1.0-3.0 cr. [max 6.0 cr.]; prereq #, %; fall, spring, summer, every year) Specially arranged projects, trips, or field work.

**Applied Economics (APEC) College of Food, Agricultural and Natural Resource Sciences**

**APEC 1001. Orientation to Applied Economics.** (1.0 cr.; A-F or Audit; fall, every year) Introduction to curriculum offerings, liberal education requirements, employment opportunities, faculty in the Department of Applied Economics. Emphasizes historical development of the discipline, areas of specialization, coursework expectations, career planning.


**APEC 1102H. Honors: Principles of Microeconomics.** (4.0 cr.; A-F only; = [ECON 1105, ECON 1102H, ECON 1102, APEC 1102]; prereq [1101 or 1101H or Econ 1101; honors; spring, every year]) Measuring/describing an economy. Macroeconomic phenomena, including long-term growth, inflation, unemployment, and recessions. International trade and capital flows. Simple macroeconomic models. Financial markets. Monetary policy. Taxation, government expenditure, and debt as macroeconomic policy. Poverty and income distribution.

**APEC 1251. Principles of Accounting.** (3.0 cr.; = [ACCT 2050]; prereq 30 cr; not recommended for premajors in Ag Food Bus Mgmt; fall, every year) Fundamentals of business accounting, basic finance concepts, use of accounting data for income tax and managerial decision making.

**APEC 1905. Topics: Freshman Seminar.** (1.0-3.0 cr.; A-F or Audit; prereq Fr; fall, every year) Topics vary.

**APEC 3001. Applied Microeconomics: Consumers, Producers, and Markets.** (4.0 cr.; = [ECON 3101H, ECON 3101]; prereq (1101 or Econ 1101 or 1101H or Econ 1101H); [MATH 1142 or MATH 1271]) or #; intended for undergrads in [Ag/Food Bus Mgmt, Appl Econ]; fall, spring, every year) Consumer/producer decisions. Theory of supply/demand. Markets, pricing, investment, effect regulation, market failures.

**APEC 3002. Applied Microeconomics: Managerial Economics.** (4.0 cr.; prereq (3001 or Econ 3101), (OMS 2550 or STAT 3011) or #; fall, spring, every year) Microeconomic theory, its application to managerial problems. Introduction to regression analysis, demand analysis, demand function estimation, forecasting, cost function estimation, resource allocation decisions, linear programming, market structure, pricing policy, risk analysis, investment analysis.

**APEC 3006. Applied Macroeconomics: Government and the Economy.** (3.0 cr.; = [ECON 3102H, ECON 3102]; prereq (1102 or Econ 1102), (3001 or Econ 3101) or #; fall, spring, every year) Public sector and market economics. Public goods, externalities, and other allocation issues. Government and stabilization of national economy. Overview of new classical/Keynesian models. Principles of taxation. Individual income tax. Sales, business, and property taxes.

**APEC 3007. Applied Macroeconomics: Policy, Trade, and Development.** (3.0 cr.; prereq (1101 or Econ 1101), (1101H or Econ 1101H), (1102 or Econ 1102), (1102H or Econ 1102H); 3001, 3006 recommended; fall, spring, every year) Indicators of economic development, growth in trade, and welfare of developing countries. Globalization. Drivers of growth, productivity, technical change, and research. Comparative advantage. Distribution consequences of trade. Trade policy instruments/institutions.


**APEC 3071. Agriculture and Economic Growth in Developing Countries.** (3.0 cr.; prereq 1101, 1102, Econ 1101, 1102 or #; fall, every year) Characteristics and performance of peasant agriculture; potential role of agriculture in economic development, and design of economic policies to achieve agriculture and economic development; role of women in agricultural development.
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<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
<th>Prerequisites</th>
<th>Delivery</th>
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<tbody>
<tr>
<td>APEC 3202</td>
<td>An Introduction to the Food System: Analysis, Management and Design. (3.0 cr.; prereq 1101 or Econ 1101; spring, every year)</td>
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<td>Introduction to use of systems thinking for exploration of problems in contemporary food system from multidisciplinary perspective. System concepts. Historical evolution of food system. Analysis, management, design.</td>
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<td>APEC 3411</td>
<td>Commodity Marketing. (3.0 cr.; prereq 1101 or Econ 1101; fall, every year) Economic concepts related to marketing agricultural commodities. Conditions of competitive markets, historical perspectives on market institutions/policy, structural characteristics of markets, policies/legislation affecting agricultural marketing of livestock, crop, and dairy products.</td>
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<tr>
<td>APEC 3451</td>
<td>Food and Agricultural Sales. (3.0 cr.; prereq 1101 or Econ 1101; spring, every year) Professional selling of agricultural and food products. Students build/refine sales abilities, identify/prospect clients, deliver sales presentations, close the sale. Principles of market research.</td>
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<td>APEC 3501</td>
<td>Agribusiness Finance. (3.0 cr.; =FINA 3000, FINA 3001; prereq [1251 or Acct 2050], 60 cr or #; fall, every year) Analysis of financing and investment strategies for agribusiness firms and their effects on liquidity, solvency, and profitability. Analysis of financial institutions, markets, and instruments. Management problems, issues facing financial intermediaries serving agriculture.</td>
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<td>APEC 3551</td>
<td>Entrepreneurship Fundamentals for Value-Added Rural Businesses. (3.0 cr.; A-F only; prereq [APEC 1101 or 1101H, Jr or sr] or #; fall, every year) Process of starting a new business or organization. Creating a new value proposition in which people are willing to pay for this new product or service according to its perceived value. Students identify market niches and develop plans to exploit them. Student-run businesses may be created as well as self-standing independent businesses.</td>
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<td>APEC 3811</td>
<td>Principles of Farm Management. (3.0 cr.; prereq 1101 or Econ 1101; spring, every year) Strategic and operations aspects of farm management; financial analysis, budgeting, strategic management; marketing plan and control; enterprise and whole farm planning and control; investment analysis, quality, risk, and personnel management.</td>
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<td>APEC 3821</td>
<td>Retail Center Management. (3.0 cr.; prereq [1101 or Econ 1101], [1251 or Acct 2050]; spring, every year) Management of garden centers, grocery stores, and other retail units selling perishable agricultural products.</td>
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<td>APEC 3840</td>
<td>Cooperative Organization. (3.0 cr.; =APEC 5811); spring, every year) Introduction to cooperative form of business. Extensive applications to agricultural/food cooperatives used. Active-student learning process with group activities/organized exercises.</td>
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<td>APEC 3991</td>
<td>Independent Study in Applied Economics. (1.0-4.0 cr.; max 12.0 cr.; prereq #; fall, spring, summer, every year) Independent study and supervised research on subjects and problems not covered in regularly offered courses.</td>
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<td>APEC 4096</td>
<td>Professional Experience Program: Internship. (1.0-3.0 cr.; max 6.0 cr.); S-N or Audit; prereq CFANS undergrad, #, completed internship contract; fall, spring, summer, every year) Professional experience in agribusiness firms or government agencies gained through supervised practical experience. Evaluative reports and consultations with faculty advisers and employers.</td>
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<td>APEC 4103</td>
<td>World Food Problems. (3.0 cr.; =AECRO 4103, CMV 6060, FSCN 4103); prereq jr or sr or grad; spring, every year) A multi-disciplinary look at problems and possible solutions affecting food production, storage, and utilization in developing countries. Presentations and discussions introduce conflicting views on population, technology, and ethical and cultural values of people in various parts of the world.</td>
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<td>APEC 4311</td>
<td>Tourism Development: Principles, Processes, Policies. (3.0 cr.; prereq 1101, 1102 or Econ 1101, 1102; spring, every year) Evolution of tourism industry; economic, environmental, and sociocultural impacts of tourism development; influence of government policies and organizations; models and tools needed for successful development; consequences of development activities and ways to involve stakeholders in decisions.</td>
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<td>APEC 4451W</td>
<td>Food Marketing Economics. (3.0 cr.; =APEC 5541); prereq [1110 or Econ 1101], [1101H or Econ 1101H], MKTG 3001, 60 cr or #; fall, every year) Economics of food marketing in the United States. Food consumption trends, consumer food behavior, marketing strategies, consumer survey methodology, food distribution/retailing system. Policy issues related to food marketing. Individual/group projects.</td>
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<td>APEC 4461</td>
<td>Horticultural Marketing. (3.0 cr.; =HORT 4461); prereq 1101 or Econ 1101; fall, every year) Difference between horticultural products and commercial commodities. Core marketing components that should be used by every small horticultural business. Basic approaches of consumer research.</td>
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<td>APEC 4481</td>
<td>Futures and Options Markets. (3.0 cr.; =APEC 5481); prereq [3001 or Econ 3101], [AnSc 2211 or OMS 1550 or Stat 3011], 60 cr or #; spring, every year) Economics of futures/options trading in theory/application. Basis/price relationship in storable/nonstorable commodities. Hedging/commercial use of futures/options contracts. Speculation. Pricing efficiency. Market performances/regulation.</td>
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<td>APEC 4501</td>
<td>Financial Modeling. (3.0 cr.; A-F or Audit; prereq [3501 or FINA 3001], [1251 or ACCT 2050]; spring, every year) Designing/implementing solutions to financial problems with Microsoft Excel® spreadsheet software. Development of computer-based tools. Interpreting/implementing concepts/theories in economics/finance.</td>
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<td>APEC 4821W</td>
<td>Business Economics and Strategy. (3.0 cr.; prereq 3002, [3501 or FINA 3001], MGMT 3001; spring, every year) Strategic management for production, processing, wholesaling, retailing, and service. Strategy formulation, implementation, and control. Business plans. Case study analysis.</td>
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<td>APEC 5031</td>
<td>Methods of Economic Data Analysis. (3.0 cr.; prereq Math 1271, Stat 5021, knowledge of matrix algebra; fall, every year) Statistical and econometric techniques for applied economists. Theory and application of multivariate regression model using data sets from published economic studies. Emphasis on use of statistical technique to understand market behavior.</td>
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<td>APEC 5032</td>
<td>Economic Data Analysis for Managerial and Policy Decisions. (3.0 cr.; prereq 5031 or #; spring, every year) Statistical/econometric methods for the analysis of large data sets to support managerial/policy decisions. Methods for organizing, accessing, and ensuring the quality of data. Estimation techniques include panel data methods, limited dependent variable models, and time series analysis. Clarity of reporting and design of procedures for maintaining/updating data estimates.</td>
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<td>APEC 5151</td>
<td>Applied Microeconomics: Firm and Households. (3.0 cr.; prereq 3001 or Math 1271 or Math 2243 or equiv or grad student or #; fall, every year) Quantitative techniques for analysis of economic problems of firms and households. Links between quantitative tools and economic analysis Regression analysis, mathematical programming, and present value analysis.</td>
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<td>APEC 5152</td>
<td>Applied Macroeconomics: Income and Employment. (3.0 cr.; prereq 3001 or Math 1271 or Math 2243 or equiv or grad student or #; spring, every year) Static general equilibrium open economy models and simple business cycle models that examine economic growth, business cycles, and fiscal and monetary policy. Input-output analysis and large scale econometric models. Sources/properties of economy and sector-wide data. Empirical applications.</td>
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<td>APEC 5321</td>
<td>Regional Economic Analysis. (3.0 cr.; prereq 3006 or ECON 3102 or #; fall, offered periodically) Development patterns. Role of resources, transportation, and institutional constraints.</td>
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**APEC 5341. Public Finance.** (3.0 cr.; A-F or Audit; prereq 3001 or Econ 3101 or PA 5021; spring, every year)
Which services should the public sector provide? Which level of government should provide them? How should governments fund those services? Which types of taxes should be levied and on whom? Applying economic theory/analysis to spending, revenue, and tax policy issues facing governments.

**APEC 5451. Food Marketing Economics.** (3.0 cr.; A-F or Audit; =APEC 4451W; prereq grad student; fall, every year)

**APEC 5481. Futures and Options Markets.** (3.0 cr.; =APEC 4481; prereq grad student; spring, every year)
Economic concepts related to futures/options trading. Hedging, speculation.

**APEC 5511. Labor Economics.** (3.0 cr.; prereq [[3001 or Econ 3101 or PA 5021], [PA 5032 or equiv], grad student] or #; fall, every year)
Theoretical foundations of labor markets. Intertemporal/household labor supply. Demand for labor, efficiency wages. Human capital theory, unemployment, migration decisions. Analysis of econometric research applied to labor policy issues such as minimum wage, tax policy, social insurance, education.

**APEC 5611. Economic Aspects of Environmental Management.** (3.0 cr.; A-F or Audit; prereq [Sr or grad student] in [biological science or conservation biology or ecology or fisheries or forestry or public affairs or water resources or wildlife conservation] or CLA or #; spring, offered periodically)
Economist approach to environmental problems such as water/air pollution. Application of supply/demand concepts to evaluation of environmental resources. Methods of evaluation. Analysis of pollution control policies from economic point of view.

**APEC 5651. Economics of Natural Resource and Environmental Policy.** (3.0 cr.; =PA 5722; prereq [3001 or ECON 3101], [3611 or ECON 3611 or ESPM 3261] or #; fall, every year)
Economic analyses, including project evaluation of current natural resource/ environmental issues. Intertemporal use of natural resources, natural resource scarcity/ adequacy, environmental quality, and mechanisms for pollution control and their implications for public policy.

**APEC 5711. U.S. Agricultural and Environmental Policy.** (3.0 cr.; prereq 3001 or Econ 3101; spring, offered periodically)
U.S. agricultural policy in an open world economy; role of private markets and government in regulating supply and demand; income vs. price support, supply controls, environmental constraints, and export protectionism; functioning of markets; roles of public interest groups and future of American agricultural policy.

**APEC 5721. Economics of Science and Technology Policy.** (3.0 cr.; prereq 3001 or ECON 3101 or #; fall, every year)

**APEC 5731. Economic Growth and International Development.** (3.0 cr.; prereq 3002 or [Econ 3101, Stat 3022]; Econ 4211 recommended; spring, offered periodically)

**APEC 5751. Global Trade and Policy.** (3.0 cr.; prereq 3001 or Econ 3101 or PA 5021; fall, every year)

**APEC 5811. Cooperative Organization.** (3.0 cr.; =APEC 3840; prereq Grad student or #; spring, every year)
Introduction to cooperative form of business. Extensive applications to agricultural/food cooperatives. Active-student learning process with group activities/written exercises.

**APEC 5891. Independent Study: Advanced Topics in Farm and Agribusiness Management.** (1.0-4.0 cr.; prereq #; fall, spring, every year)
Special topics or individual work suited to the needs of particular groups of students.

**APEC 5991. Special Topics and Independent Study in Applied Economics.** (1.0-4.0 cr.; =APEC 4122; prereq #; fall, spring, summer, every year)
Special classes, independent study, and supervised research/research on subjects/problems not covered in regularly offered courses.

**APEC 5972. What Does It Mean to Be Green?.** (3.0 cr.; =APEC 4172; prereq Grade of A in 3102/4122; fall, spring, every year)
Biodiversity, ecological balance, nutrient cycling, soil quality. Organic practices of tillage, fertility management, weed control, insect control. Specific practices compared with conventional/integrated pest management. Economic analysis of both organic/conventional practices.

**APS 5100. Topics in Applied Professional Studies.** (1.0-4.0 cr. [max 24.0 cr.]; A-F or Audit; prereq #; fall, spring, summer, every year)
Topics in Applied Professional Studies.

**APS 5101. Polyculture Design.** (3.0 cr.; A-F or Audit; prereq SOIL 5125, HORT 1001, %; summer, offered periodically)
Design/systems thinking with plant mechanisms.

**APS 5201. Career and Job Search Preparation for Graduate Students.** (1.0 cr.; S-N only; prereq %; fall, spring, every year)
Job search and career development tools. Goals, networking, job search, resume/CV, interviewing. Assignments include resume/CV, informational interview, career development plan.

**Arabic (ARAB) College of Liberal Arts**

**ARAB 1101. Beginning Arabic I.** (5.0 cr.; =ARAB 4101; fall, summer, every year)
Oral practice, reading, comprehension, basic grammar.

**ARAB 1102. Beginning Arabic II.** (5.0 cr.; =ARAB 4102; prereq 1101 or #; spring, summer, every year)
Comprehension, oral practice, reading of standard Arabic.

**ARAB 3101. Intermediate Arabic I.** (5.0 cr.; =ARAB 4121; prereq 1102 or #; fall, every year)
Advanced grammar/conversational practice. Reading Arabic texts.

**ARAB 3102. Intermediate Arabic II.** (5.0 cr.; =ARAB 4122; prereq 3101 or #; spring, every year)
Advanced grammar, analyses of readings, oral comprehension.

**ARAB 3290. Arabic Language Teaching Tutorial.** (1.0 cr. [max 2.0 cr.]; S-N only; prereq Grade of A in 3102/4122; fall, spring, every year)
Students tutor beginning students of Arabic and are part of department's Arabic language team.

**ARAB 3993. Directed Study.** (1.0-3.0 cr. [max 12.0 cr.]; prereq Prereq-instr consent, dept consent, college consent.; fall, spring, offered periodically)
For advanced students with individual faculty members.

**ARAB 4101. Beginning Arabic I.** (3.0 cr.; =ARAB 1101; prereq Grad student; fall, summer, every year)
Oral practice, reading, comprehension, grammar.

**ARAB 4102. Beginning Arabic II.** (3.0 cr.; =ARAB 1102; prereq [4101 or equiv], grad student; spring, summer, every year)
Comprehension, oral practice, reading of standard Arabic. Meets with 1102.
ARCH 4211. Intermediate Arabic I. (3.0 cr.; =ARAB 3101; prereq [4102 or equiv]; grad student; fall, every year) Advanced grammar, conversational practice. Reading Arabic texts.

ARCH 4212. Intermediate Arabic II. (3.0 cr.; =ARAB 3102; prereq [4121 or equiv]; grad student; spring, every year) Advanced grammar, analysis of readings, oral comprehension. Meets with 3102.

ARCH 5101. Advanced Arabic I. (3.0 cr. [max 4.0 cr.]; prereq [3102, successful completion of the Arabic language proficiency exam] or #; fall, every year) Advanced readings in classical/ modern Arabic. Compositions based on texts.

ARCH 5102. Advanced Arabic II. (3.0 cr. [max 4.0 cr.]; prereq 5101 or #; spring, every year) Readings of Arabic texts. Writing compositions based on texts. Continuation of 5101.

Architecture (ARCH)

College of Design

ARCH 1281. Design Fundamentals I. (4.0 cr.; A-F only; fall, every year) Introduction to design thinking in architecture through project-based learning. Lectures, films, field trips. Four design projects, including an off-campus service learning.

ARCH 1701. The Designed Environment. (3.0 cr.; A-F only; fall, every year) Examination of seminal issues in the designed environment, including relationships between place and space, and realms of the ideal and real, public and private. Survey of how the fields of architecture, landscape architecture, and urban design have explored those issues.

ARCH 1701H. Honors: The Designed Environment. (3.0 cr.; A-F only; prereq [Fr or soph] honors; spring, every year) Seminal issues in the designed environment. Relationships between place/space, ideal/real, public/private. How architecture, landscape architecture, and urban design have explored those issues.

ARCH 2281. Design Fundamentals II. (4.0 cr.; A-F only; prereq 1281, [Arch mjr or pre-arch]; spring, every year) Foundation architectural design studio. Design principles, technical drawing, material manipulation.

ARCH 2301. Introduction to Drawing in Architecture. (4.0 cr.; A-F only; =LA 5301, LA 5371, LA 5376; prereq pre-arch major or BDA major; no prereq in summer; fall, spring, summer, every year) Perceiving/representing material environment. Sketching/drawing conventions of visual phenomena/forms.

ARCH 3150. Topics in Architecture. (1.0-6.0 cr. [max 24.0 cr.]; fall, spring, offered periodically) Selected topics in architecture design, theory, representation, or history.

ARCH 3250. Design Workshop. (1.0-6.0 cr. [max 18.0 cr.]; A-F only; prereq 2281, [Arch BA or BDA major]; fall, spring, every year) Design process as it relates to architecture. Hands-on projects involving interactive design process. Students develop rigorous/inventive graphic means of communicating.

ARCH 3281. Undergraduate Architecture Studio I. (6.0 cr.; A-F only; prereq BS Arch major; fall, every year) Introduction to architectural design in relation to site.

ARCH 3282. Undergraduate Architecture Studio II. (6.0 cr.; =LA 5281 or 4281; BS Arch major; spring, every year) Introduction to architectural design in relation to program.

ARCH 3301. Drawing for Design in Architecture. (3.0 cr.; A-F or Audit; prereq [1301 or LA 1301 or 2301], [Arch or BED major]; fall, spring, every year) Introduction to practical/conceptual function of drawing in architecture.

ARCH 3312. Rome: Drawing (-in) the Eternal City. (4.0 cr.; A-F only; prereq Jr or sr BDA or BS arch major or landscape arch major; spring, offered periodically) Intensive drawing workshop focused on investigating Rome’s urban fabric. Study, document, represent how city’s buildings shape spaces of urban life. How elements help craft unique experience of Eternal City.

ARCH 3351. AutoCAD I. (3.0 cr.; =ARCH 5351; prereq Arch major or BDA major or #; fall, spring, summer, offered periodically) Concepts, tools, and techniques of computer-aided drawing with current AutoCAD Release. Producing dimensioned/annotated drawings for plotting. 3-D drawing capabilities. Use of dimension variables, attributes, blocks, symbols.

ARCH 3381. Introduction to Computer Aided Architectural Design. (3.0 cr.; A-F or Audit; prereq Arch major or BDA major or #; fall, every year) Introduction to 2-D drawing, 3-D modeling/animation, printing, plotting. Electronic networking/communications, database management, spreadsheet analysis, land-use analysis, project management.

ARCH 3411V. Architectural History to 1750. (3.0 cr.; A-F only; prereq Soph or above; fall, every year) History of architecture/city planning from antiquity to 1750, as illustrated by major monuments from western/non-western cultures.

ARCH 3411W. Architectural History to 1750. (3.0 cr.; A-F or Audit; prereq Soph or above; fall, every year) History of architecture/city planning from antiquity to 1750, as illustrated by major monuments from western/non-western cultures.

ARCH 3411V. Architectural History since 1750. (3.0 cr.; A-F or Audit; prereq Soph or above; spring, every year) Examples of the built environment from the Enlightenment to the present are studied within a broad social, cultural, and political context. Major architectural movements and their associated forms and designs.

ARCH 3412H. Honors: Architectural History Since 1750. (3.0 cr.; A-F or Audit; prereq Soph, honors; spring, every year) Built environment from the Enlightenment to the present in a broad social, cultural, and political context. Major architectural movements and associated forms/designs. Ideas/philosophies that have emerged over time. Lecture, textbooks, discussion, writing, drawing, looking, and researching.

ARCH 3511. Material Transformations: Technology and Change in the Built Environment. (3.0 cr.; A-F only; fall, every year) Surveys development of significant architectural material technologies/their relationships to society/natural environment.

ARCH 3611. Design in the Digital Age. (3.0 cr.; A-F or Audit; =ARCH 5611; spring, every year) Introduction to design, design process. Developing/understanding ways of seeing, thinking, and acting as a designer. Changes in design being wrought by digital technology. Team design project.

ARCH 3641. Introduction to Heritage Preservation. (3.0 cr.; A-F only; prereq Jr or sr only; fall, every year) Potential of, and challenges to, heritage preservation in the United States. Preservation’s pros/cons. Lectures, readings, films, class discussions, assignments, local field trips, case studies.

ARCH 3711V. Honors: Environmental Design and the Sociocultural Context. (3.0 cr.; A-F only; =ARCH 3711V; prereq Honors, [soph or above]; fall, every year) Designed environment as cultural medium and as product of a sociocultural process and expression of values, ideas, and behavioral patterns. Design/construction as complex political process.

ARCH 3711W. Environmental Design and the Sociocultural Context. (3.0 cr.; A-F only; =ARCH 3711W; prereq Soph or above; fall, every year) Designed environment as cultural medium/product of sociocultural process/expression of values, ideas, behavioral patterns. Design/construction as complex political process.

ARCH 3722. Istanbul: The City in Visual Culture. (3.0 cr.; A-F only; prereq Jr or sr arch major or landscape arch major; spring, every year) Examine how spaces of Istanbul are created, experienced, represented through its visual culture. How physical landscape of city has changed over many eras. Seminars, readings, on-site lectures, explorations.

ARCH 3993. Directed Study. (1.0-3.0 cr. [max 6.0 cr.]; A-F only; prereq #; fall, spring, summer, every year) Guided individual reading or study.
ARCH 4150. Topics in Architecture. (1.0-4.0 cr. [max 24.0 cr.]; A-F or Audit; prereq Arch major or #; fall, spring, offered periodically) Design, technology, history, theory, representation, or urbanism.

ARCH 4194H. Thesis/Capstone Project. (3.0 cr. [max 6.0 cr.]; A-F only; prereq Arch Major, sr, honors; fall, spring, every year) Individualizes honors experience by connecting aspects of major program with special academic interests.

ARCH 4283. Undergraduate Architecture Studio III. (6.0 cr.; A-F only; prereq 3282 or 4282; B.S. Arch major; fall, every year) Introduction to architectural design in relation to materials, construction methods.

ARCH 4284. Undergraduate Architecture Studio IV. (6.0 cr.; A-F only; prereq 4283, BS Arch major; spring, every year) Topical design studio.

ARCH 4313. Visual Communication Techniques in Architecture. (3.0 cr.; A-F or Audit; =ARCH 5313; prereq 3301 or 4301; fall, every year) Delineation, presentation, and design techniques. Various visual media, methods of investigation.

ARCH 4321. Architecture in Watercolor. (3.0 cr.; A-F or Audit; =ARCH 5321; prereq 1301; fall, spring, summer, offered periodically) Watercolor as tool in design process. Foundation principles, techniques, medium, tools, materials. Color relationships, mixing, composition, applications to design.

ARCH 4325. Architectural Photography: Imaging by Design. (4.0 cr.; A-F only; prereq BDA or BS major or Landscape Design and Planning major or #; fall, spring, offered periodically) Principals of architectural photography as language of design through lectures, demonstrations, critical discussions. Ongoing photographic study under framework of conceptual themes. Compositional forms, graphic styling, use of natural/artificial light, technical issues.

ARCH 4361. 3-D Computer Architectural Modeling and Design. (3.0 cr.; A-F or Audit; =ARCH 5361; prereq 3351, Arch major; fall, spring, summer, every year) Use of 3D computer modeling for representation in abstract/realistic ways. Creation/arrangement of objects. Setting up lighting. Developing surface materials. Creating still renderings/animations. Ways computer visualization can be used for design exploration, feedback during idea development, and realistic representation of designs.

ARCH 4382. Computer-Aided Architectural Design. (3.0 cr.; A-F or Audit; prereq 3381 or 5381; spring, every year) Computer-aided tools as used in design. Practice in 2-3-D CAD, image manipulation. Advanced multimedia visualization techniques, including solid modeling, photo realistic imaging, animation, and video editing/recording.

ARCH 4421W. Architecture and Interpretation: The Cave and the Light. (3.0 cr.; A-F or Audit; =ARCH 5421; prereq [3411, 3412] or #; spring, odd years) Historical/hermeneutical investigation of iconography of grotto. Intertwined themes of descent into earth and ascent to light, from earliest strata of human culture to present day.

ARCH 4423. Gothic Architecture. (3.0 cr.; A-F or Audit; =ARCH 5423; prereq 3411 or #; fall, offered periodically) History of architecture and urban design in Western Europe, from 1150 to 1400.

ARCH 4424. Renaissance Architecture. (3.0 cr.; A-F or Audit; =ARCH 5424; prereq 3411 or #; fall, offered periodically) History of architecture and urban design in Italy, from 1400 to 1600. Emphasizes major figures (Brunelleschi, Alberti, Bramante, Palladio) and evolution of major cities (Rome, Florence, Venice).

ARCH 4425. Baroque Architecture. (3.0 cr.; A-F or Audit; =ARCH 5425; prereq 3411 or #; fall, offered periodically) Architecture and urban design in Italy, from 1600 to 1750. Emphasizes major figures (Bernini, Borromini, Cortona, Guarini) and evolution of major cities (Rome, Turin).

ARCH 4428. Byzantium/Istanbul: Crossroads of East and West. (3.0 cr.; A-F only; prereq jr or sr arch major or landscape arch major; spring, every year) Survey architecture/landscapes of Byzantium/Istanbul. Visual, chronological, theoretical understandings of key monuments/landscapes in Byzantine/Ottoman architecture.

ARCH 4432. Modern Architecture. (3.0 cr.; A-F or Audit; =ARCH 5432; prereq 3412 or #; fall, odd years) Architecture and urban design in Europe and the United States from early 19th century to World War II.

ARCH 4434. Contemporary Architecture. (3.0 cr.; A-F or Audit; =ARCH 5434; prereq 3412 or #; fall, every year) Developments, theories, movements, and trends in architecture and urban design from World War II to present.

ARCH 4441. Minnesota: Architecture and Landscapes. (3.0 cr.; A-F or Audit; =ARCH 5441; prereq 3411, 3412) recommended; spring, every year) History of major architectural monuments, urban phenomena, and landscape forms of Minnesota. Interrelationships between architecture, geography, and people.

ARCH 4445W. Suburbia. (3.0 cr.; A-F only; =ARCH 5445; fall, every year) Suburbia, from origins in 18th-century England to present. Theories and design challenges, especially in America. Ideology, mythology, planning, development, geography, transportation, the family. Specific sites/designs. Representations in film, television, popular literature, and music.

ARCH 4461. North American Indian Architecture. (3.0 cr.; A-F only; =ARCH 5461; prereq Arch 3412, Arch or Amin major; spring, odd years) Historic/contemporary principles/theories of North American Indian architecture. Culture, technology, environment, art, and craft of North American Indians in their settlements/architecture.


ARCH 4521. Environmental Technology I. (3.0 cr.; A-F or Audit; prereq BS Arch major; spring, every year) Issues related to environmental quality/design. Climate response. Heating, cooling, lighting design. Indoor air quality.


ARCH 4561. Architecture and Ecology. (3.0 cr.; A-F or Audit; =ARCH 5501; spring, every year) Introduction to theories/practices of ecological approaches to architectural design. Ecological context, implications/opportunities of architecture. Historical/theoretical framework for ecological design thinking. Issues studied at various scales: site/community, building, component.


ARCH 4672. Historic Building Conservation. (3.0 cr.; A-F or Audit; prereq 4671 or concurrent enrollment in 4671 or #; fall, every year) Historic building materials, systems, methods of conservation. Structural systems,...
ARCH 4701W. Introduction to Urban Form and Theory. (3.0 cr.; A-F only; prereq [3411, 3412] or #; fall, every year)
Urban form, related issues of design/theory/culture. Thematic history of cities. Lectures, discussions, assignments.

ARCH 4731. Territorial City. (3.0 cr.; A-F only; prereq #: fall, every year)
Seminar. Students research, define, and test conditions within which the territory and contemporary city coexist. Site for research is Twin Cities metropolitan area. Readings, discussions, field trips, collaborative development of urban proposals.

ARCH 4750. Introduction to Urban Form and Issues. (3.0 cr.; A-F or Audit; prereq Undergrad arch major or #; fall, every year)
Topics in architecture/design.

ARCH 5011. Architecture as Catalyst. (1.0 cr. [max 3.0 cr.]; S-N only; prereq M.Arch; spring, every year)
Topical workshops on design methods, theories, or emerging practices.

ARCH 5101. Architectural Design Studies. (7.0 cr.; S-N only; prereq 3+ track for MArch; summer, every year)
Principles/methods of architectural design. Theories, history, technologies, media, and processes as foundation for critical thinking. Analytic modeling, visual thinking.

ARCH 5110. Architecture in Watercolor. (3.0 cr.; A-F only; =ARCH 4313); prereq M Arch major or #; fall, spring, every year)
Watercolor as a tool in design process. Foundation principles, techniques, medium, tools, materials. Color relationships, mixing, composition, applications to design.

ARCH 5131. Visual Communication Techniques in Architecture. (3.0 cr.; A-F or Audit; =ARCH 4313); prereq M Arch major or instr consent; fall, spring, every year)
Delineation, presentation, and design techniques. Various visual media and methods of investigation.

ARCH 5140. Principles of Design. (3.0 cr.; A-F only; =ARCH 4311); prereq M Arch major or #; fall, every year)
Principles of design and their instrumentation. How and why architecture theory is generated. Types and significance of formal analysis. Theoretical positions and modes of criticism.

ARCH 5241. Architecture and Interpretation: The Cave and the Light. (3.0 cr.; A-F only; =ARCH 4421W); prereq [3411, 3412] or #; fall, odd years)
Historical/hermeneutical investigation of iconography of grotto. Intertwined themes of descent into earth and ascent to light from earliest strata of human culture to present day.

ARCH 5243. Gothic Architecture. (3.0 cr.; A-F or Audit; =ARCH 4423); prereq MS Arch or M Arch major or #; spring, every year)
History of architecture and urban design in Western Europe, from 1150 to 1400.

ARCH 5244. Renaissance Architecture. (3.0 cr.; A-F or Audit; =ARCH 4424); prereq MS Arch or M Arch major or #; fall, spring, offered periodically)
History of architecture and urban design in Italy, from 1400 to 1600. Emphasizes major figures (Brunelleschi, Alberti, Bramante, Palladio) and evolution of major cities (Rome, Florence, Venice).

ARCH 5245. Baroque Architecture. (3.0 cr.; A-F or Audit; =ARCH 4425); prereq MS Arch or M Arch major or #; fall, odd years)
Architecture and urban design in Italy, from 1600 to 1750. Emphasizes major figures (Bernini, Borromini, Cortona, Guarini) and evolution of major cities (Rome, Turin).

ARCH 5246. Modern Architecture. (3.0 cr.; A-F or Audit; =ARCH 4432); prereq MS Arch or M Arch major or #; fall, every year)
Developments, theories, movements, and trends in architecture and urban design, from World War II to present.

ARCH 5441. Minnesota: Architecture and Landscapes. (3.0 cr.; A-F only; =ARCH 4441); prereq [3411, 3412] recommended; spring, every year)
History of major architectural monuments, urban phenomena, and landscape forms of Minnesota. Interrelationships between architecture, geography, and people.

ARCH 5445. Suburbia. (3.0 cr.; A-F only; =ARCH 4445W); fall, every year)
Suburbia, from origins in 18th-century England to present. Historical changes and present challenges, especially in America. Ideology, mythology, planning, development, geography, transportation, the family. Specific sites/designs. Representations in film, television, popular literature, and music.
Eight-week seminar. Avant-garde architectural responses to postwar consciousness of social issues/meaning. How tenets of western avant-gardism were transformed by regional constraints when introduced to post-independent agendas of non-western world.

ARCH 5450. Topics in Architectural Theory. (1.0-3.0 cr. [max 9.0 cr.]; A-F or Audit; prereq Arch major or M Arch major or #; fall, spring, summer, every year)
Selected topics in architectural theory and criticism.

ARCH 5451. Architecture: Defining the Discipline. (4.0 cr.; A-F only; prereq M Arch major; fall, spring, offered periodically)
Paradigms through which architecture has defined itself. Implications for its practice, product, and architecture in general. Lecture, discussion, design exercises.

ARCH 5452. Architecture: Design, Form, Order, and Meaning. (4.0 cr.; A-F or Audit; prereq M Arch major or #; fall, spring, every year)
Architecture and the issue of meaning. Explores fundamental and constituent elements of architectural form and order; their inherent tectonic, phenomenal, experiential, and symbolic characteristics; their potential and implications for the creation and structure of meaningful human places.

ARCH 5461. North American Indian Architecture. (3.0 cr.; =ARCH 4461; prereq M Arch major or instr consent; spring, every year)
Historic/contemporary principles/theories of North American Indian architecture. Culture, technology, environment, art, and craft of North American Indians in their settlements/architecture.

ARCH 5465. Le Corbusier's Search for Theory and Identity in His Formative Years. (3.0 cr.; A-F only; prereq M Arch major; spring, every year)

ARCH 5513. Environmental Technology I: Thermal Design in Architecture. (3.0 cr.; A-F or Audit; prereq M Arch major or #; fall, every year)
Thermal and climatic issues in the design of small and mid-size buildings. Investigations in built and mechanical methods to modify climate. Evaluation of the impact of design techniques on energy use, the environment, and architectural meaning.

ARCH 5514. Environmental Technology II: Lighting and Acoustic Design. (3.0 cr.; A-F or Audit; prereq M Arch major or #; fall, every year)
Principles of daylighting, electric lighting, and acoustic design in architecture. Relationship between luminous and acoustic environments, human comfort and architectural experience. Analytical methods, design process, and modeling of daylighting.

ARCH 5515. Technology One: Building Materials and Construction Systems. (3.0 cr.; A-F only; prereq M Arch student; fall, every year)

ARCH 5516. Technology Two: Luminous and Thermal Design. (6.0 cr.; A-F only; prereq M Arch; spring, every year)
Concepts/principles of daylighting, thermal, energy, and systems integration. Architectural/technological implications of lighting and thermal design. Ecological thinking in support of sustainable design decision making.

ARCH 5517. Technology Three: Structural Systems. (3.0 cr.; A-F only; prereq M Arch student; fall, every year)
Structural behavior in withstanding gravity and lateral forces. Evolution, range, and applications of structural systems. Structural analysis. Graphical methods, site visits, analog/digital modeling. Case studies, problems.

ARCH 5521. Material Investigation: Concrete. (4.0 cr.; A-F only; prereq MArch or MS; spring, every year)
Design projects identify common problems/improvements, investigate alternatives, and develop solutions where concrete is primary building material.

ARCH 5523. Material Investigation: Steel and Glass. (4.0 cr.; A-F only; prereq Grad student; spring, every year)
Design projects identify common problems and improvements, investigate alternatives and develop solutions where steel and glass are the primary building materials.

ARCH 5527. Material Investigations: Stone and Water. (4.0 cr.; A-F only; prereq MArch or M.S.; spring, every year)
Design projects identify common problems/improvements, investigate alternatives, and develop solutions where wood is primary building material.

ARCH 5539. Daylighting and Architecture Design. (4.0 cr.; A-F only; prereq M Arch major; spring, every year)
Ecological design approaches that combine ecological, physiological, and experiential aspects to enhance relationship to place. How formal, aesthetic, and experiential aspects of daylighting support/foster sustainable architectural design.

ARCH 5541. Material Strategies. (3.0 cr.; A-F only; prereq M Arch or Arch MS major; fall, every year)
Emergent materials in advanced building design; strategies for material approaches relevant to global resource flows, technological trajectories, and sociocultural effects. Research projects based on evaluative tools and case studies.

ARCH 5550. Topics in Technology. (1.0-4.0 cr. [max 12.0 cr.]; A-F only; prereq M.Arch or MS Arch major; fall, spring, summer, every year)
Selected topics in architecture technology, e.g., construction, environmental management, energy performance, lighting, materials.

ARCH 5561. Tech 1, Structures for Building. (2.0 cr.; A-F only; prereq M Arch major or #; fall, every year)
Role of structure in architectural design. Common systems found throughout history. Review systems to identify parameters that influence structural decisions.

ARCH 5562. Tech 2, Intro to Building Technology. (2.0 cr.; A-F only; prereq M.Arch or #; fall, every year)
Origin/development of architectural idea. Designs as direct means of representing our underlying intentions.

ARCH 5563. Tech 3: Advanced Building Technology Integrated Building Systems. (0.0-2.0 cr.; A-F only; prereq M.Arch or #; fall, every year)
Logic of integrating building systems. Improving understanding of/thinking critically about integration principles, theories, practice, application. Identifying/working through problems project architect must address.

ARCH 5564. Tech 4: Building Structural Systems. (0.0-2.0 cr.; A-F only; prereq M Arch or #; fall, every year)
Main concepts related to building structures. Basic knowledge of flow of forces. Review of rules for sizing structures. Calculations to understand systems behavior. Knowledge/tools to design buildings considering structure within design process.

ARCH 5609. Development and Implementation of Research. (3.0 cr.; A-F only; prereq #; fall, every year)
Bridge gaps among architectural research, design, practice. Forum for students to independently develop research topics/implement research methods related to architectural scholarship/practice, aided by classmates, instructor, guest lecturers.

ARCH 5611. Design in the Digital Age. (3.0 cr.; A-F or Audit; =ARCH 3611; prereq Grad student or upper level undergrad student; spring, every year)
Introduction to design, design process. Developing/understanding ways of seeing, thinking, and acting as a designer. Changes in design being wrought by digital technology. Team design project.

ARCH 5621. Professional Practice in Architecture. (3.0 cr.; A-F or Audit; prereq M Arch major or #; fall, spring, summer, every year)
Legal, ethical, business, and practical requirements of architectural practice. Contemporary and historical models of contract formation, business principles, accounting, project management, design services, and marketing.

ARCH 5630. Practicum: Advanced Issues in Practice. (3.0 cr. [max 6.0 cr.]; S-N only; prereq M.S. Architecture or M.Arch; fall, spring, every year)
Advanced architectural practice topics not normally covered in curricula are examined/
evaluated as foundation for licensure/ARE 4.0 testing processes.

ARCH 5650. Topics in Architectural Practice.  (1.0-4.0 cr. [max 16.0 cr.]; prereq M Arch 5621, Arch major or 5621, M Arch major or #; fall, spring, summer, every year) Topics in architectural practice, methods of design production, marketing, operation, and relationships among clients, architecture, and society.

ARCH 5651. Building Stories.  (3.0 cr. [max 12.0 cr.]; A-F only; spring, every year) Professional practice education by means of case study analysis.

ARCH 5670. Topics in Historic Preservation.  (1.0-3.0 cr. [max 12.0 cr.]; prereq MS Arch or M Arch major or #; fall, offered periodically) Selected topics in the theory, philosophy, research, and methods of architectural historic preservation.

ARCH 5671. Historic Preservation.  (3.0 cr.; fall, every year) Philosophy, theory, origins of historic preservation. Historic architecture/research, descriptive analysis, documentation of historic buildings. Government's role in historic preservation, preservation standards/guidelines, preservation/building codes, preservation advocacy.


ARCH 5673. Historic Property Research and Documentation.  (3.0 cr.; prereq [3412, 3641, 4671, 5671, 4672 or 5672] or #; spring, every year) Philosophy, theory, methods of historic building research. Descriptive analysis of buildings, building documentation, historical archaeology, architectural taxonomy.

ARCH 5677. Preservation of the Vernacular Built Environment and Cultural Landscape.  (3.0 cr.; A-F only; prereq Grad student, open to upper level (junior/senior) undergraduates with #. Honors student encouraged.; spring, offered periodically) Theoretical, methodological, practical implications of preserving vernacular environment such as commercial blocks, strips/buildings, warehouses/sheds, wharves/piers, abandoned streetcar tracks/railroad spurs.

ARCH 5711. Theory and Principles of Urban Design.  (3.0 cr.; A-F or Audit; prereq M Arch major or LA grad major or grad student or #; spring, every year) Seminar. Debate on dominant theories/paradigms informing city design from renaissance to 21st century. Critical issues central to current debates.

ARCH 5721. Case Studies in Urban Design.  (3.0 cr.; A-F or Audit; [LA 5721]; prereq Grad student or #; spring, every year) Reading seminar. Evolution of contemporary city. Dynamics that created contemporary urban spatial patterns. Planning/design theories that have guided public interventions in built environment. Thematic texts, classroom discussions.

ARCH 5731. Territorial City.  (3.0 cr.; A-F only; fall, every year) Seminar. Students research, define, and test conditions within which the territory and contemporary city coexist. Site for research is Twin Cities metropolitan area. Readings, discussions, field trips, collaborative development of urban proposals.

ARCH 5750. Topics in Urban Design.  (1.0-4.0 cr. [max 16.0 cr.]; A-F or Audit; prereq Arch major; fall, spring, summer, every year) Special topics in theory/practice of urban design.

ARCH 5993. Directed Study.  (1.0-4.0 cr. [max 8.0 cr.; A-F or Audit; prereq #; fall, spring, every year) Guided individual reading or study.

ART (ARTS)
College of Liberal Arts

ARTS 1001. Introduction to Contemporary Art and Theory.  (4.0 cr.; fall, spring, summer, every year) Introductory overview of contemporary artistic practices/theoretical foundations. Familiarization with contemporary critical/creative practices. Approaches to contemporary art through lens of cultural diversity/social justice.

ARTS 1002. Art and Life: Thinking About Ethics Through Art.  (3.0 cr.; fall, spring, every year) Case examples from visual arts. Ethical theories. Philosophical take on relationship between art, life, ethics.

ARTS 1003. MyMovies.  (4.0 cr.; fall, every year) Examination of new moving image/filmmaking practices. How technology has changed practice, aesthetics, discourse of moving images. Hybrid practice/study course. Create short films using new technologies such as smart-phones/other hand-held devices.

ARTS 1004. Artistic Interpretation from Vintage Cinema.  (3.0 cr. [max 4.0 cr.]; S-N only; every year) For non-art majors who enjoy classic movies/want to familiarize themselves with basic artistic techniques. View twelve rarely seen vintage films from different time periods/cultures. Discuss films, respond in visual medium. No previous drawing experience/artistic ability necessary.

ARTS 1101. Drawing.  (4.0 cr.; [ARTS 2101]; fall, spring, summer, every year) Fundamental principles/processes of drawing; various drawing media.

ARTS 1102. Painting.  (4.0 cr.; [ARTS 2102]; prereq 1101 or 2101; fall, spring, summer, every year) Introduction to painting with attention to understanding and applying the fundamental principles of spatial organization and color interaction.

ARTS 1301. Sculpture.  (4.0 cr.; [ARTS 2301]; fall, spring, summer, every year) Introduction to sculptural practice. Materials, methods, concepts, history. Emphasizes correlation between concepts and materials. Creative work in clay, plaster, metal, and wood.

ARTS 1490. Workshop in Art.  (1.0-4.0 cr. [max 12.0 cr.]; fall, spring, summer, every year) Selected topics. Intensive studio activity.

ARTS 1501. Printmaking: Intaglio and Lithography.  (4.0 cr.; [ARTS 2501]; fall, spring, summer, every year) Introduction to techniques of intaglio etching/lithography. Historical approaches/use through contemporary materials/concepts. Emphasizes interrelationship of process, materials, and ideas/aesthetics.

ARTS 1502. Printmaking: Relief, Screen, and Digital Processes.  (4.0 cr.; [ARTS 2502]; fall, spring, summer, every year) Techniques of relief (linoleum and woodcut), screenprint, and digital printmaking. Historical approaches and use through contemporary materials, concepts, and practices. Emphasizes interrelationship of process, materials, and ideas.

ARTS 1505. Papermaking.  (4.0 cr.; fall, spring, every year) Introduction to approaches, forms, and aesthetic possibilities of paper as an expressive medium. Studio work in both Eastern and Western traditions and sculptural applications.

ARTS 1601. Experimental and Media Arts.  (4.0 cr.; [ARTS 2601]; fall, spring, summer, every year) New technologies as a source for creative art making. Basic processes in digital video, sound, animation, interactive, and networked technologies. Integration of new technologies with more traditional media arts and art disciplines, including filmmaking, sculpture, painting, printmaking, photography, and ceramic arts.

ARTS 1701. Photography.  (4.0 cr.; [ARTS 2701]; fall, spring, summer, every year) Presents conceptual, technical, historical aspects of photography within fine arts context. Emphasis on creative process through hands-on experience in use of camera, digital, black/white, darkroom processes.

ARTS 1901. Freshman Seminar. (3.0 cr.; A-F or Audit; prereq freshman; fall, every year)
Topics specified in Class Schedule.

ARTS 1902. Freshman Seminar. (3.0 cr.; spring, every year)
Topics specified in Class Schedule.

ARTS 1903. Freshman Seminar. (3.0 cr.; spring, every year)
Topics specified in Class Schedule.

ARTS 1904. Freshman Seminar. (3.0 cr.; prereq Fr; fall, spring, offered periodically)
Topics specified in Class Schedule.

ARTS 1905. Freshman Seminar. (3.0 cr.; A-F or Audit; prereq freshman; fall, spring, offered periodically)
Topics specified in Class Schedule.

ARTS 1910W. Freshman Seminar. (3.0 cr.; A-F or Audit; prereq Freshman; fall, spring, offered periodically)
Topics specified in Class Schedule.

ARTS 2101. Drawing. (4.0 cr.; A-F only; = [ARTS 1101]; prereq Intended or declared art major or minor; fall, spring, summer, every year)
Fundamental principles/processes of drawing; various drawing media.

ARTS 2102. Painting. (4.0 cr.; A-F only; = [ARTS 1102]; prereq 1101 or 2101, intended or declared art major; fall, spring, summer, every year)
Introduction to painting with attention to understanding and applying the fundamental principles of spatial organization and color interaction.

ARTS 2301. Sculpture. (4.0 cr.; A-F only; = [ARTS 1301]; prereq Intended or declared art major or minor; fall, spring, summer, every year)

ARTS 2501. Printmaking: Intaglio and Lithography. (4.0 cr.; A-F only; = [ARTS 1501]; prereq Intended or declared art major or minor; fall, spring, summer, every year)
Introduction to techniques of intaglio etching/lithography. Historical approaches/use through contemporary materials/concepts. Emphasizes interrelationship of process, materials, and ideas/aesthetics.

ARTS 2502. Printmaking: Relief, Screen, Digital Processes. (4.0 cr.; A-F only; = [ARTS 1502]; prereq Intended or declared art major or minor; fall, spring, summer, every year)
Techniques of relief (linoleum and woodcut), screenprint, and digital printmaking. Historical approaches/use through contemporary materials, concepts, and practices. Emphasizes interrelationship of process, materials, and ideas.

ARTS 2601. Experimental and Media Arts. (4.0 cr.; A-F only; = [ARTS 1601]; prereq Intended or declared art major or minor; fall, spring, summer, every year)
New technologies as a source for creative art making. Basic processes in digital video, sound, animation, interactive, and networked technologies. Integration of new technologies with more traditional media arts and art disciplines, including filmmaking, sculpture, painting, printmaking, photography, and ceramic arts.

ARTS 2701. Photography. (4.0 cr.; A-F only; = [ARTS 1701]; prereq Intended or declared art major or minor; fall, spring, summer, every year)
Presents conceptual, technical, historical aspects of photography within fine arts context. Emphasis on creative process through hands-on experience in use of camera, digital, black/white, darkroom processes.

ARTS 2801. Ceramics. (4.0 cr.; A-F only; = [ARTS 1801]; prereq Intended or declared art major or minor; fall, spring, summer, every year)

ARTS 3101. Intermediate Drawing. (4.0 cr.; prereq 1001, 1101 or 2101; fall, spring, every year)
Further exploration and understanding of drawing elements with emphasis on developing visual judgment, drawing process, and execution. Specific problems to promote the understanding of pictorial structure and personal expression.

ARTS 3102. Intermediate Painting. (4.0 cr.; prereq 1001, 1101 or 2101, 1102 or 2102; fall, spring, every year)
Emphasizes development of visual sensibility, individual direction, critical judgment.

ARTS 3105. Dimensional Painting. (4.0 cr.; prereq 1001, 1101 or 2101, 1102 or 2102; spring, every year)
Application of two-dimensional visual concerns as they relate to sculptural form. Exploration of how painting ideas affect perception of real space.

ARTS 3106. Drawing: Interpreting the Site. (4.0 cr.; prereq 1001, 1101 or 2101; summer, every year)
Field trips to draw or paint in various metropolitan area locations. Site interpretations, experimentation with marks/symbols. Focuses on search for personal content as inspired by site.

ARTS 3107. Drawing Using Digital Media as an Essential Tool. (4.0 cr.; prereq 1001, 1101 or 2101; fall, spring, every year)
Possibilities of digital technology as tool/component in contemporary, creative drawing practice.

ARTS 3111. Life Drawing I. (4.0 cr.; prereq 1001, 1101 or 2101; fall, spring, summer, every year)

ARTS 3112. Life Drawing II. (4.0 cr.; prereq 3111 or #; spring, every year)
The human form in pictorial structure, single, and multiple figure compositions. The creative process, work toward a personal direction. Attention to representation of the human image in cultural, historical, and contemporary context.

ARTS 3300. Intermediate Sculpture. (4.0 cr.; prereq [1001, 1301] or [2301, 3390]; fall, spring, every year)

ARTS 3301. Sculpture: Direct Metal. (4.0 cr.; prereq 1001, 1301; fall, offered periodically)
Constructive approach to sculpture through welding in steel, other metals. Studio practice, investigation of historical/contemporary methods/concepts.

ARTS 3302. Sculpture: Spatial Problems. (4.0 cr.; prereq 1001, 1301; fall, spring, every year)
Focuses on sculptural practice outside traditional media/approaches. Theoretical constructions of space as primary medium of sculpture. Installation, theater, public art, architecture.

ARTS 3303. Sculpture: Metalcasting. (4.0 cr.; prereq 1001, 1301; fall, spring, every year)
Metal casting of sculpture in bronze, iron, aluminum, other metals. Studio practice, investigation of historical/contemporary methods/concepts.

ARTS 3304. Sculpture: Carving and Construction. (4.0 cr.; prereq 1001, 1301; fall, spring, every year)

ARTS 3305. Sculpture: Kinetics. (4.0 cr.; prereq 1001, 1301; spring, every year)
The exploration of movement in sculpture (wind, water, electric). Studio practice and investigation of historical and contemporary methods and concepts.

ARTS 3306. Performance Art and Installation. (4.0 cr.; prereq 1001, 1301; fall, spring, offered periodically)
Studio practice, investigation of forms of expression involving narrative, performance, installation. Hybrid art forms introduced by Dada movement in 1920’s, continued by Fluxus movement in 1950’s, to contemporary performance/installation artists.

ARTS 3307. Contemporary and Traditional Approaches to Figurative Sculpture. (4.0 cr.; prereq 1001, 1301; spring, every year)
Clay modeling of human figure, other forms. Mold-making, plaster casting with historical/contemporary systems. Studio practice, investigation of traditional sculptural methods/concepts.

ARTS 3309. Sculpture Methods and Practice. (4.0 cr.; [max 12.0 cr.]; prereq 1001 or 1301 or 2301; fall, spring, every year)
ARTS 3401W. Critical Theories and Their Construction From a Studio Perspective. (3.0 cr.; prereq [1001, junior] or #; fall, spring, every year)

Primary critical theories that shape analysis of works of art. Evaluation of works from artist's perspective. Theory as organizational structure from which to understand contemporary works.

ARTS 3402. Artists' Books. (4.0 cr.; prereq 1001, one visual art course; fall, spring, every year)

Study/creation of unique, handmade books using various structures, media, techniques. Critical, historical, theoretical issues surrounding contemporary book arts.

ARTS 3403. Women's Images and Images of Women. (3.0 cr.; =ARTS 5403; prereq 1001 or #; fall, spring, every year)

Women's place in Western art from the artist's perspective. Women as artists and the imagery they have created. Women as the object of imagery and the social and political attitudes those images convey. Survey of women artists from late-Renaissance through contemporary feminism; relevant issues.

ARTS 3411H. Honors Tutorial in Visual Arts. (1.0-4.0 cr. [max 6.0 cr.]; A-F or Audit; prereq Honors, #; fall, spring, summer, every year)

Individual consultation with a faculty member on visual work, research project, presentation, paper, or bibliography.

ARTS 3415H. Honors Exhibition. (2.0 cr.; A-F or Audit; prereq [Magna or summa honors candidate], #; %; fall, spring, summer, every year)

Advanced problems in studio and research, leading to a magna or summa exhibition.

ARTS 3416H. Honors Thesis: Supporting Paper. (1.0 cr.; A-F or Audit; prereq Summa level honors candidate, #; fall, spring, summer, every year)

Summa thesis paper written in support of honors exhibition or in relation to candidate's visual/conceptual interests.

ARTS 3420. Visiting Artists Program. (1.0 cr. [max 2.0 cr.]; S-N only; fall, spring, every year)

Guest speakers, artist presentations. Identification of themes, correlations between ideas presented by guest artists/critics and students' own creative work.

ARTS 3444. Major Project. (1.0 cr.; S-N only; prereq Concurrent registration in a ARTS 3xxx or 5xxx course; fall, spring, every year)

Develop professional skills. Exhibition in Regis Center public spaces.

ARTS 3490. Workshop in Art. (1.0-4.0 cr. [max 12.0 cr.]; fall, spring, summer, every year)

Selected topics and intensive studio activity; topics vary yearly.

ARTS 3496. Internship in the Arts. (1.0-3.0 cr.; S-N or Audit; prereq BFA Art major, #; fall, spring, summer, every year)

Field work at local, regional, national, or international arts organization or with professional artist provides experience in activities/administration of art/art-based organizations.

ARTS 3499. Internship at Katherine E. Nash Gallery. (3.0 cr.; S-N or Audit; prereq 1001 or ARTH 1XXX or #; fall, spring, summer, every year)

Hands-on experience in day-to-day operation/mission of Department of Art's professional gallery.

ARTS 3505. Papermaking as an Art Form. (4.0 cr.; prereq 1001, 1505; fall, spring, every year)

Further exploration of Eastern, Western, and sculptural applications of papermaking as an art form. Development of visual vocabulary through experimentation and focused inquiry into historical and contemporary methods.

ARTS 3510. Intermediate Printmaking: Traditional and Contemporary Approaches. (4.0 cr. [max 8.0 cr.]; prereq 1001, [1501 or 2501 or 2502 or 2502]; fall, spring, every year)

The print as vehicle for conceptual/personal expression. Traditional printmaking techniques, evolving contemporary processes for realizing visual concepts. Historical/cultural development of multiple/matrix as means of communication.

ARTS 3601. New Media: Making Art Interactive. (4.0 cr.; prereq 1001, 1601 or 2601; fall, spring, offered periodically)


ARTS 3602. Narrative Digital Video. (4.0 cr.; prereq 1001, [1601 or 2601 or #]; fall, spring, every year)


ARTS 3603. Experimental Video. (4.0 cr.; prereq 1001, [1601 or 2601 or #]; fall, spring, every year)


ARTS 3604. Animation. (4.0 cr.; prereq 1001, 1601 or 2601; fall, spring, every year)


ARTS 3605. Sound Art. (4.0 cr.; prereq 1001, 1601 or 2601; fall, spring, every year)

Sound Art practice/theory. Students produce creative projects using sound as primary material. History of experimental sound art from early 20th century to present. Critiques, readings, writing, public presentations.

ARTS 3609. Art for the People/Art on Wheels. (4.0 cr.; prereq 1001, 1601 or 2601; spring, every year)

Introduction to the Minneapolis Art on Wheels (MAW) project and participation in a student-run public art group. Engage in creative uses of MAW's hardware and software technologies for mobile projections and current urban projection techniques that rely on bicycles. Opportunities to develop and exhibit large scale works in public spaces.

ARTS 3701. Photography: The Extended Image. (4.0 cr.; prereq 1001, 1701 or 2701; fall, spring, every year)

Classical photographic practice, concentrating on camera/darkroom controls. Historical overview of the medium. Conceptual/contemporary approaches to traditional themes.

ARTS 3702. Photography: The Extended Image. (4.0 cr.; prereq 1001, 1701 or 2701; fall, spring, every year)

Manipulation of the photo image using various camera and darkroom methods including sequence, multiples, narrative, and book formats. Marking and altering photographic surfaces, applied color, and toning. Use of the photograph in interdisciplinary projects.

ARTS 3703. Photography: Digital Imaging. (4.0 cr.; prereq 1001, [1703 or 2703]; fall, spring, summer, every year)

Photographic digital imaging in fine arts. Manipulation, computer applications. Editing in photo imaging software.

ARTS 3801. Ceramics: Wheel Throwing. (4.0 cr. [max 8.0 cr.]; prereq 1001, 1801 or 2801; fall, spring, every year)

Expands wheel-throwing skills, develops aesthetic awareness of ceramic forms. Kiln firing, glaze formulation.

ARTS 3802. Ceramics: Handbuilding. (4.0 cr. [max 8.0 cr.]; prereq 1001, 1801 or 2801; fall, spring, every year)


ARTS 5105. Advanced Dimensional Painting. (4.0 cr.; prereq 3105 or #; spring, every year)

Illusionary space applied to sculptural forms. Practical applications of spatial/painterly concepts. Emphasizes critical/visual judgment. Development of cohesive body of work reflecting interaction of two/three dimensions.

ARTS 5106. Advanced Drawing: Interpreting the Site. (4.0 cr.; prereq 3106 or #; summer, every year)

Search for personal content as inspired by site. Field trips (2/3 of course) to draw or paint from various metropolitan area locations. Interpretations enhanced by experimentation with new marks/symbols.

ARTS 5107. Advanced Drawing Using Digital Media. (4.0 cr.; prereq 3107 or #; fall, spring, every year)
ARTS 5110. Advanced Drawing. (4.0 cr. [max 16.0 cr.]; prereq 3101 or 3111 or #; fall, spring, every year) Developing personal direction in form/content. Various media. Various aesthetic/conceptual approaches.

ARTS 5120. Advanced Painting. (4.0 cr. [max 16.0 cr.]; prereq 3102 or #; fall, spring, every year) Developing personal vision/content through painting. Emphasizes critical thinking, self-evaluation, and independent pursuit of ideas.


ARTS 5310. Advanced Sculpture: Direct Metal. (4.0 cr. [max 8.0 cr.]; prereq 3301 or #; fall, offered periodically) Direct metal sculpture in steel, other metals. Studio practice, investigation of historical/contemporary methods/concepts. Development of personal sculpture imagery.

ARTS 5320. Advanced Sculpture: Spatial Problems. (4.0 cr. [max 8.0 cr.]; prereq 3302 or #; fall, spring, every year) Sculptural practice outside traditional media/approaches. Installation, theater, public art, architecture as topics for individual investigations into spatial organization.

ARTS 5330. Advanced Sculpture: Metal Casting. (4.0 cr. [max 12.0 cr.]; prereq 3303 or #; fall, spring, every year) Metal casting of sculpture in bronze, iron, aluminum, other metals. Studio practice, investigation of historical/contemporary methods/concepts. Development of personal sculptural imagery.


ARTS 5350. Advanced Sculpture: Kinetics. (4.0 cr. [max 8.0 cr.]; prereq 3305 or #; spring, every year) Studio practice in kinetic sculpture. Historical/contemporary methods/concepts of sculpture produced by motion. Development of personal imagery.

ARTS 5360. Advanced Performance Art and Installation. (4.0 cr. [max 8.0 cr.]; prereq 3306 or #; fall, spring, offered periodically) Studio practice in performance art and installation; investigation of historical and contemporary methods and concepts of interdisciplinary expression. Development of personal imagery.


ARTS 5390. Advanced Sculpture Methods and Practice. (4.0 cr. [max 12.0 cr.]; prereq 5300; fall, spring, every year) Work in selected sculptural processes with intense studio activity. Development of innovative methods/techniques.


ARTS 5402. Artists' Books. (4.0 cr.; prereq 3402 or #; fall, spring, every year) Advanced projects in creation of unique, handmade books using various structures, media, techniques. Critical, historical, theoretical issues surrounding contemporary book arts.

ARTS 5403. Women's Images and Images of Women. (3.0 cr.; offered periodically) Women's place in Western art from the artist's perspective. Women as artists and the imagery they have created. Women as the object of imagery and the social and political attitudes those images convey. Survey of women artists from late-Renaissance through contemporary feminism; relevant issues.

ARTS 5441. Professional Practices. (3.0 cr.; A-F only; prereq Grad student or [Art BFA student or Art Major, jr or sr]; fall, spring, offered periodically) Theoretical issues, business practices, professional skills required for career management/development in visual arts.

ARTS 5444. Bachelor of Fine Arts Exhibition. (1.0 cr.; S-N only; prereq 5400, BFA candidate, sr; fall, spring, every year) Final solo or small group exhibition and artist's statement developed in consultation with faculty adviser. Visual documentation of work and statement as appropriate to media.

ARTS 5490. Workshop in Art. (1.0-4.0 cr. [max 12.0 cr.]; fall, spring, summer, every year) Selected topics and intensive studio activity. Topics vary yearly.

ARTS 5510. Advanced Printmaking. (4.0 cr. [max 12.0 cr.]; prereq 3510 or #; fall, spring, every year) In-depth research of personal imagery using a broad range of historical and contemporary applications. Development of imagery using color, photo-mechanical, digital processes. Cross-media approaches.

ARTS 5550. Advanced Papermaking. (4.0 cr. [max 8.0 cr.]; prereq 3505 or #; fall, spring, offered periodically) Distinct expressive qualities of handmade paper, its versatility as contemporary art form. Independent research pursued in consultation with instructor.

ARTS 5610. New Media: Making Art Interactive. (4.0 cr. [max 12.0 cr.]; prereq 3601 or #; fall, spring, offered periodically) Conceptual/aesthetic development with digital, interactive art. Experimental approaches to interactive technologies. Projects with responsive/tangible media. Theory/history of new media.

ARTS 5620. Narrative Digital Video. (4.0 cr. [max 12.0 cr.]; prereq 3602; fall, spring, every year) Individual, advanced, creative projects with narrative forms of video art. Documentary, live action, memoir. Relationships between conceptual, aesthetic, and artistic process.

ARTS 5630. Advanced Experimental Video. (4.0 cr. [max 12.0 cr.]; prereq 3603 or #; fall, spring, every year) Experimental approaches in producing digital video within a contemporary art context. Using digital media technologies in installation, performance, and interactive video art. Emphasizes expanding personal artistic development. Theoretical issues, critical/historical readings/writings in media arts.

ARTS 5640. Advanced Animation. (4.0 cr. [max 12.0 cr.]; prereq 3604 or #; fall, spring, every year) Two/three-dimensional animation with digital technologies. Individual projects. Expansion of personal voice/visual clarity within framework of animated imagery and time-based artwork.

ARTS 5650. Advanced Sound Art. (4.0 cr. [max 12.0 cr.]; prereq 3605; fall, spring, every year) Sound art practice/theory. Emphasizes individual creative projects using sound as primary material. History of experimental sound art from early 20th century to present. Critiques, readings, writing, public presentations.

ARTS 5670. Interdisciplinary Media Collaborations. (3.0 cr. [max 9.0 cr.]; offered periodically) Upper-degree undergraduate or graduate student in art, creative writing, dance, music or theater. Interdisciplinary, collaborative artist teams explore modes of creative expression at intersections of the arts. Students collaborate to co-author/produce works of art for public presentation. Emphasizes integration of media arts with visual art, music, dance, and theater to produce interdisciplinary/collaborative art.

ARTS 5690. Art for the People/Art on Wheels: Advanced Projects. (4.0 cr. [max 12.0 cr.]; prereq Arts 3609; spring, every year)
Advanced work in the Minneapolis Art on Wheels (MAW) project/participation in a student-run public art group. Use MAW's hardware/software technologies for mobile projections and current urban projection techniques that rely on bicycles. Opportunities to develop/exhibit large scale works in public spaces.

ARTS 5701. Performed Photography: Documentation of Artistic Acts and Social Interventions. (4.0 cr.; prereq Two 3xxx [photography or video] courses; fall, spring, offered periodically) Studio course. Use of image-based media to document various artistic, site-specific acts that may otherwise go unnoticed. Relationship between original event (performance, social intervention, sculptural prop, ephemeral gesture) and memory trace left in image/record.

ARTS 5710. Advanced Photography. (4.0 cr.; max 12.0 cr.; prereq Two semesters of 3xxx photography or #; fall, spring, every year) Design/implementation of individual advanced projects. Demonstrations, lectures, critique. Reading, writing, discussion of related articles/exhibitions.

ARTS 5810. Advanced Ceramics. (4.0 cr.; max 16.0 cr.; prereq [3801, 3802, 3810] or #; fall, spring, every year) Critical discourse of aesthetics. History of, contemporary issues in clay and criticism. Independent, advanced projects.

ARTS 5821. Ceramic Materials Analysis. (4.0 cr.; prereq 3801 or 3802 or #; fall, spring, offered periodically) Ceramic materials, their interrelationships. Advanced investigation of glazes, slip formulation, clay bodies in high/low temperature ranges. Individual interests related to students’ aesthetic needs.

ARTS 5990. Independent Study in Art. (1.0-4.0 cr. [max 12.0 cr.; prereq Major, completed regular course with instructor; #, fall, spring, every year]) Independent study project designed by student in consultation with instructor.

**Art History (ARTH)**

College of Liberal Arts

**ARTH 1001. Introduction to Art History: Prehistoric to Contemporary.** (4.0 cr.; fall, spring, every year) Major monuments/trends in art, prehistoric to present. Style, subject matter, patronage. Reconstructing artworks’ original setting: religious, political, and social contexts. Western canon, occasionally in comparison with non-Western works.

**ARTH 1002W. Why Art Matters.** (4.0 cr.; fall, every year) Introduction to history of topics that investigate power/importance of art both globally and in its diverse forms, from architecture and painting to video and prints. Sacred space, propaganda, the museum, art/gender, art/authority, tourism.

**ARTH 104W. Introduction to Asian Art.** (3.0 cr.; =ARTH 104W; fall, every year) South, Southeast, East Asian art/material culture from Neolithic Age to twentieth century.

**ARTH 1905. Freshman Seminar.** (3.0 cr.; prereq Fr; fall, spring, offered periodically) Topics specified in Class Schedule.

**ARTH 1907W. Freshman Seminar.** (3.0 cr.; prereq F or fewer than 30 cr; fall, spring, every year) Topics specified in Class Schedule.

**ARTH 1909W. Topics: Freshman Seminar.** (3.0 cr.; prereq freshman; fall, every year) Topics specified on One Stop Course Guide.

**ARTH 1910W. Topics: Freshman Seminar.** (3.0 cr.; A-F or Audit; prereq Fr; fall, spring, offered periodically) Topics specified in Class Schedule.

**ARTH 1921W. Introduction to Film Study.** (4.0 cr.; =CSCL 1921W; fall, every year) Fundamentals of film language, major theories of cinema. Detailed analysis of several films, including John Ford's Stagecoach, Jean-Luc Godard's Breathless.

**ARTH 3005. American Art.** (4.0 cr.; fall, spring, every year) Artistic practice in the United States: colonial period to cold war. America as idea/identity shaped, expressed, represented, and contested through art. Canon of American art history. Works by individuals outside of traditional channels of art instruction/reception. Questions about what does/does not count as art history.

**ARTH 3009. Medieval Art.** (3.0 cr.; fall, spring, every year) Medieval art in Western Europe, from around 1000 to the mid-14th century. Works from France, Spain, Germany, Italy, and England examined in their historical context. Cross cultural relations, development of completely new forms of art and techniques, and the processes of realization.

**ARTH 3012. 19th and 20th Century Art.** (3.0 cr.; fall, spring, summer, every year) Major monuments/issues of modern period. Sculpture, architecture, painting, prints. Neo-classicism, romanticism, realism, impressionism, evolution of modernism, symbolism, fauvism, cubism, dadaism, surrealism, abstract expressionism, pop art, conceptualism, postmodernism.

**ARTH 3013. Introduction to East Asian Art.** (3.0 cr.; =EAS 3013; fall, every year) A selective examination of works of art produced in China, Korea and Japan from the neolithic era to modern times. Nearly every major type of object and all major styles are represented.

**ARTH 3014V. Art of India.** (4.0 cr.; =ALL 3014V, ARTH 3014W, RELS 3415W; fall, spring, every year) Indian sculpture, architecture, and painting from the prehistoric Indus Valley civilization to the present day.

**ARTH 3015W. Art of Islam.** (4.0 cr.; =CLCV 3015W; fall, every year) Architecture, painting, and other arts from Islam's origins to the 20th century. Cultural and political settings as well as themes that unify the diverse artistic styles of Islamic art will be considered.

**ARTH 3017. Islamic Culture.** (4.0 cr.; fall, spring, every year) Emphasis on visual arts and literature produced by the Muslim world from Spain to the Indian sub-continent. Analysis of original visual and literary sources will form the basis for understanding diverse cultural developments.

**ARTH 3152. Art and Archaeology of Ancient Greece.** (3.0 cr.; =CNES 3152; fall, spring, every year) Introduction to history of Greek/Hellenistic art, from formation of Greek city states, through conquest of last Hellenistic Kingdoms in Mediterranean (Egypt) and South Asia (Punjab).

**ARTH 3162. Roman Art and Archaeology.** (3.0 cr.; =CNES 3162; fall, spring, odd years) Introduction to history of Roman art, from formation of city-state of Rome under Etruscan domination, to transformation of visual culture in late antiquity under peoples influenced by the Romans.

**ARTH 3182. Egypt and Western Asia: Art and Archaeology of Ancient Egypt and Western Asia.** (3.0 cr.; fall, spring, every year) Art, architecture, and archaeology of Egypt, East Africa, Asia Minor, Mesopotamia, Iran, and Central Asia from the Neolithic through Late Antiquity (ca. 7,000 B.C.E.-650 C.E.). Relationship between the visual material and the social, intellectual, political, and religious contexts. Evolution of, and exchanges and differences among, the visual cultures of these time periods and regions.

**ARTH 3205. Introduction to Aztec, Maya, and Inka Art, from Ancient Times to the Colonial Period.** (3.0 cr.; =AMIN 3205, RELS 3322, ANTH 3205; fall, even years) Art/architecture of native peoples of Americas from twelfth century B.C. until arrival of Europeans in sixteenth century. Ways that people living in diverse areas of South America/Mesoamerica used art/architecture. Tools to investigate Pre-Columbian art at more advanced levels.

**ARTH 3208. Mexico on My Mind.** (3.0 cr.; =CHIC 3208; fall, spring, every year) Images/issues across time and over a vast geographic territory—from art of Pre-Columbian cultures of Mesoamerica to colonial, post-Independence, and modern Mexico to modern Chicano art in the United States. How Mexico and its people have represented themselves and been represented by others. Identify, define, and solve some of the intricate problems that arise when representing and viewing images of oneself and others. Interpret/
make more informed choices. Role images play in community, national, and international politics through history. How these images have come to shape modern perceptions and how these perceptions affect people in Mexico and the United States today.

ARTH 3302. Print Culture in Early Modern Europe. (3.0 cr.; A-F or Audit; fall, odd years) Cultural history of printed images in Europe from their emergence in 15th century through about 1750. Book illustration, reproductive printmaking. History of print connoisseurship. Prints and scientific knowledge. Role of print culture in major social/political events such as Protestant Reformation.

ARTH 3309. Renaissance Art in Europe. (3.0 cr.; A-F only; fall, spring, every year) Major monuments of painting/sculpture in Western Europe, 1400-1600. Close reading of individual works in historical context. Influence of patrons. Major social/political changes such as Renaissance humanism, Protestant Reformation, market economy.


ARTH 3315. The Age of Curiosity: Art and Knowledge in Europe, 1500-1800. (3.0 cr.; [ARTH 3708]; fall, spring, every year) Diverse ways in which making of art and scientific knowledge intersected in early modern Europe. Connections between scientific curiosity and visual arts in major artists (e.g., da Vinci, Durer, Vermeer, Rembrandt). Artfulness of scientific imagery/ diagrams, geographical maps, cabinets of curiosities, and new visual technologies, such as the telescope and microscope.

ARTH 3335. Baroque Rome: Art and Politics in the Papal Capital. (3.0 cr.; [ARTH 3535, HIST 3706, RELS 5612, RELS 3612]; fall, even years) Center of baroque culture—Rome—as city of spectacular and pageantry. Urban development. Major works in painting, sculpture, and architecture. Ecclesiastical/private patrons who transformed Rome into one of the world's great capitals.

ARTH 3401. Art Now. (3.0 cr.; A-F or Audit; spring, every year) Analysis of visual representations in fine arts and popular media, in context of social issues. Obscenity, censorship, democracy, technology, commerce, the museum, propaganda, social role of artist. Understanding the contemporary world through analysis of dominant aesthetic values.

ARTH 3422. Off the Wall: History of Graphic Arts in Europe and America in the Modern Age. (4.0 cr.; spring, offered periodically) History/theory of creation of lithography, social caricature (e.g., Daumier, Gavarni), revival of etching (e.g., Goya/mid-century practitioners, Whistler), and color lithography (e.g., Toulouse-Lautrec, Vuillard, Bonnard). Media changes of 20th century. Revolutionaty nature of new media.

ARTH 3434. Art and the Environment. (3.0 cr.; fall, spring, every year) Historical development of land, earth, and environmental art since 1968. Artists' engagement with environmental problems. Responses to changing aesthetic, political, biological, economic, agricultural, technological, and climactic conditions from global perspective.

ARTH 3464. Art Since 1945. (4.0 cr.; fall, spring, every year) Broad chronological overview of U.S./ international art movements since 1945. Assessment of critical writings by major theorists (e.g., Clement Greenberg) associated with those movements. Theoretical perspective of postmodernism.

ARTH 3484. The Art of Picasso and the Modern Movement. (4.0 cr.; fall, spring, every year) Works of Picasso in all media. Blue, Rose, Cubist, Classical, and later periods of Picasso's development against innovations in media; collage, utilization of found-objects, printmaking and ceramics. Autobiographical nature of imagery gives methodological basis for exploring frequently personalized themes.

ARTH 3494. East/West, West/East. (3.0 cr.; fall, spring, every year) Beginning in the early 18th century and culminating at the dawn of the First World War. Chinoiserie, Orientalism, Japonism, and western influence in Japan during the Meiji Era. Historical and critical context of trade competition, the colonial race, and the shrinking geopolitical map as the period progresses. Paintings to prints, decorative arts to architecture, and world fair exhibitions to photography.


ARTH 3600. The Renaissance. (3.0 cr.; [CLA 3600, MEST 3600, FRIT 3600, HIST 3600]; spring, offered periodically) Relationships between the visual arts, literature, science, philosophy and politics in Europe from about 1300-1600. Works of artists, writers, and intellectuals (e.g., Michelangelo Buonarotti, Niccolo Machiavelli, Michel de Montaigne), different artistic and literary forms (e.g., portrait, sonnet, essay), and broad thematic issues, including the individual, antiquity, the state, and discovery. Team taught.

ARTH 3627. Seminar: Harlem Renaissance. (3.0 cr.; [AFRO 5627, AFRO 3627, ENGL 5597]; fall, every year) Review Harlem Renaissance from variety of perspectives. Literary, historical, cultural, political, international. Explore complex patterns of permutation/interdependency between worlds inside/outside of what W.E.B. Du Bois called "Veil of Color."


ARTH 3921W. Art of the Film. (4.0 cr.; spring, every year) History of the motion picture as an art form; major films, directors, genres, and styles. Films discussed include THE BIRTH OF A NATION, CITIZEN KANE, BICYCLE THIEF, RASHOMON, and JULES AND JIM.

ARTH 3926. The Cinema of Alfred Hitchcock. (3.0 cr.; [ARTH 5926]; fall, even years) Achievement/significance of Alfred Hitchcock. Career including both British/American periods. Major films/television program. Characteristic themes/concerns, traditions that shaped him, influence he had on other films/filmmakers. Biographical, historical, technological, industrial, aesthetic issues surrounding his achievement.

ARTH 3930. Junior-Senior Seminar. (3.0 cr.; A-F or Audit; prereq [Jr or sr] ArtH major, #: fall, spring, offered periodically) Major art-historical theme, artist, period, or genre. Topics specified in Class Schedule.

ARTH 3930H. Honors: Junior-Senior Seminar. (3.0 cr.; A-F or Audit; prereq Honors [j or sr] ArtH major; fall, every year) Major art-historical theme, artist, period, or genre.

ARTH 3940. Topics in Art History. (1.0-4.0 cr.; fall, spring, summer, every year) Topics specified in Class Schedule.

ARTH 3971V. Honors: Major Project. (1.0 cr.; A-F or Audit; [ARTH 3971V]; prereq Honors ArtH major, #: fall, spring, every year) Facilitate completion of research paper begun in a 5xx course to qualify as senior project. Evaluation of work to date while strengthening skills and research experience. Study of historical, philosophical, and aesthetic methods related to the writing of art history as well as exposure to a variety of art historical genres.

ARTH 3971W. Major Project. (1.0 cr.; A-F or Audit; [ARTH 3971V]; prereq ArtH major, #: fall, spring, summer, every year) Facilitate completion of research paper begun in a 5xx course to qualify as senior project.
Evaluation of work to date while strengthening skills and research experience. Study of historical, philosophical, and aesthetic methods related to the writing of art history as well as exposure to a variety of art historical genres.

ARTH 3975. Directed Museum Experience. (1.0-2.0 cr.; prereq #; fall, spring, summer, every year) Internship or docentship in approved program, art institution, or museum.

ARTH 3993. Directed Study. (1.0-4.0 cr. [max 12.0 cr.]; A-F or Audit; prereq #; fall, spring, summer, every year) TBD

ARTH 3994. Directed Research. (1.0-4.0 cr. [max 12.0 cr.]; A-F or Audit; prereq #; fall, every year) TBD

ARTH 5112. Archaic and Classical Greek Art. (3.0 cr.; prereq jr or sr or grad or #; fall, offered periodically) Sculpture, painting, architecture, and minor arts in Greek lands from the 9th through 5th centuries B.C. Examination of material remains of Greek culture, archaeological problems such as identifying and dating buildings; analysis of methods and techniques.

ARTH 5113. Heritage After Iraq and Afghanistan: Debates in Art History, Museum Studies, and the Art Market. (3.0 cr.; fall, spring, offered periodically) Pre- and postwar Iraq, looting of the Baghdad Museum, systematic looting of archaeological sites; destruction of Afghanistan's cultural heritage under the Taliban, looting/trade in antiques since the overthrow; art/war in historical/contemporary perspective; nationalistic uses of archaeology, museology.

ARTH 5115. Hellenistic and Iranian Asia: Art and Archaeology of Hellenistic, Scythian, Kushan, and Sogdian Asia. (3.0 cr.; fall, spring, every year) Transformations of Greek architecture, sculpture, painting, mosaic, and decorative arts beginning of the eastern Mediterranean and Hellenistic Asia. Art and archaeology of the post-Hellenistic Iranian world. Religious, political and historical contexts of archaeological sites, monuments, and art objects.

ARTH 5188. Art and Archaeology of Early Christianity and the Late Roman Empire. (3.0 cr.; =RELS 5252; fall, spring, offered periodically) Emergence of Christian visual culture in Rome, Age of Tetrarchs and Constantine the Great. Age of Justinian. Development of liturgical environments such as Jewish synagogue and Christian church. Melding of imperial and Christian art, architecture, and ritual. Constantinople, from its founding through sixth century. Church architecture. Early icon/ manuscript painting.

ARTH 5192. Persia and the Ancient Iranian World: Art and Archaeology of Achaemenid to Sasanian Persia. (3.0 cr.; fall, spring, every year) Art, archaeology of ancient Persia and the wider ancient Iranian world from the rise of the Achaemenid empire in 650 BCE to the advent of Islam in the seventh century CE.

ARTH 5301. Visual Culture of the Atlantic World. (3.0 cr.; A-F or Audit; spring, offered periodically) Visual culture of Atlantic world, from Columbus to American Revolution. Visual objects, practices considered in context of Europe's colonization of Americas. Slavery, religious conflict, international commerce, production of scientific knowledge addressed in terms of their impact upon visual imagery.

ARTH 5302. Print Culture in Early Modern Europe. (3.0 cr.; A-F or Audit; ) Cultural history of printed images in Europe from their emergence in 15th century through about 1750. Book illustration, reproductive printmaking. History of print connoisseurship. Prints and scientific knowledge. Role of print culture in major social/political events such as Protestant Reformation.

ARTH 5323. Art of the Italian Renaissance: 14th-16th Centuries. (3.0 cr.; fall, every year) Chronological/thematic study of painting, sculpture, and architecture. Emphasizes major artists/commissions, but lesser schools/followers also considered.

ARTH 5324. 15th-Century Painting . (3.0 cr.; prereq Jr or Sr or grad or #; fall, spring, offered periodically) The origin, character, and development of painting in Northern and Southern Europe.

ARTH 5325. Art of the Aztec Empire . (3.0 cr.; =ARTH 5325, RELS 5325; spring, every year) Art/architecture of Nahua-talking Aztecs of Central Mexico, from first appearance in archaeological record until Spanish invasion in 1521. Major scholarly problems, theoretical/methodological approaches. Analysis of scholarly writing.

ARTH 5335. Baroque Rome: Art and Politics in the Papal Capital. (3.0 cr.; =HIST 3706, ARTH 3335, RELS 5612, RELS 3612); fall, even years) Center of baroque culture--Rome--as city of spectacular and pageantry. Urban development. Major works in painting, sculpture, and architecture. Emphasizes ecclesiastical/private patrons who transformed the Eternal City into one of the world's great capitals.

ARTH 5411. Gender and Sexuality in Art Since 1863. (3.0 cr.; fall, spring, offered periodically) History of art from late 19th to early 21st century. How gender/sexuality have been central to that period's artistic production, art criticism, and aesthetic theorization. How gender/sexuality are important themes for artists. How the writing of history reveals assumptions about gender/sex. Critical reading/writing.


ARTH 5417. Twentieth Century Theory and Criticism. (3.0 cr.; prereq 3464 or #; fall, offered periodically) Trends in 20th-century art theory, historical methodology, criticism. Key philosophical ideas of modernism/postmodernism: formalism, semiotics, poststructuralism, feminism, marxism, psychoanalysis, deconstruction.

ARTH 5422. Off the Wall: History of Graphic Arts in Europe and America in the Modern Age. (4.0 cr.; spring, offered periodically) History/theory of creation of lithography, social caricature (e.g., Daumier, Gavarni), revival of etching (e.g., Goya, mid-century practitioners, Whistler), and color lithography (e.g., Toulouse-Lautrec, Vuillard, Bonnard). Media changes of 20th century. Revolutionary nature of new media.


ARTH 5466. Contemporary Art. (3.0 cr.; prereq 3464 or #; spring, offered periodically) Survey of the art and important critical literature of the period after 1970. Origins and full development of postmodern and subsequent aesthetic philosophies.


ARTH 5494. East/West, West/East . (3.0 cr.; fall, spring, every year) Beginning in the early 18th century and culminating at the dawn of the First World War. Chinoiserie, Orientalism, Japonisme, and western influence in Japan during the Meiji Era. Historical and critical context of trade competition, the colonial race, and the shrinking geopolitical map as the period progresses. Paintings to prints, decorative arts to architecture, and world fair exhibitions to photography.

ARTH 5546. American Architecture: 1840 to 1914. (3.0 cr.; ) American architecture from 1840 to 1914, examined in relation to European precedents and American sociohistorical conditions. Critical attention to problems of style, the architectural profession, vernacular vs. "high" architecture, technology, economics, urbanism, and social reform.
ARTH 5565. American Art in the Gilded Age. (3.0 cr.; fall, spring, offered periodically) Major artists, artistic movements, and aesthetic concerns that dominated American art history from the Civil War to the turn of the century. Nationalism and cosmopolitanism as well as masculinity and femininity, industrialization and the "incorporation of America," methods of art instruction and its social role. Place of art in civic life.

ARTH 5575. Boom to Bust: American Art from the Roaring Twenties to the Great Depression. (3.0 cr.; fall, spring, every year) American art/culture from 1917 to 1940. Boom of post-WWI affluence, bust of stock market crash, Midwestern Dust Bowl. How tumultuous times influenced painting, sculpture, photography, and industrial design.

ARTH 5577. Art of the Harlem Renaissance. (3.0 cr.; fall, every year) Visual side of Harlem Renaissance, as represented by painters, illustrators, sculptors, and photographers. How African-Americans in 1920s/30s tried to reclaim visual field for purpose of racial redefinition.

ARTH 5575. African American Cinema. (3.0 cr.; fall, spring, every year) African American cinematic achievements, from silent films of Oscar Micheaux through contemporary Hollywood and independent films. Class screenings, critical readings.

ARTH 5765. Early Chinese Art. (3.0 cr.; spring, every year) Art/material culture of early China from Neolithic age (ca. 10000-2000 BCE) to early imperial period (221 BCE-906 CE).

ARTH 5766. Chinese Painting. (3.0 cr.; fall, odd years) Major works from the late bronze age to the modern era that illustrate the development of Chinese landscape painting and associated literary traditions.

ARTH 5775. Formation of Indian Art: 2500 BCE to 300 CE. (3.0 cr.) Sculpture/architecture, from Indus Valley civilization through Kushana period.

ARTH 5777. The Diversity of Traditions: Indian Art 1200 to Present. (3.0 cr.; fall, spring, summer, every year) Issues presented by sculpture, architecture and painting in India, from prehistoric Indus Valley civilization to present day.

ARTH 5781. Age of Empire: The Mughals, Safavids, and Ottomans. (3.0 cr.) Artistic developments under the three most powerful Islamic empires of the 16th through 19th centuries: Ottomans of Turkey; Safavids of Iran; Mughals of India. Roles of religion and state will be considered to understand their artistic production.

ARTH 5785. Art of Islamic Iran. (3.0 cr.) Architecture, painting, and related arts in Iran from the inception of Islam (7th century) through the 20th century. Understanding the nature of Islam in Persianate cultural settings and how artistic production here compares to the Islamic world.

ARTH 5786. Theorizing City and Space in the Mediterranean and Western Asia. (3.0 cr.; spring, even years) Development of greatest cities of Eastern Mediterranean/Western Asia from age of Alexander to rise of Islam. Methodological/theoretical approaches to study of cities where as much evidence exists in texts as archaeological form.

ARTH 5787. Visual Cultures in Contact: Cross-Cultural Interaction in the Ancient and Early Medieval Worlds. (3.0 cr.; fall, even years) Evaluate critical perspectives from variety of interdisciplinary conversations. Framework for studying cross-cultural interaction among ancient visual cultures that integrates practical, cognitive, object oriented approaches. Cross-continental movement/selective appropriation of objects/motifs.


ARTH 5926. The Cinema of Alfred Hitchcock. (3.0 cr.; = [ARTH 3926]; fall, even years) Achievement/significance of Alfred Hitchcock, British/American periods of career, major films, television program. Biographical, historical, technological, industrial, aesthetic issues surrounding his achievement.

ARTH 5927. The Cinema of Alfred Hitchcock. (3.0 cr.; = [ARTH 3926]; fall, even years) Achievement/significance of Alfred Hitchcock, British/American periods of career, major films, television program. Biographical, historical, technological, industrial, aesthetic issues surrounding his achievement.

ARTH 5933. Directed Study. (1.0-4.0 cr. [max 12.0 cr.]; A-F or Audit; prereq %; fall, spring, summer, every year) Guided individual reading or study for qualified graduate students.

ARTH 5994. Directed Research. (1.0-4.0 cr.; A-F or Audit; prereq %; fall, spring, summer, every year) Topics specified in Class Schedule.

ARTH 5994. Directed Research. (1.0-4.0 cr.; A-F or Audit; prereq %; fall, spring, summer, every year) Topics specified in Class Schedule.

Asian American Studies (AAS)
College of Liberal Arts

AAS 1101. Imagining Asian America. (3.0 cr.; fall, every year) Issues in Asian American Studies. Historical/recent aspects of the diverse/multifaceted vision of "Asian America," using histories, films, memoirs, and other texts as illustrations.


AAS 1902. Freshman Seminar. (3.0 cr.; prereq Freshman; fall, offered periodically) Topics specified in Class Schedule.
AAS 1905. Freshman Seminar. (3.0 cr. [max 6.0 cr.]; A-F or Audit; prereq Fr; fall, spring, every year) Topics specified in Class Schedule.


AAS 3251W. Sociological Perspectives on Race, Class, and Gender. (3.0 cr.; A-F only; =SOC 3251W, AFRO 3251W; prereq Soc majors/minors must register A-F; fall, spring, every year) Race, class, and gender as aspects of social identity and as features of social organization. Experiences of women of color in the United States. Family life, work, violence, sexuality/reproduction. Possibilities for social change.

AAS 3270. Service Learning in the Asian Community. (2.0 cr. [max 8.0 cr.]; prereq #: fall, spring, summer, every year) Students engage in service learning among members of local Asian communities. Readings, mentoring, English language instruction. Other activities as deemed appropriate by instructor and sponsoring agency.

AAS 3301. Asian America Through Arts and Culture. (3.0 cr.; = [ENGL 3301]; spring, odd years) Interdisciplinary questions of Asian American experience, identity, and community. Literature, dance, music, photography, film, theater, other cultural forms. Students work with local Asian American arts organizations. Students express their own cultural contradictions through writing and other forms of artistic expression and attend local arts events.

AAS 3303W. Writing Differences: Literature by U.S. Women of Color. (3.0 cr.; = [GWSS 3303W]; fall, odd years) Interpret/analyze poetry, fiction, drama of U.S. women minority writers. Relationship of writer's history, ethnicity, race, class, gender to her writings.

AAS 3409W. Asian American Women's Cultural Production. (3.0 cr.; = [GWSS 3409W]; fall, every year) Diversity of cultures designated "Asian American." Understanding women's lives in historical, cultural, economic, and racial contexts.

AAS 3483. Hmong History Across the Globe. (3.0 cr.; fall, spring, odd years) Hmong interaction with lowland Southeast Asian states (Laos, Vietnam) and Western colonial powers (French, American) since 19th century. Changes to religious, social, political, and gender institutions. Aspirations for political autonomy.

AAS 3486. Hmong Refugees from the Secret War: Becoming Americans. (3.0 cr.; = [HIST 3486]; spring, even years) Socio-economic, political, gender, cultural/religious changes in Hmong American community during last three decades. How Hmong are racialized in American society. Impact to first/second generations.

AAS 3503. Asian American Identities, Families, & Communities. (3.0 cr.; = [SOC 3503H; SOC 3503]; spring, every year) Overview of Asian American identities, families/communities. Racial/ethnic identity formation, immigration, intergenerational relationships, dating/family formation, transnational adoption, popular culture, educational/work experiences, ethnic enclaves/activism.

AAS 3862. American Immigration History. (3.0 cr.; A-F or Audit; = [HIST 3862, CHIC 3862]; spring, every year) Global migrations to U.S. from Europe, Asia, Latin America, and Africa, from early 19th century to present. Causes/cultures of migration. Migrant communities, work, and families. Xenophobia, assimilation/integration, citizenship, ethnicity, race relations. Debates over immigration. Place of immigration in America's national identity.

AAS 3875W. Comparative Race and Ethnicity in U.S. History. (3.0-4.0 cr.; A-F or Audit; fall, spring, every year) America through its cultural diversity. Changing notions of American national identity/citizenship from 19th century to present. Historical experiences of Native Americans, African Americans, Hispanic Americans, European immigrants, and Asian Americans: How these groups were defined in relation to each other and in relation to the nation.

AAS 3877. Asian American History, 1850 to Present. (3.0 cr.; = [HIST 3877]; fall, spring, every year) Asian American history and contemporary issues, from 1850 to present. Immigration, labor, anti-Asian movements, women/families, impact of World War Two, new immigrant/refugee communities, civil rights, Asian American identity/culture.

AAS 3920. Topics in Asian American Studies. (2.0-4.0 cr. [max 8.0 cr.]; prereq Jr or Sr; fall, spring, every year) Topics specified in Class Schedule.

AAS 3993. Directed Studies in Asian American Studies. (1.0-9.0 cr.; prereq #: fall, spring, summer, every year) Guided individual reading or study.

AAS 4231. Color of Public Policy: African Americans, American Indians, Asian Americans & Chicanos in the U.S. (3.0 cr.; = [AFRO 4231, AMIN 4231, CHIC 4231]; fall, offered periodically) Structural or institutional conditions through which people of color have been marginalized in public policy. Critical evaluation of social policy addressing the problem of contemporary communities of color in the United States.

AAS 4232. American Drama by Writers of Color. (3.0 cr.; A-F or Audit; fall, spring, offered periodically) Selected works by Asian American, African American, American Indian, Latino, and Chicano playwrights. How racial/ethnic differences are integral to shaping different visions of American drama. History of minority/ethnic theaters, politics of casting, mainstreaming of the minority playwright.

AAS 4311. Asian American Literature and Drama. (3.0 cr.; A-F or Audit; fall, odd years) Literary/dramatic works by Asian American writers. Historical past of Asian America through perspective of writers such as Sui Sin Far and Carlos Bulosan. Contemporary artists such as Frank Chin, Maxine Hong Kingston, David Henry Hwang, and Han Ong. Political/historical background of Asian American artists, their aesthetic choices.

AAS 4920. Topics in Asian American Studies. (2.0-4.0 cr. [max 8.0 cr.]; fall, spring, every year) Topics specified in Class Schedule.

AAS 5920. Topics in Asian American Studies. (1.0-4.0 cr. [max 12.0 cr.]; fall, spring, offered periodically) Topics specified in Class Schedule.

AAS 5993. Directed Readings. (1.0-4.0 cr. [max 8.0 cr.]; fall, offered periodically) Directed reading--must be set up with individual instructor.

AAS 5996. Graduate Proseminar. (1.0 cr. [max 4.0 cr.]; S-N only; fall, spring, every year) Discussions/presentations from various disciplinary perspectives on research, activism, and performance in Asian American/Diasporic Studies. Students engage in dialogue, observe models of scholarly engagement, and reflect on issues within Asian American/diasporic studies.

Asian Languages and Literatures (ALL) College of Liberal Arts

ALL 1904. Freshman Seminar. (3.0 cr. [max 6.0 cr.]; A-F or Audit; prereq freshman; fall, every year) Topics specified in Class Schedule and Course Guide.

ALL 1905. Freshman Seminar. (3.0 cr. [max 6.0 cr.]; A-F or Audit; prereq freshman; fall, offered periodically) Topics specified in Class Schedule and Course Guide.

ALL 1909W. Freshman Seminar. (3.0 cr. [max 6.0 cr.]; A-F or Audit; prereq freshman; fall, spring, every year) Topics specified in Class Schedule and Course Guide.

ALL 1910W. Freshman Seminar. (3.0 cr. [max 6.0 cr.]; A-F or Audit; prereq freshman; fall, every year) Topics specified in Class Schedule and Course Guide.

ALL 3001. Reading Asian Cultures. (3.0 cr.; A-F or Audit; ) Introduction to primary Asian texts in translation. Emphasizes introducing/applying various methods of interpretation to a
ALL 3014W. Art of India. (4.0 cr.; =ARTH 3014W, ARTH 3014V, RELS 3415W; spring, every year)
Indian sculpture, architecture, and painting, from prehistoric Indus Valley civilization to present.

ALL 3110. Study of an Asian Language. (1.0-5.0 cr. [max 10.0 cr.]; prereq %; fall, spring, every year)
Study of an Asian language in another country or at other non-campus locations. Students study in situations complementary to regular University course offerings.

ALL 3232W. "Short" Poetry in China and Japan. (3.0 cr.; spring, odd years)

ALL 3261W. Writing (in) East Asian Cultures: From Oracle Bones to Tattoos. (3.0 cr.; prereq One year in Chinese or Japanese or Korean language or similar exposure to East Asian writing systems; fall, even years)
History, materiality, practice of writing Chinese characters (hanzi/kanjii/hanja) in cultural venues in East Asia, including contemporary society. Sites/practices where writing takes on high cultural value. Oracle bone writing, calligraphy, advertisements, tattooing. Identity construction, nationalism.

ALL 3265W. The Fantastic in East Asia: Ghosts, Foxes, and the Alien. (3.0 cr.; prereq Some coursework in East Asia recommended; fall, odd years)
How the strange/alien is constructed in premodern Chinese/Japanese literature. East Asian theories of the strange and their role in the classical tale, through the works of Pu Songling, Ueda Akinari, and others. Role of Buddhist cosmology/salvation in other works (e.g., Journey to the West, drama).

ALL 3320. Topics in Chinese Literature. (1.0-3.0 cr. [max 9.0 cr.]; )
Selected topics in Chinese culture. Topics specified in the Class Schedule.

ALL 3336. Revolution and Modernity in Chinese Literature and Culture. (3.0 cr.; A-F only; fall, every year)
Introduction to modern Chinese literature, visual culture, and critical thought from the beginning of 20th century to end of Mao era. Examples of literature/culture, parallel readings of Chinese critical essays. Readings are in English translation.

ALL 3337. Chinese Literature and Popular Culture Today. (3.0 cr.; A-F only; fall, odd years)

ALL 3356W. Chinese Film. (3.0 cr.; A-F or Audit; spring, even years)
Survey of Chinese cinema from China (PRC), Taiwan, and Hong Kong. Emphasizes discussion/comparison of global, social, economic, sexual, gender, psychological, and other themes as represented through film.

ALL 3361W. Maps, Pictures, and Writing in the Representation of Taiwan. (3.0 cr.; A-F or Audit; spring, even years)
How visual/written media is used to form identity in representing people, places, history of Taiwan. Historical/contemporary contexts.

ALL 3371. History of Chinese Cities and Urban Life. (3.0-4.0 cr. ; A-F or Audit; =EAS 3479, HIST 3479, HIST 5479; fall, spring, offered periodically)
Introduction to traditional Chinese cities, modern transformation. Ideal city plan in Confucian classics compared with physical layout of major cities. Models about Chinese cities, influence of models on our understanding of Chinese history/society.

ALL 3372. History of Women and Family in China, 1600-2000. (3.0 cr.; =HIST 3469, GWSS 3469; fall, spring, even years)

ALL 3373. Religion and Society in Imperial China. (3.0 cr.; =RELS 3373, HIST 3466; fall, spring, offered periodically)
Introduction to religious traditions of imperial China (Buddhism, Daoism, Confucianism, "popular" religion), their relation to society. Role of gender. Conceptualizing relations with the divine. Ritual and its goals. Position of religious specialists such as monks and Daoist priests. Primary/secondary readings.

ALL 3400. Topics in Japanese Literature. (3.0 cr. [max 9.0 cr.]; )
Selected topics in Japanese literature. Topics specified in the Class Schedule.

ALL 3433W. Traditional Japanese Literature in Translation. (3.0 cr.; A-F or Audit; fall, odd years)
Survey of texts in different genres, from 8th to early 19th centuries, with attention to issues such as "national" identity, gender/sexuality, authorship, popular culture. No knowledge of Japanese necessary.

ALL 3436. Postwar Japanese Literature in Translation. (3.0 cr.; prereq Basic knowledge of modern Japanese history helpful, knowledge of Japanese language not required; fall, every year)
Survey of ideas/styles of recent Japanese literature. Writers include Dazai Osamu, Ibuske Masuji, Oe Kenzaburo, Mishima Yukio, and Yoshimoto Banana. All readings in English translation.

ALL 3437. Early 20th Century Japanese Literature in Translation. (3.0 cr.; fall, offered periodically)
Survey of the principal authors and genres of the period spanning Japan's opening to the West (1860s) to World War II. Writers include Natsume Soseki, Shiga Naoya, Kawabata Yasunari, and Tanizaki Junichiro.

ALL 3441W. Japanese Theater. (3.0 cr.; A-F or Audit; spring, odd years)
Japanese performance traditions. Emphasizes noh, kabuki, and bunraku in their literary/cultural contexts. Relationship between these pre-modern traditions and modern theatrical forms (e.g., Takarazuka Revue).

ALL 3456. Japanese Film. (3.0 cr.; spring, even years)
Themes, stylistics, and genres of Japanese cinema through work of classic directors (Kurosawa, Mizoguchi, and Ozu) and more recent filmmakers (Itami, Morita). Focuses on representations of femininity/masculinity.

ALL 3457. War and Peace in Japan Through Popular Culture. (4.0 cr.; A-F or Audit; =HIST 3476; fall, spring, offered periodically)
War-related issues in Japan. Animation films, comics from 1940s to 1990s. Mobilization of culture for WWII. Conflict between constitutional pacifism/national security. Japan's role in cold war/post-cold war worlds.

ALL 3466. Japanese Popular Culture in a Global Context. (3.0 cr.; spring, offered periodically)
What happens when one nation's popular culture begins to permeate others. Japanimation, manga, fashion, and music. Relationship of popular culture to nation(alism), ethnicity, gender, and identity. Effects of popular culture on consumers, socialization. Ways that consumption affects us personally.

ALL 3468. Environment, Technology and Culture in Modern Japan. (3.0 cr.; fall, even years)
Read/view historical, literal, visual texts to discover guiding ideas about nature, environment, technology use in Japan. No prior knowledge of Japan is necessary.

ALL 3478. Modern Japan, Meiji to the Present (1868-2000). (3.0 cr.; =HIST 3471, EAS 3471; fall, spring, every year)

ALL 3536. Modern Korean Literature. (3.0 cr.; fall, every year)
Modern Korean literature in English translation from the colonial period until the 1990s. READ literary texts critically, using genre categories, theories of narrative voice, different understandings of modern literary subjectivity, and historical contextualization.

ALL 3556. Korean Film. (3.0 cr.; spring, every year)
Introduction to Korean film from the Japanese colonial period to the present day, with a particular emphasis on the last two decades.
ALL 3383. The Ottoman Empire. (3.0 cr.; = [ARAB 3547, HIST 3547]; fall, spring, every year) Survey of Islam’s most successful empire, from its founding circa 1300 to its demise in 1923. Lands, institutions, peoples, historical legacy.

Astronomy (AST)

ALL 3671. Hinduism. (3.0 cr.; = [HIST 3492, RELS 5671, RELS 3671, ALL 5671]; fall, spring, offered periodically) Development of Hinduism focusing on sectarian trends, modern religious practices, myths and rituals, pilgrimage patterns and religious festivals, and the interrelationship between Indian social structure and Hinduism.

ALL 3672. Buddhism. (3.0 cr.; = [ALL 5672, RELS 5371, RELS 3371]; summer, odd years) Historical and contemporary account of the Buddhist religion in Asia/world in terms of its development, various schools, practices, philosophical concepts, and ethics. Current trends in the modern faith and the rise of “socially engaged” Buddhism.

ALL 3676. Culture and Society of India. (3.0 cr.; = [ANTH 3023, GLOS 3961]; fall, spring, odd years) Contemporary society/culture in South Asia from anthropological perspective with reference to nationalism; postcolonial identities; media and public culture; gender, kinship, and politics; religion; ethnicity; and Indian diaspora.


ALL 3890. Topics in Asian Literature. (3.0 cr.; = [ART 3590, HIST 3890]; fall, spring, every year) Topics specified in Class Schedule.

ALL 3920. Topics in Asian Culture. (3.0 cr.; = [ART 3590, HIST 3890]; fall, spring, every year) Topics specified in Class Schedule.

ALL 3990. Directed Study. (1.0-4.0 cr.; = [ART 3590, HIST 3890]; fall, spring, every year) Individual reading/study, with guidance of a faculty member, on topics not covered in regular courses. Prereq - instr consent, dept consent, college consent.

ALL 4900W. Major Project. (3.0 cr.; = [ART 4900, HIST 4900]; fall, spring, every year) Directed research/writing on topic selected according to individual interest, in consultation with faculty adviser.

AST 1001. Exploring the Universe. (4.0 cr.; = [AST 1005, AST 1011H]; fall, spring, summer, every year) The human place in the Universe. Study of Earth, other planets, sun, stars, galaxies. Background and fragility of life on Earth. Scale, origin, history of universe and our relationship to it.

AST 1005. Descriptive Astronomy. (3.0 cr.; = [AST 1011H, AST 1001]; prereq - non-science major; fall, spring, summer, every year) Twentieth century astrophysics, current frontiers of astrophysical research.

AST 1011H. Exploring the Universe, Honors. (4.0 cr.; = [AST 1005, AST 1001]; prereq - high school trigonometry, [high school physics or chemistry]; fall, spring, every year) Human place in universe. Earth, other planets, sun, stars, galaxies. Background/fragility of life on Earth. Scale, origin, history of universe, our relationship to it. Honors version of 1001.

AST 1905. Freshman Seminar. (2.0 cr.; = [ART 1905, HIST 1905]; fall, spring, every year) Topics vary. See Class Schedule.

AST 1910W. Freshman Seminar, Writing Intensive. (1.0-3.0 cr.; = [ART 1905, HIST 1905]; fall, spring, every year) Topics vary. See Class Schedule.

AST 2001. Introduction to Astrophysics. (4.0 cr.; = [AST 1005, AST 1001]; fall, spring, every year) Physical principles and study of solar system, stars, galaxy, and universe. How observations/conclusions are made.

AST 2990. Directed Studies. (1.0-5.0 cr.; = [ART 2990, HIST 2990]; fall, spring, every year) Independent, directed study in observational and theoretical astrophysics. Arranged with faculty member.

AST 4001. Astrophysics I. (4.0 cr.; = [ART 4001, HIST 4001]; fall, spring, every year) Astrophysics of stars and stellar populations. Stellar formation, evolution, interiors/atmospheres. Stellar populations, galactic distribution of stars.

AST 4002. Astrophysics II. (4.0 cr.; = [ART 4001, HIST 4001]; spring, every year) Diffuse matter, galactic structure, and evolution. Clusters of galaxies. Introductory cosmology, evolution of the universe.

AST 4031. Interpretation and Analysis of Astrophysical Data. (4.0 cr.; = [ART 4031, HIST 4031]; fall, spring, every year) Introduction to analysis techniques with applications to current research. For senior undergraduate/graduate students in Physics/Astronomy.
Biochemistry (BIOC)

College of Biological Sciences


BIOC 2011. Biochemistry for the Agricultural and Health Sciences. (3.0 cr.; =BIOC 3021, BIOC 3022; [prereq Chem 1015, Bio 1009, credit not granted if received for 3021; fall, spring, every year] Survey of organic chemistry/biochemistry outlining structure/metabolism of biomolecules, metabolic regulation, principles of molecular biology.

BIOC 2331. Chemical Mechanisms in Biology. (3.0 cr.; A-F only; =CHEM 2304, CHEM 2302H, CHEM 2302) one semester of general biology recommended; fall, spring, every year) Organic structure, properties, chemical mechanisms as they apply to biological systems. Theoretical approach. Metabolic conversions, biodegradation, other biology-specific aspects of chemistry.

BIOC 3021. Biochemistry. (3.0 cr.; =BIOC 6021, BIOC 2011) [prereq [2331 or CHEM 2301, [BIOl 1002 or BIOl 1009 or BIOl 2003]] or #; fall, spring, summer, every year) Fundamentals of biochemistry. Structure/ function of proteins, nucleic acids, lipids, and carbohydrates. Metabolism/regulation of metabolism. Quantitative treatments of chemical equilibria, enzyme catalysis, and bioenergetics. Chemical basis of genetic information flow.

BIOC 3960. Research Topics in Biochemistry. (1.0 cr. [max 2.0 cr.]; S-N or #; fall, spring, every year) Lectures, discussion on current research in the department.

BIOC 4025. Laboratory in Biochemistry. (2.0 cr.; prereq [3021 or & 3021 or or 4331 & 4331 or #; fall, spring, every year) Theory, principles, and use of fundamental techniques in modern biochemistry labs.

BIOC 4125. Laboratory in Molecular Biology and Biotechnology. (3.0 cr.; A-F or Audit; =BIOC 4125, BIOC 4185, BIOC 4185) [prereq [3021 or Bio 3021 or Bio 4003], [4025 or GCC 4015 or GCC 4025 or MCB 3301]; spring, summer, every year) Basic recombinant DNA techniques: methods for growing, isolating, and purifying recombinant DNA and cloning vectors, DNA sequencing and sequence analysis, gene expression, Polymerase Chain Reaction (PCR), current techniques.

BIOC 4185. Laboratory in Molecular Genetics. (3.0 cr.; A-F or Audit; =BIOC 4125, BIOC 4125, BIOC 4185) [prereq Enrollment in Life Sciences Summer Undergraduate Research Program; summer, every year] Basic recombinant DNA techniques. Methods for growing, isolating, and purifying recombinant DNA and cloning vectors. DNA sequencing, sequence analysis. Gene expression, Polymerase Chain Reaction (PCR). Current techniques.

BIOC 4225. Laboratory in NMR Techniques. (1.0 cr.; S-N only; prereq 4331; 4521 recommended; intended for biochemistry majors; summer, every year) Practical aspects of nuclear magnetic resonance (NMR) spectrometry. Hands-on experience with 900/600 MHz instruments. Sample preparation/handling, contamination sources, tube/probe options, experiment selection, experimental procedures, software, data processing.

BIOC 4325. Laboratory in Mass Spectrometry. (1.0 cr.; S-N only; prereq 4332, 4521; spring, every year) Hands-on experience with techniques/ instruments. Sample preparation/handling, 2-dimensional gels, MS-MS, MALDI-TOF, electrospray/LC-MS, experiment selection/ procedures, software, data processing.

BIOC 4331. Biochemistry I: Structure, Catalysis, and Metabolism in Biological Systems. (4.0 cr.; prereq [Biol 1002 or Biol 1009 or Biol 2003 or equiv], [CHEM 2302 or equiv] or #; fall, spring, every year) Advanced survey of structure/catalysis, metabolism/bioenergetics.


BIOC 4351. Protein Engineering. (3.0 cr.; A-F only; prereq 4331 or #; fall, every year) Key properties of enzymes/molecular basis, computer modeling strategies, mutagenesis strategies to create protein variants, expression/screening of protein variants. Evaluate research papers, identify unsolved practical/theoretical problems, plan protein engineering experiment.

BIOC 4521. Introduction to Physical Biochemistry. (3.0 cr.; prereq 4331, recommended, [Chem 1062 and Chem 1066 and Phys 1202] or [Chem 1022 and Phys 1202]; fall, spring, every year) Physical chemical principles, their applications in biochemistry. Thermodynamics, kinetics, spectroscopy, solution dynamics as applied to biochemical reactions/ biopolymers.

BIOC 4793W. Directed Studies: Writing Intensive. (1.0-7.0 cr.; S-N or Audit; prereq #, %; fall, spring, summer, every year) Individual study on selected topics or problems. Emphasizes readings, use of scientific literature. Written report.

BIOC 4794W. Directed Research: Writing Intensive. (1.0-6.0 cr. [max 42.0 cr.]; S-N or Audit; prereq #, %; fall, spring, summer, every year) Laboratory or field investigation of selected areas of research, including written report.

BIOC 4950. Computer Simulation and Data Analysis in Biochemistry. (3.0 cr.; A-F or
Audit; prerequisite 4331, 4332, MATH 1272; fall, every year)
Introduction to computer simulation and data analysis. How to use readily available computer tools to formulate quantitative models and analyze experiments with free/open source software program R.

BIOC 4960. Special Topics in Biochemistry.
(3.0 cr.; A-F only; prerequisite [3021 or equiv]; CHEM 2301) or #; spring, every year)
In-depth study of a topic in biochemistry.

BIOC 4993. Directed Studies.
(1.0-7.0 cr.; S-N or Audit; prerequisite #; fall, spring, summer, every year)
Individual study on selected topics or problems. Emphasizes selected readings, use of scientific literature.

BIOC 4994. Directed Research.
(1.0-6.0 cr. [max 42.0 cr.]; S-N or Audit; prerequisite #; fall, spring, summer, every year)
Laboratory or field investigation of selected areas of research.

BIOC 5001. Biochemistry, Molecular and Cellular Biology.
(5.0 cr.; prerequisite Biochemistry course in biochemistry, #; fall, every year)
Integrated course in biochemistry, molecular biology, cell biology, and developmental biology.

BIOC 5213. Selected Topics in Molecular Biology.
(3.0 cr.; A-F only; prerequisite 4332 or 8002 or [3021, BIOL 4003]) or #; fall, every year)
Cutting edge areas in molecular biology. Topics focus on the "3 Rs" of DNA: repair, replication, and recombination. Faculty who are experts in these areas teach modules on specific topics, including discussion of their research interests.

BIOC 5216. Current Topics in Signal Transduction.
(3.0 cr.; A-F only; prerequisite BioC 4332 or Biol 4004 or #; spring, every year)

BIOC 5225. Graduate Laboratory in NMR Techniques.
(1.0 cr.; S-N only; prerequisite 8001 or #; spring, every year)
Practical aspects of nuclear magnetic resonance (NMR) spectroscopy. Hands-on experience with 500/600 MHz instruments. Sample preparation/handling, contamination sources, tube/probe options, experiment selection, experimental procedures, software, data processing.

BIOC 5309. Biocatalysis and Biodegradation.
(3.0 cr.; prerequisite MICE 5309; spring, every year)
Fundamentals of microbial enzymes/metabolism as pertaining to biodegradation of environmental pollutants/biosynthesis for making commodity chemicals. Practical examples. Guest speakers from industry.

BIOC 5351. Protein Engineering.
(3.0 cr.; A-F only; fall, every year)
Key properties of enzymes/molecular basis, computer modeling strategies, mutagenesis strategies to create protein variants, expression/screening of protein variants. Evaluate research papers, identify unsolved practical/theoretical problems, plan protein engineering experiment.

BIOC 5352. Biotechnology and Bioengineering for Biochemists.
(3.0 cr.; A-F or Audit; prerequisites [3021 or 4331 or BIOL 3021 or MCB 4111] or #; spring, offered periodically)
Fundamentals of microbial enzymes/molecular basis, metabolism as pertaining to biodegradation. Applications of protein biotechnology in bioinformatics. Formulation of therapeutic biopharmaceuticals.

BIOC 5353. Microbial Biochemistry and Biotechnology: Small Molecules.
(3.0 cr.; A-F or Audit; prerequisite [3021 or 4331 or BIOL 3021 or MCB 4111] or #; spring, every year)

BIOC 5361. Microbial Genomics and Bioinformatics.
(3.0 cr.; prerequisite College-level courses in [organic chemistry, biochemistry, microbiology]; fall, spring, every year)
Introduction to genomics. Emphasizes microbial genomics. Sequencing methods, sequence analysis, genomics databases, genome mapping, prokaryotic horizontal gene transfer, genomics in biotechnology, intellectual property issues.

BIOC 5444. Muscle.
(3.0 cr.; prerequisite [PHSL 5444] or #; BIOL 3021 or 4331 or BIOL 3031 or PHSL 3061 or #; spring, every year)

BIOC 5527. Introduction to Modern Structural Biology.
(4.0 cr.; prerequisite [intro biochemistry, intro physics] or physical chemistry or #; fall, every year)
Methods employed in modern structural biology to elucidate macromolecular structures. Primary focus on X-ray diffraction, nuclear magnetic resonance (NMR) spectroscopy and mass spectrometry. Principles underlying structural biology and structure/function relationships.

(4.0 cr.; prerequisite [intro physical chemistry or equiv; intro biochemistry recommended]; spring, every year)

(1.0 cr.; S-N or Audit; prerequisite [one organic chemistry or biochemistry course], [two calculus or college physics courses] or instr approval; fall, every year)
Macromolecular crystallography for protein structure determination/engineering. Determining macromolecule structure by diffraction.

BIOC 5532. Macromolecular Crystallography II: Techniques and Applications.
(1.0 cr.; S-N or Audit; prerequisite 5531; spring, every year)
Determining structure of macromolecule by diffraction. Using software in macromolecular crystallography.

BIOC 5960. Special Topics in Biochemistry.
(3.0 cr.; A-F only; prerequisite [3021 or equiv]; CHEM 2301] or #; spring, every year)
In-depth study of topics in biochemistry.

Bioethics, Center for (BTHX)
Academic Health Center Shared

BTHX 5000. Topics in Bioethics.
(1.0-4.0 cr. [max 8.0 cr.]; prerequisite Graduate student or #; fall, every year)
Bioethics topics of contemporary interest. Topics specified in Class Schedule.

BTHX 5010. Bioethics Proseminar.
(2.0 cr.; A-F only; prerequisite Bioethics grad student or grad minor; fall, every year)
Introduction to topics in bioethics.

BTHX 5100. Introduction to Clinical Ethics.
(3.0 cr.; prerequisite Jr or Sr or grad student or #; fall, every year)
Most frequent ethical problems faced by clinicians, patients/families, and ethics consultants. Forgiving life sustaining treatment, decisional capacity, informed consent, treatment refusal, death/dying, pediatric ethics, reproductive issues, research ethics, psychiatric illness. Real cases.

BTHX 5210. Ethics of Human Subjects Research.
(3.0 cr.; prerequisite Grad student or #; fall, every year)
Issues in ethics of human subjects research.

BTHX 5300. Foundations of Bioethics.
(3.0 cr.; prerequisite Grad student or #; spring, every year)
Overview of major contemporary frameworks used to approach ethical issues in bioethics.

BTHX 5325. Biomedical Ethics.
(3.0 cr.; prerequisite Jr or Sr or grad student or #; fall, spring, every year)
Major topics/issues in biomedical ethics. Patients' rights/duties, informed consent, confidentiality, ethical issues in medical research, initiation/termination of medical treatment, euthanasia, abortion, allocation of medical resources.

BTHX 5400. Intro Ethics in Hlth Policy.
(3.0 cr.; prerequisite Grad student or professional student or #; spring, odd years)
Topics vary to reflect issues of current significance. Relates to law/politics as
appropriate but focuses on moral analyses of policy issues.

BTHX 5411. Health Law and Policy. (3.0 cr.; A-F or Audit; prereq Grad student or #; spring, odd years)

BTHX 5453. Law, Biomedicine, and Bioethics. (3.0 cr.; A-F only; prereq Grad student or #; spring, odd years)

BTHX 5610. Research & Publication Seminar. (1.0 cr.; prereq [Junior or senior or grad student]; bioethics grad majors must register A-F; fall, every year)

BTHX 5620. Social Context of Health and Illness. (3.0 cr.; prereq Grad student or #; spring, odd years)
Social context in which contemporary meanings of health and illness are understood by providers/patients. Ethical implications. Readings from history, social science, literature, and first-person accounts.

BTHX 5900. Independent Study in Bioethics. (1.0-4.0 cr. [max 8.0 cr.]; prereq #; fall, spring, every year)
Students propose area for study with faculty guidance, write proposal which includes outcome objectives and work plan. Faculty member directs student's work and evaluates project.

Bioinformatics (BINF)
College of Biological Sciences

BINF 5480. Bioinformatics Journal Club. (1.0 cr. [max 6.0 cr.]; S-N or Audit; fall, spring, summer, every year)
Bioinformatics Journal Club

BINF 5490. Topics in Bioinformatics. (1.0-6.0 cr. [max 12.0 cr.]; prereq #; fall, spring, summer, every year)
Independent or group study in bioinformatics.

Biography (BIOL)
College of Biological Sciences

BIOL 1001. Introductory Biology: Evolutionary and Ecological Perspectives. (4.0 cr.; =BIOL 1001H, BIOL 1003; fall, spring, every year)
Biological diversity from genetic variation to diversity of species/ecosystems. Genetic, evolutionary, and ecological processes governing biological diversity. Genetic, evolutionary, and ecological perspectives on issues concerning human diversity, human population growth, health, agriculture, and conservation. Lab.

BIOL 1001H. Introductory Biology I: Evolutionary and Ecological Perspectives. (4.0 cr.; A-F only; =BIOL 1001, BIOL 1003; prereq Honors; fall, every year)
Biological diversity from genetic variation to diversity of species/ecosystems. Genetic, evolutionary, and ecological processes governing biological diversity. Issues of human diversity, population growth, health, agriculture, and conservation. Lab.

BIOL 1003. Evolution and Biology of Sex. (4.0 cr.; =BIOL 1001, BIOL 1001H; fall, spring, every year)

BIOL 1009. General Biology. (4.0 cr.; =BIOL 1009H; prereq high school chemistry; 1 term college chemistry recommended; fall, spring, summer, every year)

BIOL 1009H. Honors: General Biology. (4.0 cr.; =BIOL 1009H; prereq high school chemistry; honors; one term college chemistry recommended; spring, every year)

BIOL 1010. Human Biology: Concepts and Current Ethical Issues. (4.0 cr.; fall, spring, every year)
Concepts related to structure/function of human body. Unifying themes such as homeostasis. Impact of science on society, civic life, and ethics. Weekly debates/discussion relating to current issues in science.

BIOL 1020. Biology Colloquium. (1.0 cr. [max 2.0 cr.]; S-N or Audit; fall, spring, every year)
Introduction to the diverse fields of biology through seminars, lab tours, trips to Itasca Biological Station, and interaction with other biology students and faculty. Course may be repeated once.

BIOL 1050. Environmental Biology: Science and Solutions. (3.0 cr.; fall, every year)
Independently explore science behind environmental topics. Ethics of environmental science, policy, personal choice. Environmental toxicology, biodiversity, food production, global climate change.

BIOL 1055. Environmental Biology: Science and Solutions with Laboratory. (4.0 cr.; fall, spring, every year)
Conduct work of biologists, proposing hypotheses. Conduct experiments, analyzing/interpreting data.

BIOL 1093. Biology Colloquium: Directed Study. (1.0 cr.; S-N or Audit; prereq 1020 and & 1020; fall, spring, every year)
Individual study or research undertaken by a student concurrently enrolled in Biol 1020 with oversight by a faculty sponsor.

BIOL 1101W. Heredity and Human Society. (3.0 cr.; prereq No cr if taken after 4003 or GCB 3022; fall, spring, every year)
Principles of heredity and their social and cultural implications.

BIOL 1105. Introduction to Biology, Society, and the Environment. (2.0 cr.; A-F or Audit; fall, spring, every year)
Social context of biology, relevance of biology to social/environmental issues. How biology shapes and is shaped by current events, legislation, ethical concerns, and history. Case studies, discussion.

BIOL 1301. Becoming a Reflective Leader. (1.0 cr.; S-N only; prereq Dean's Scholar; fall, every year)

BIOL 1700. Special Topics in Biology. (1.0-3.0 cr. [max 9.0 cr.]; fall, spring, every year)
Faculty members lead students in discussion on topics of interest.

BIOL 1805. Nature of Life: Introducing New Students to the Biological Sciences. (0.5 cr.; S-N or Audit; prereq Fr in College of Biological Sciences; fall, spring, every year)
Biological sciences, from molecules to ecosystems and from laboratory science to field biology. Introduction to the College of Biological Sciences community and opportunities. Held at Itasca Biological Station and Laboratories. Transportation, board, and lodging fee.

BIOL 1806. Nature of Life, Part Two. (0.5 cr.; S-N only; prereq 1805; spring, every year)
Second semester of Nature of Life with focus on building intentional pathway in CBS/student success/engagement.

BIOL 1904. Freshman Seminar for the Biological Sciences. (1.0-3.0 cr. [max 6.0 cr.]; A-F only; prereq Freshman; spring, every year)
Orientation to University environment. Special topics that illustrate importance of biological topics/issues in modern society.

BIOL 1905. Freshman Seminar for the Biological Sciences. (1.0-3.0 cr. [max 6.0 cr.]; A-F only; prereq freshman; fall, spring, every year)
Orientation to University environment. Special topics that illustrate the importance of biological topics/issues in modern society.
BIOL 2001. Career Planning for Biologists. (1.0 cr.; S-N or Audit; fall, spring, every year) Introduction to career planning. Students assess their strengths, interests, values, and motivations. Decision making, campus/community resources, developing an action plan. Online modules/assessments, in-class discussions, presentations, one-to-one consultations.

BIOL 2002. Foundations of Biology for Biological Sciences Majors, Part I. (6.0 cr.; A-F only; =[BIOL 2002H]; prereq [[CHEM 1021 or 1061 or equiv], CBS major] or \%; calculus I or equiv recommended; fall, spring, every year) Core biological concepts, from biomolecules to ecosystems. Emphasizes evolution, organismal diversity, and genetics within context of problem solving/applications.

BIOL 2002H. Foundations of Biology for Biological Sciences Majors, Part I. (6.0 cr.; A-F only; =[BIOL 2002]; prereq [CHEM 1021 or 1061 or equiv], CBS major, honors student] or \%; calculus I or equiv recommended; fall, spring, every year) Core biological concepts, from biomolecules to ecosystems. Evolution, organismal diversity, and genetics within context of problem solving/applications.

BIOL 2003. Foundations of Biology for Biological Sciences Majors, Part II. (3.0 cr.; A-F only; =[BIOL 2003]; prereq [2002 or 2002H or CBS major; fall, spring, every year]) Second of two courses. Biological concepts, from biomolecules to ecosystems. Ecology/biochemistry concepts within problem solving/application.

BIOL 2003H. Foundations of Biology for Biological Sciences Majors, Part II. (3.0 cr.; A-F only; =[BIOL 2003]; prereq [2002 or 2002H], honors; fall, spring, every year) Second of two courses. Biological concepts, from biomolecules to ecosystems. Ecology/biochemistry concepts within problem solving/application.

BIOL 2005. Animal Diversity Laboratory. (2.0 cr.; =[BIOL 2007, BIOL 2012]; fall, spring, summer, every year) Dissection, direct observation of representatives of major animal groups.

BIOL 2007. Marine Animal Diversity Laboratory. (2.0 cr.; A-F only; =BIOL 2012, BIOL 2005); prereq Introductory biology with lab; fall, spring, every year) Survey of marine animal diversity. Understanding major animal groups, how they relate to one another, how they differ in structure, how each group achieves survival/reproduction in diverse environments. Lab includes dissections, including vertebrates, such as fish.

BIOL 2012. General Zoology. (4.0 cr.; =BIOL 2007, BIOL 2005); prereq One semester of college biology; fall, spring, every year) Major animal groups (phyla). Applications of morphological, physiological, and developmental characteristics to define evolutionary relationships. Parasitic forms affecting human welfare. Lab requires dissection, including mammals.


BIOL 2100. Brewing: The Biology, History, and Practice. (3.0 cr.; A-F only; prereq 1001 or 1009 or 2002 or 2003 or 2004; fall, spring, offered periodically) History of brewing, microbiology, biochemistry and biological concepts such as competition, using brewing as a model. Practical aspects of modern brewing.

BIOL 2301. Leadership and Service. (2.0 cr.; S-N only; prereq 1301, 2001, CBS Dean's Scholar; fall, spring, every year) Importance of service in leadership. How personal experiences influence perspectives on social issues. Techniques for group work. Service project with community organization related to biological sciences.

BIOL 2700. Special Topics in Biology. (1.0-3.0 cr.; [max 9.0 cr.]; fall, spring, every year) Faculty members lead students in discussion of topics of interest.

BIOL 2800. Understanding the Environment: Ecology for Educators. (5.0 cr.; A-F only; prereq UMTC: 1001 or 1009 or 2002 UMD: 1011 or 1012; summer, every year) Ecology/earth systems science content, concepts, investigation skills that environmental educators, science communicators, natural history interpreters should be proficient in when addressing respective audiences about science, environmental issues, nature studies.

BIOL 2812. Field Zoology. (4.0 cr.; A-F only; prereq Beginning biology; summer, every year) Major animal groups. Native Minnesota organisms in their natural habitat. Lecture, lab, and field experiences emphasize morphological, physiological, and developmental characteristics to define evolutionary relationships. Parasitic forms affecting human welfare. Labs require dissections, including mammals.

BIOL 2905. Nature of Life, Part III. (0.5 cr.; S-N only; prereq 1805, 1806; fall, every year) Reflect on aspirations, personal characteristics, experiences. Resources/practical tools to reach educational/professional goals. Special focus on developing personal/professional goals, articulating personal experiences in light of aspirations.

BIOL 2906. Nature of Life, Part IV. (0.5 cr.; S-N only; prereq 2905; spring, every year) Reflect on aspirations, personal characteristics, experiences. Resources/practical tools to reach educational/professional goals. Special focus on developing personal/professional goals, articulating personal experiences in light of aspirations.

BIOL 2960H. Exploring Research in the Biological Sciences. (1.0 cr.; A-F only; prereq CBS, Honors program, soph, \%; fall, every year) Explore areas of biological research. Learn where/how to access research papers. Prepare in-depth review paper.

BIOL 3001. Nature of Science and Research. (1.0 cr.; S-N only; prereq College-level biology; fall, every year) Explore how to read/use research papers. Role of research ethics. Financial, legal, regulatory oversight on research/other topics.


BIOL 3004. Foundations of Biology for Biological Sciences Majors, Part II Laboratory. (3.0 cr.; A-F only; =[BIOL 3004H]; prereq [2002 or 2002H or CBS major]; fall, spring, every year) Accompanies 2003. Students design/perform research projects. Relationship between biology and other sciences. Applying quantitative skills, scientific method, and modern biological tools to real-world questions.

BIOL 3004H. Foundations of Biology for Biological Sciences Majors, Part II Laboratory. (3.0 cr.; A-F only; =[BIOL 3004]; prereq [2002 or 2002H]; honors; fall, spring, every year) Accompanies 2003H. Students design/perform research projects. Relationship between biology and other sciences. Applying quantitative skills, scientific method, and modern biological tools to real-world questions.

BIOL 3005W. Plant Function Laboratory. (2.0 cr.; prereq Concurrent enrollment 3002; spring, every year) Various plant processes at subcellular, organ, whole plant levels. Lab, recitation.

BIOL 3007W. Plant, Algal, and Fungal Diversity and Adaptation. (4.0 cr.; prereq One semester college biology, CHEM 1021; fall, every year) Evolution/diversity of plants. Their adaptations for survival in varied environments. Includes lab.

BIOL 3209. Understanding the Evolution-Creationism Controversy. (3.0 cr.; A-F only; prereq 1001 or 1009 or 2002 or equiv; fall, spring, every year) Aspects of evolution-creationism controversy, including its history, legacy, relevance, and key people. Court decisions, public opinion, and related issues (e.g., racism, politics).

BIOL 3211. Physiology of Humans and Other Animals. (3.0 cr.; prereq [1009 or 2003 or equiv], [CHEM 1021 or 1061], [2005 is recommended]; fall, spring, every year) Ways different animals solve similar physiological problems.

BIOL 3270. Introduction To Systems Biology. (3.0 cr.; A-F only; prereq Recommended prereq MATH1241, BIOC3021; spring, every year)
Build model test. Determine validity by comparing emergent properties to experimental data. **BIOL 3272. Applied Biostatistics.** (3.0 cr.; A-F only; = [BIOL 5272]; prereq High school algebra; 2003 recommended; fall, every year) Conceptual basis of statistical analysis.

Statistical analysis of biological data. Data visualization, descriptive statistics, significance tests, experimental design, linear model, simple/multiple regression, general linear model. Lectures, computer lab.

**BIOL 3302. Leadership For Change.** (1.0 cr.; S-N only; prereq 1301, 2001, 2301, CBS dean's scholar; fall, spring, every year) Practice of leading change. Students create vision for change initiative, develop/implement action plan, and evaluate outcomes of their work within a project focused on areas of professional interest.

**BIOL 3303. Peer Leadership Practicum.** (1.0 cr.; S-N only; prereq 1301, 2001, CBS dean's scholar; fall, every year) Assist first-year students in transition to college. How to mentor students and effectively work in diverse groups. Interpersonal communication/presentation skills. Reflection, discussion, group project.

**BIOL 3310. Research Seminars in Biology.** (1.0 cr.; A-F only; prereq One semester of college level general biology; spring, every year) Research seminars in Genetics, Microbiology, Plant Biology, Ecology, Biomedical Engineering, Biochemistry, Neuroscience. Identify, prepare for, evaluate, discuss research seminars.

**BIOL 3407. Ecology.** (3.0 cr.; = [BIOL 3408W, BIOL 5407, BIOL 3807, EEB 3001, EEB 3408W]; prereq [One semester college biology], [MATH 1142 or MATH 1271 or MATH 1281 or equiv]; fall, every year) Principles of population growth/interactions and ecosystem function applied to ecological issues. Regulation of human populations, dynamics/impacts of disease, invasions by exotic organisms, habitat fragmentation, biodiversity. Lab.

**BIOL 3408W. Ecology.** (3.0 cr.; = [BIOL 5407, BIOL 3807, EEB 3001, BIOL 3407, EEB 3408W]; prereq [One semester college biology], [MATH 1142 or MATH 1271 or MATH 1281 or equiv]; spring, every year) Principles of population growth/interactions and ecosystem function applied to ecological issues. Regulation of human populations, dynamics/impacts of disease, invasions by exotic organisms, habitat fragmentation, biodiversity. Lab.

**BIOL 3409. Evolution.** (3.0 cr.; = [BIOL 3809, EEB 3409, EEB 5409, BIOL 5409, BIOL 2822]; prereq One semester college biology; fall, spring, every year) Diversity of forms in fossil record and in presently existing biology. Genetic mechanisms of evolution. Examples of ongoing evolution in wild/domesticated populations and in disease-causing organisms. Lab.

**BIOL 3411. Introduction to Animal Behavior.** (3.0 cr.; = [BIOL 3411W, BIOL 3811, EEB 3412W]; prereq One semester of college biology; fall, spring, every year) Biological study of animal behavior. Mechanism development, function, and evolution. Emphasizes evolution of adaptive behavior, social behavior in the natural environment. Lab.

**BIOL 3411W. Introduction to Animal Behavior.** (4.0 cr.; A-F only; = [BIOL 3811, EEB 3412W, BIOL 3411]; prereq Undergrad biology course; fall, spring, every year) Writing intensive course. Introduction to animal behavior. Feeding behavior, reproductive behavior, perception, learning, animal conflict, social behavior, parental care, communication. Scientific process. Formulate research questions.

**BIOL 3503. Biology of Aging.** (2.0 cr.; A-F only; prereq 1002 or 1009 or 2003 or equiv; fall, offered periodically) Age-related changes in individuals/populations. Evolution of senescence. Genes that influence aging. Interventions. Prospects for an aging human society.

**BIOL 3600. Directed Instruction.** (1.0-2.0 cr.; max 6.0 cr.; S-N or Audit; prereq 1020, upper div, application; #; up to 4 cr may apply to major; fall, spring, every year) Students assist with biology colloquium.

**BIOL 3610. Internship: Professional Experience in Biological Sciences.** (1.0-6.0 cr.; S-N or Audit; prereq Prereq-Acceptance into CBS Internship Program, internship workshop, college consent.; fall, spring, summer, every year) Matches student's academic or career goals with opportunities in industry, non-profit organizations, and government agencies.

**BIOL 3700. Undergraduate Seminar.** (1.0-3.0 cr.; max 9.0 cr.; S-N only; fall, spring, every year) Faculty members lead students in discussions on topics of interest.

**BIOL 3807. Ecology.** (4.0 cr.; A-F or Audit; = [BIOL 3408W, BIOL 3407, BIOL 5407, EEB 3001, BIOL 3407, EEB 3408W]; prereq [One semester college biology], [MATH 1142 or MATH 1271 or MATH 1281 or equiv]; summer, every year) Population growth/interactions. Ecosystem function applied to ecological issues. Regulation of human populations, dynamics/impacts of disease, invasions by exotic organisms, habitat fragmentation, biodiversity. Lab, field work.

**BIOL 3809. Evolution in Lab and Field.** (4.0 cr.; A-F or Audit; = [EEB 3409, EEB 5409, BIOL 3409, BIOL 2822, BIOL 3409]; prereq Introductory Biology with laboratory, college-level math; summer, every year) Foundations of evolutionary biology. Experimental evolution with model organism in lab. Context-dependent evolutionary stable strategies in field. Pose own evolution-related hypothesis, based on natural phenomena at Itasca State Park field setting. Observational or experimental test of hypothesis.

**BIOL 3811. Introduction to Animal Behavior.** (4.0 cr.; A-F or Audit; = [BIOL 3411W, EEB 3412W, BIOL 3411]; prereq 1002 or 1009 or 2003 or equiv or #; summer, every year) Biological study of animal behavior. Mechanism development, function, evolution. Emphasizes evolution of adaptive behavior, social behavior in natural environment. Lab, field work.

**BIOL 3960H. Communicating in the Biological Sciences.** (1.0 cr.; A-F only; prereq CBS honors; fall, every year) Oral reports on topics of current interest to biologists. Progress reports on lab/field research by students.

**BIOL 4003. Genetics.** (3.0 cr.; = [GCD 3022]; prereq [BIOC 3021 or BIOC 4331], [any CBS major or major in animal science or applied plant science or BA biology or BA microbiology or nutrition or physiology or biology/society/environment] or Grad MBS major) or #; fall, spring, summer, every year) Genetic information, its transmission from parents to offspring, its expression in cells/organisms, and its course in populations.

**BIOL 4004. Cell Biology.** (3.0 cr.; = [GCD 4005W]; prereq 4003, [BIOC 3021 or BIOC 4331], [CBS major or CSE major or grad MSB major]; fall, spring, summer, every year) Processes fundamental to cells. Emphasizes eukaryotic cells. Assembly/function of membranes/organelles. Cell division, cell form/movement, intercellular communication, transport, secretion pathways. Cancer cells, differentiated cells.


**BIOL 4201. Teaching in the Biology Laboratory.** (1.0 cr.; max 2.0 cr.; S-N only; prereq Student who is teaching in CBS lab course; fall, spring, every year) Pedagogical underpinnings for teaching in lab.

**BIOL 4590. Coral Reef Ecology.** (2.0 cr.; A-F only; prereq Introductory biology course with lab; fall, every year) Contemporary issues in tropical reef ecology from diverse perspectives. Option of two-credit seminar during fall semester plus additional two-credit field option (BIOL 4596) to involve SCUBA diving/snorkeling on tropical reef.

**BIOL 4596. Coral Reef Ecology (Dive Trip).** (2.0 cr.; A-F only; prereq Introductory biology with lab, valid passport, and SCUBA certification.; fall, every year) SCUBA diving/snorkeling on tropical reef. Conduct primary research/writing.

**BIOL 4793W. Directed Studies: Writing Intensive.** (1.0-6.0 cr.; max 36.0 cr.; S-N only; prereq A-F; %; fall, spring, summer, every year) Individual study on selected topics or problems. Emphasizes selected readings, use of scientific literature or literature on biology education.
BIO 4794W. Directed Research. (1.0-6.0 cr. [max 36.0 cr.]; S-N only; prereq #, %; fall, spring, summer, every year) Lab or field investigation of selected areas of research.

BIO 4850. Special Topics in Biology. (1.0-5.0 cr. [max 10.0 cr.]; A-F only; prereq Beginning biology; summer, offered periodically) Offered at Itasca Biological Station and Laboratories. Metagenomics, telemetry/animal behavior, aquatic botany, field evolution.

BIO 4862. Biological Photography and Digital Imaging Techniques. (3.0 cr.; A-F or Audit; prereq One semester college biology or #; summer, offered periodically) Field photography techniques for documentation of invertebrates, vertebrates, aquatic organisms, and habitats of Itasca area. Digital imaging equipment, software, related techniques. Building video files for the web.

BIO 4894. Directed Research at Itasca. (1.0-7.0 cr.; S-N or Audit; prereq #, %; max of 7 cr of [4894 or 4993 or 4994] may count toward major requirements; fall, spring, offered periodically) Field investigation of selected areas of research at Itasca Field Station.

BIO 4950. Special Topics in Biology. (1.0-4.0 cr. [max 12.0 cr.]; spring, offered periodically) In-depth study of special topic in life sciences.

BIO 4960H. Thesis Writing in the Biological Sciences: Developing the Literature Review. (1.0 cr.; A-F only; prereq Honors, [College of Biological Sciences student or interdisciplinary major with life sciences focus]; fall, every year) Develop/refine lit review component of honors thesis. Conceptualizing/drafting/revision process. Give/receive formative feedback. Unpack conventions of scientific writing. Develop at least one draft module of each data-related thesis section.

BIO 4961H. Thesis Writing in the Biological Sciences: Conveying and Contextualizing Results. (1.0 cr.; A-F only; prereq honors, CBS student or interdisciplinary major with life sciences focus; spring, every year) Continue work in Bio 4960H to develop/draft/revise results/methods/discussion sections of honors thesis. Prepare/present professional research poster. Complete thesis assessed against standards outlined in CBS Thesis Assessment Rubric.

BIO 4993. Directed Studies. (1.0-6.0 cr. [max 36.0 cr.]; S-N only; prereq #, %; fall, spring, summer, every year) Individual study on selected topics or problems. Emphasizes selected readings, use of scientific literature or literature on biology education.

BIO 4994. Directed Research. (1.0-6.0 cr. [max 36.0 cr.]; S-N only; prereq #, %; fall, spring, summer, every year) Lab or field investigation of selected areas of research.

BIO 5272. Applied Biostatistics. (3.0 cr.; A-F only; =BIOL 3272; prereq One semester of college-level [calculus or statistics or computer programming], general biology); fall, every year) Conceptual basis of statistical analysis. Statistical analysis of biological data. Data visualization, descriptive statistics, significance tests, experimental design, linear model, simple/multiple regression, general linear model. Lectures, computer lab.

BIO 5309. Molecular Ecology and Ecological Genomics. (3.0 cr.; =BIOL 3407 or BIOL 3409 or BIOL 4003; fall, every years) Application of molecular tools (PCR, sequencing, AFLP, SNPs, QTL) and analyses of molecular data for understanding ecological/evolutionary processes. Strengths/weaknesses of techniques/analyses. Questions molecular tools are used to answer.

BIO 5407. Ecology. (3.0 cr.; =BIOL 3408W, BIOL 3807, EEB 3001, BIOL 3407, EEB 3408W); prereq [One semester college biology, [MATH 1142 or MATH 1271 or MATH 1281 or equiv], grad student] or #; fall, spring, every year) Principles of population growth/interactions and ecosystem function applied to ecological issues, including regulation of human populations, dynamics/impacts of disease, invasions by exotic organisms, habitat fragmentation, and biodiversity.

BIO 5409. Evolution. (3.0 cr.; =BIOL 3809, EEB 3409, EEB 5409, BIOL 2822, BIOL 3409); prereq One semester college biology, grad student; fall, every year) Diversity of forms in fossil record and in presently existing biology. Genetic mechanisms of evolution. Examples of ongoing evolution in wild/domesticated populations and in disease-causing organisms. Lab.

BIO 5910. Special Topics in Biology for Teachers. (1.0-4.0 cr. [max 12.0 cr.]; prereq BA or BS in science or science education or elementary education or K-12 licensed teacher; spring, summer, every year) Courses developed for K-12 teachers depending on topics or subtopics which might include any of the following: plant biology, animal biology, genetics, cell biology, biochemistry, microbiology.

BIO 5950. Special Topics in Biology. (1.0-4.0 cr. [max 8.0 cr.]; A-F only; fall, spring, summer, offered periodically) In-depth study of special topic in life sciences.
BMEN 3211. Bioelectricity and Bioinstrumentation. (3.0 cr.; A-F or Audit; prerequisite BMEN 3201; Math 2263 or Math 1372, PHYS 1302, CSE student; fall, every year)

Principles of electrical phenomena, instruments relevant to biomedical applications. Lecture/laboratory.

BMEN 3215. Bioelectricity and Transport Processes. (4.0 cr.; A-F or Audit; prerequisite SCHEM 1022, SMATH 1372, &PHYS 1302, CSE student; fall, every year)


BMEN 3001. Biomechanics. (4.0 cr.; A-F or Audit; prerequisite MATH 2374, PHYS 1302, [BME upper div or %]; fall, every year)

Statics, dynamics, and deformable body mechanics applied to biological/biomedical problems. Mechanical properties of biological and commonly used biomedical engineering materials. Techniques for numerical solution of biomechanics problems. Lecture/laboratory.

BMEN 3011. Biomechanics. (3.0 cr.; A-F or Audit; prerequisite BMEN Upper Div or %; fall, every year)

Statics, dynamics, deformable body mechanics applied to biological/biomedical problems. Mechanical properties of biological/commonly used biomedical engineering materials. Techniques for numerical solution of biomechanics problems. Lecture/Discussion.

BMEN 3015. Biomechanics Lab. (1.0 cr.; A-F or Audit; prerequisite [BME UD or %], &3011; fall, )

Lab accompanies BMEN 3011 Biomechanics.

BMEN 3101. Biomedical Transport Processes. (4.0 cr.; A-F or Audit; prerequisite Math 2374, Phys 1302, [BMEN upper div or %]; fall, spring, offered periodically)

Principles of momentum, heat, and mass transfer illustrated with applications in physiological processes. Fluid mechanics, heat condition, mass diffusion, convection. Lecture/laboratory.

BMEN 3111. Biomedical Transport Processes. (3.0 cr.; A-F or Audit; prerequisite [3011, 3015], [BMEN upper div or %]; spring, every year)


BMEN 3115. Biomedical Transport Processes Lab. (1.0 cr.; A-F or Audit; prerequisite [3011, &3111], [BMEN upper div or %]; spring, every year)

Lab accompanies BMEN 3111 Biomedical Transport Processes.

BMEN 3201. Bioelectricity and Bioinstrumentation. (4.0 cr.; A-F or Audit; prerequisite [BMEN 3211]; Math 2263 or Math 2374, Phys 1302, [BMEN upper div or %]; fall, spring, every year)

Principles of electrical phenomena, instruments relevant to biomedical applications. Lecture/laboratory.

BMEN 3211. Bioelectricity and Bioinstrumentation. (3.0 cr.; A-F or Audit; prerequisite BMEN 3201; Math 2263 or Math 1372, &PHYS 1302, CSE student; fall, every year)

Principles of electrical phenomena, instruments relevant to biomedical applications. Lecture/discussion.

BMEN 3215. Bioelectricity and Transport Processes. (4.0 cr.; A-F or Audit; prerequisite Math 2263 or Math 2374, Phys 1302, [BMEN upper div or %]; spring, every year)


BMEN 3301. Biomaterials. (4.0 cr.; A-F or Audit; prerequisite [Math 2263 or Math 2374, Phys 1302, [BMEN upper div or %]; spring, every year)


BMEN 3311. Biomaterials Lab. (1.0 cr.; A-F or Audit; prerequisite [2101, &3311]; [BMEN upper div or %]; spring, every year)

Lab accompanies BMEN 3311 Biomaterials.

BMEN 3401. Biomedical Systems Analysis. (4.0 cr.; A-F only; prerequisite 3101, 3201; spring, every year)

Introduction to quantitative analysis of physiological/biological systems. First/second order systems, linear time-invariant systems, systems classification/identification. Introduction to linear control theory and controller synthesis. Biological examples of electrical, mechanical, thermal, and chemical/biological control systems.

BMEN 3411. Biomedical Systems Analysis. (3.0 cr.; A-F or Audit; prerequisite 3211, [BMEN Upper Div or %]; spring, every year)


BMEN 3415. Biomedical Systems Analysis Lab. (1.0 cr.; A-F or Audit; prerequisite [3211, &3411]; [BMEN Upper Div or %]; spring, every year)

Lab accompanies BMEN 3411 Biomedical Systems Analysis.

BMEN 3601. Biomedical Engineering Careers and Practice in the Med Tech Industry. (1.0 cr.; A-F only; spring, every year)

Local industry speakers describe various job roles available to BBME graduates at graduation. Input from Career Center on internship/job search/interviewing. Exposure to other aspects of the medical devices industry (e.g. failure mode analysis, tolerancing, reading/critiquing clinical literature, etc).

BMEN 4001W. Biomedical Engineering Design I. (3.0 cr.; A-F or Audit; prerequisite 2501, 3001, 3101, 3201, 3301, 3701; fall, every year)

Design/analysis of biomedical devices/technologies. Students work in teams on open ended design project, present completed work at design show.

BMEN 4002W. Biomedical Engineering Design II. (3.0 cr.; A-F or Audit; prerequisite 4001W; spring, every year)

Continuation of 4001W.

BMEN 4011. CAD/CAE of Bioelectrical Devices. (1.0 cr.; A-F or Audit; prerequisite [3111, 3215] or #; fall, every year)

Introduction to CAD modeling/analysis for medical device engineers using SOLIDWORKS CAD platform. Emphasis on practical applications of CAD for engineers using real-world examples from actual industry projects.

BMEN 4015. CAE of Biomechanical/Transport Devices. (1.0 cr.; A-F or Audit; prerequisite 3011, 3015, 3111, 3115; fall, every year)

Analyze transport/mechanical problems involving biomedical engineering/medical devices.

BMEN 4710. Directed Research. (1.0-4.0 cr.; A-F or Audit; prerequisite #; fall, spring, summer, every year)

Independent laboratory research under faculty supervision.

BMEN 4720. Directed Study. (1.0-4.0 cr.; A-F or Audit; prerequisite #; fall, spring, summer, every year)

Directed study under faculty supervision.

BMEN 4896. Industrial Assignment I: Co-op Program. (2.0 cr.; A-F only; prerequisite BMEN upper div, completion of required courses in BMEN prog through spring sem of 3rd yr, registered in co-op prog; fall, every year)

Industrial assignment in co-op program. Formal written report on assignment.

BMEN 4910. Special Topics in Biomedical Engineering. (1.0-4.0 cr.; A-F or Audit; prerequisite #; fall, spring, offered periodically)

New or experimental special topics.

BMEN 4996. Industrial Assignment II: Co-op Program. (3.0 cr.; A-F only; prerequisite 4896, registration in co-op prog; spring, every year)

Industrial Assignment in co-op program. Formal written final report on assignment. Oral presentation.
Commonly used biomaterials. Chemical/physical aspects. Practical examples from such areas as cardiovascular/orthopedic applications, drug delivery, and cell encapsulation. Methods used for chemical analysis and for physical characterization of biomaterials. Effect of additives, stabilizers, processing conditions, and sterilization methods.

BMEN 5041. Tissue Engineering. (3.0 cr.; prereq CSE upper div or grad student or med student or #; fall, every year) Fundamentals of wound healing and tissue repair; characterization of cell-matrix interactions; case study of engineered tissues, including skin, bone marrow, liver, vessel, and cartilage; regulation of biomaterials and engineered tissues.

BMEN 5101. Advanced Bioelectricity and Instrumentation. (3.0 cr.; prereq [CSE upper div, grad student] or #; spring, offered periodically) Instrumentation, computer systems, and processing requirements for clinical physiological signals. Electrode characteristics, signal processing, and interpretation of physiological events by ECG, EEG, and EMG. Measurement of respiration and blood volume/flow.

BMEN 5111. Biomedical Ultrasound. (3.0 cr.; prereq [3401 or equiv], [MATH 2373 or equiv], [MATH 2374 or equiv], [CSE upper div or grad student] or #; spring, every year) Introduction to biomedical ultrasound, including physics of ultrasound, transducer technology, medical ultrasound imaging, photoacoustic imaging, applications of non-linear acoustics, and high-intensity ultrasound.

BMEN 5151. Introduction to BioMEMS and Medical Microdevices. (2.0 cr.; A-F or Audit; prereq CSE sr or grad student or medical student; spring, every year) Design/microfabrication of sensors, actuators, drug delivery systems, microfluidic devices, and DNA/protein microarrays. Packaging, biocompatibility, ISO 10993 standards. Applications in medicine, research, and homeland security.

BMEN 5201. Advanced Biomechanics. (3.0 cr.; prereq [[3001 or equiv]], [CSE upper div or grad student]] or #; fall, spring, offered periodically) Introduction to biomechanics of musculoskeletal system. Anatomy, tissue material properties. Kinematics, dynamics, and control of joint/limb movement. Analysis of forces/motions within joints. Application to injury, disease. Treatment of specific joints, design of orthopedic devices/implants.

BMEN 5311. Advanced Biomedical Transport Processes. (3.0-4.0 cr.; M 5753, 5211/ME 5381; prereq CSE upper div or grad student or #; [CHEN 5103 or ME 5342] recommended; spring, every year) Introduction to biological fluid, mass, and heat transport. Mass transfer across membranes. Fluid flow in vessels/interstitium. Heat transfer in cells, tissues, and body. Applications to blood oxygenation, respiration, drug delivery, and tissue engineering.


BMEN 5351. Cell Engineering. (3.0 cr.; prereq [2401, [2501 or A5501], [MATH 2243 or MATH 2373]] or CSE upper div or grad student or #; fall, spring, offered periodically) Engineering approaches to cell-related phenomena important to cell/tissue engineering. Receptor/ligand binding. Trafficking/signaling processes. Applications to cell proliferation, adhesion, and motility. Cell-matrix interactions.

BMEN 5401. Advanced Biomedical Imaging. (3.0 cr.; A-F or Audit; prereq CSE upper div or grad student or #; fall, every year) Functional biomedical imaging modalities. Principles/applications of technologies that offer high spatial/temporal resolution. Bioelectromagnetic and magnetic resonance imaging. Other modalities.

BMEN 5411. Neural Engineering. (3.0 cr.; prereq 3401 recommended; fall, every year) Theoretical basis. Signal processing techniques. Modeling of nervous system, its response to stimulation. Electrode design, neural modeling, cochlear implants, deep brain stimulation. Prosthetic limbs, micuntion control, prosthetic vision. Brain machine interface, seizure prediction, optical imaging of nervous system, place cell recordings in hippocampus.

BMEN 5412. Neuromodulation. (3.0 cr.; A-F only; prereq 5411 or #; spring, every year) Fundamentals of bioengineering approaches to modulate the nervous system, including bioelectricity, biomagnetism, and optogenetics. Computational modeling, design, and physiological mechanisms of neuromodulation technologies. Clinical exposure to managing neurological disorders with neuromodulation technology.

BMEN 5413. Neural Decoding and Interfacing. (3.0 cr.; A-F or Audit; prereq 5411, [3201 or 3401 or equiv recommended]; spring, every year) Neural interface technologies currently in use in patients as well as the biophysical, neural coding, and hardware features relating to their implementation in humans. Practical and ethical considerations for implanting these devices into humans.

BMEN 5421. Introduction to Biomedical Optics. (3.0 cr.; A-F or Audit; prereq CSE sr or grad student; spring, offered periodically) Biomedical optical imaging/sensing principles, laser-tissue interaction, detector design, noise analysis, interferometry, spectroscopy. Optical coherence tomography, polarization, birefringence, flow measurement, fluorescence, nonlinear microscopy. Tours of labs.

BMEN 5444. Muscle. (3.0 cr.; spring, offered periodically) Muscle structure/function: molecular mechanism by which force is generated.

BMEN 5501. Biology for Biomedical Engineers. (3.0 cr.; prereq Engineering upper div or grad student; fall, spring, offered periodically) Concepts of cell/tissue structure/function. Basic principles of cell biology. Tissue engineering, artificial organs.


BMEN 5701. Cancer Bioengineering. (3.0 cr.; max 6.0 cr.; fall, spring, offered periodically) Special topics in biomedical engineering.

BMEN 5920. Special Topics in Biomedical Engineering. (2.0-3.0 cr. [max 6.0 cr.]; fall, every year) Special topics in biomedical engineering.

Bioproducts and Biosystems Engineering (BBE)

Institute of Technology

BBE 1001. Bioproducts and Biosystems Engineering Orientation. (1.0 cr.; S-N or Audit; fall, every year) Academic programs/careers related to bioproducts and biosystems engineering. Required field trip.

BBE 1002. Biorenewable Resources. (3.0 cr.; A-F or Audit; spring, every year) Environmental/social impacts of materials used to make a product. Biorenewable resources, using wood and agriculture-based biomass. Environmental, technological, social, and economic implications of the use of these resources.

BBE 1906W. Freshman Seminar. (3.0 cr.; prereq Fr; fall, spring, every year) Issues/topics related to natural resources and the environment. Topics vary each semester.

BBE 1943W. Freshman Seminar. (3.0 cr.; prereq Fr; fall, offered periodically) Issues/topics related to natural resources and the environment. Topics vary each semester.

BBE 2001. Mechanics and Structural Design. (4.0 cr.; A-F or Audit; prereq [MATH 1272 or MATH 1372]; [PHYS 1101 or PHYS 1301]; fall, every year) Fundamental treatment of statics, dynamics, and principles of structural design. Techniques for individual components, including trusses, beams, and columns. Using conventional lumber products, engineered wood products, and steel. Lab.

Courses listed in this catalog are current as of December 12, 2014. For up-to-date information, visit www.catalogs.umn.edu
BBE 2002. Introduction to Engineering Design. (3.0 cr.; A-F only; prereq [MATH 1271 or MATH 1371, CHEM 1021, BBE lower div (sof) or upper div (jr) or grad student or senior or soph] or #; fall, every year)

Identify, formulate, develop/complete open-ended designs in bioproducts & biosystems engineering at the conceptual level; engineering economics principles, safety/health considerations, and ethics for design project. Written, graphical, and oral presentations.

BBE 2201. Renewable Energy and the Environment. (3.0 cr.; fall, every year)

Renewable energy technologies. Environmental, technical, social, and economic challenges/opportunities for each technology.

BBE 3012. Transport in Biological Processes I. (4.0 cr.; A-F only; prereq 2001 or 3033, MATH 2243 or 2373, PHYS 2263 or 2374, PHYS 1302W or #; fall, every year)


BBE 3013. Engineering Principles of Molecular and Cellular Processes. (3.0 cr.; A-F or Audit; prereq BIOL 1009, CHEM 1062 or CHEM 1066 or #; Math 2242 or Math 1372 or #; fall, every year)


BBE 3023. Ecological Engineering Principles. (3.0 cr.; prereq BIOL 1009, BBE 3012 or #BBE 3012 or #; fall, every year)


BBE 3033. Material and Energy Balances in Biological Systems. (3.0 cr.; A-F or Audit; prereq CHEM 1022, MATH 1272 or MATH 1372, PHYS 1302; spring, every year)

Basic principles of materials and energy balances, their applications in biological systems.

BBE 3043. Biological and Environmental Thermodynamics. (3.0 cr.; A-F or Audit; prereq BBE 1009, CHEM 1021, MATH 1272, PHYS 1302; spring, every year)


BBE 3093. Directed Studies. (1.0-5.0 cr.; prereq #; fall, spring, every year)

Independent study of topic(s) involving physical principles as applied to agricultural production and land resources.

BBE 3101. Introductory Statics and Structures for Construction Management. (3.0 cr.; A-F or Audit; prereq Working knowledge of [trigonometry, geometry, algebra]; fall, spring, every year)

Statics, engineering wood design principles, mechanical properties of wood. Design techniques for individual components. Trusses, beams, columns. Using conventional lumber products, engineered wood products, and steel. Simple structures explored through examples, assignments.

BBE 3201. Sustainability of Food Systems: A Life Cycle Perspective. (3.0 cr.; A-F only; fall, spring, every year)

Consequences of global food system. Diversity in food systems. Current topics in food sustainability.

BBE 3393. Directed Study. (1.0-3.0 cr. [max 12.0 cr.]; prereq #; fall, spring, every year)

Opportunity to pursue projects not available through independent study or extra credit. In consultation with an adviser, students develop a prospectus and complete progress reports and a final report on the project.

BBE 3396. Industry Assignment. (1.0 cr.; A-F or Audit; prereq BBE cooperative ed student, approval of departmental co-op coordinator; fall, spring, every year)

Industry work assignment in forest products cooperative education program. Evaluation based on formal report.

BBE 3480. Special Topics I. (1.0-4.0 cr. [max 12.0 cr.]; #BBE 5480; fall, spring, every year)

Topics specified in Class Schedule.

BBE 3503. Marketing of Bio-based Products. (4.0 cr.; A-F or Audit; #BBE 5503; fall, every year)

Intro to marketing function as it relates to current/emerging bio-based products industries (building materials, paper, fuels, etc.). Product positioning, pricing, promotion, and channel management within strategic planning and environmental marketing management.

BBE 4001. Chemistry of Biomass and Biomass Conversion to Fuels and Products. (4.0 cr.; A-F or Audit; #BBE 5001; fall, every year)

Chemistry of biomass and its sustainable utilization for biofuels and bioproducts, including bio-based materials. Chemicals/energy and their environmental implications within the context of chemical principles and associated reactions underlying the structure, properties, processing, and performance of plant materials.

BBE 4013. Transport in Biological Processes II. (3.0 cr.; A-F or Audit; prereq 3012, 3043, upper div CSE or #; spring, every year)

Application of thermodynamics, fluid flow, heat/ mass transfer to design problems. Biological processes/materials at cell, organism, system level. Agricultural, environmental, food, bioprocess applications. Solution of equations involving computer programming assignments.

BBE 4023W. Process Control and Instrumentation. (3.0 cr.; A-F or Audit; #BBE 5023; prereq Upper div CSE or grad student; fall, every year)

Measurement of motion, force, pressure, flow, temperature, size, shape, color, texture, rheology, moisture, water mobility, fat, and pH. Linking physical and biological control systems.

BBE 4301. Applied Surface and Colloid Science. (3.0 cr.; [BBE 5301]; prereq 3043 or BMEN 2101 or CHEM 3101 or CHEM 4501 or #; fall, every year)


BBE 4302. Biodegradation of Bioproducts. (3.0 cr.; #BBE 5302; prereq 1002 or #; spring, every year)

Organisms of importance to bio-based products. Deterioration, control, bioprocesses for benefit.

BBE 4303. Introduction to Bio-based Materials Science. (3.0 cr.; A-F or Audit; #BBE 5303; prereq 3001; spring, every year)

Principles of materials science, their application to bio-based materials.

BBE 4305. Pulp and Paper Technology. (3.0 cr.; prereq Junior or senior or #; spring, every year)


BBE 4333. Off-road Vehicle Design. (4.0 cr.; A-F or Audit; #BBE 5333; prereq [3001, 4303] or [AEM 2021, AEM 3031], [CE 3502 or AIE 3502], upper div IT] or #; spring, every year)


BBE 4355. Design of Wood Structures. (3.0 cr.; prereq 2001 or CE student or #; spring, every year)

Design of wood structures using Allowable Stress Design. Wood properties/characteristics important to structural design. Heavy/light frame wood construction.

BBE 4401. Bioproducts Engineering. (3.0 cr.; A-F or Audit; prereq [3033, 3012, UD] or #; fall, every year)

Unit operations of bioproducts engineering/ manufacture.

BBE 4402. Bio-based Products Engineering Lab I. (1.0 cr.; A-F or Audit; #BBE 5402; prereq CHEM 2301, [jr or sr or #]; spring, every year)
BEB 4403. Bio-based Products Engineering Lab II. (1.0 cr.; A-F or Audit; =BBE 5403; prereq CHEM 2301, [jr or sr or #]; fall, every year)
Lab exercises in bio-based products engineering.

BEB 4404. Biopolymers and Biocomposites Engineering. (3.0 cr.; A-F or Audit; =BBE 5404; prereq [BBE/CSE upper division] or #; fall, every year)
Structure/properties of biopolymers. Engineering of composites from these biopolymers or plant-based materials.

BEB 4407. Bioproducts: Manufacturing and Applications. (3.0 cr.; =BBE 5407; prereq 1002 or #; fall, every year)

BEB 4412W. Biocomposites and Biomass Energy. (4.0 cr.; =BBE 5412; prereq 1002, upper div BP; spring, every year)
Lab exercises in bio-based products and derived materials. Wood's physical properties/characteristics in various applications. Non-wood, non-wood products.

BEB 4413. Systems Approach to Residential Construction. (4.0 cr.; =HSG 4413, BEE 5413; prereq Upper div BP or #; spring, every year)
Dynamic/integrated issues of energy, moisture control, and indoor air quality in residential buildings. Design, construction, and operational aspects for energy efficient, durable structure/healthy living environment. Interaction between moisture and wood products within building system.

BEB 4414. Advanced Residential Building Science. (4.0 cr.; =BBE 5414; prereq 2001; fall, every year)
Theory, advanced applications for residential buildings. Focuses on heat/mass transfer.

BEB 4416. Building Testing and Diagnostics. (2.0 cr.; =BBE 5416; prereq 4413; spring, every year)

BEB 4491. Senior Topics: Independent Study. (1.0-4.0 cr.; prereq sr.; fall, spring, every year)
Independent study in student's area of interest.

BEB 4502W. BBE Capstone Design. (4.0 cr.; =BBE 4501; Jr or sr or #; spring, every year)
Students develop, select, formulate, and complete an open-ended, comprehensive engineering process/product design project.

BEB 4504W. Bio-based Products Development and Management. (3.0 cr.; A-F or Audit; prereq Jr or sr or #; spring, every year)
Concepts of new-product development and product management, their application to bio-based products.

BEB 4523. Ecological Engineering Design. (3.0 cr.; A-F or Audit; =BBE 5523; prereq CHEM 1022 or [CHEM 1062, CHEM 1066], 3012, upper div CSE or #; spring, every year)

BEB 4533. Sustainable Waste Management Engineering. (3.0 cr.; A-F or Audit; prereq 3023, upper div CSE; spring, every years)
Sources/characteristics of agricultural wastes. Livestock, food processing, domestic wastes. Physical, biological, chemical, rheological, microbiological properties. Effects on environment. Collection, storage, treatment (aerobic/anerobic), use/disposal. Land application.

BEB 4535. Assessment and Diagnosis of Impaired Waters. (3.0 cr.; =BBE 5535; prereq Upper division CSE or CFANS or CBS student or #; fall, every year)
Assessing impaired waters and developing TMDL for conventional pollutants. Preparing/communicating legal, social, and policy aspects. TMDL analysis of real-world impaired waters problem. Field trip to impaired waters site.

BEB 4608. Environmental and Industrial Microbiology. (3.0 cr.; A-F only; =BBE 5608; prereq [BIOL 1001 or BIOL 1009], CHEM 1011; fall, every year)
Use of organisms in remediation of waste/pollution problems related to bio-based product industries. Types, characteristics, identification of useful microorganisms. Applications of microbes to benefit industrial processes of wood/fiber.

BEB 4713. Biological Process Engineering. (3.0 cr.; =BBE 5713; prereq [3033, 4013 or #4013], upper div CSE or #; spring, every year)

BEB 4723. Food Process Engineering. (3.0 cr.; A-F or Audit; =BBE 5723; prereq [4013 or #4013], upper div CSE or #; spring, every year)
Material/energy balance, fluid dynamics, heat/mass transfer in refrigeration, freezing, psychrometrics, dehydration, evaporation, non-thermal processing, and separation. Development control for production of food products.

BEB 4733. Renewable Energy Technologies. (3.0 cr.; =BBE 5733; prereq Junior or senior; spring, every year)

BEB 4744. Engineering Principles for Biological Scientists. (4.0 cr.; A-F or Audit; =FSCN 4331; prereq [Math 1142 or Math 1271], Phys 1101; intended for non engineering students; fall, every year)
Material/energy balances applied to processing systems. Principles of fluid flow, thermodynamics, heat, mass transfer applied to food and bioprocess unit operations such as pumping, heat exchange, refrigeration/freezing, drying, evaporation, and separation.

BEB 4801H. Honors Research. (2.0 cr.; A-F or Audit; prereq BBE upper div honors, #; fall, spring, every year)
First semester of independent research project supervised by faculty member.

BEB 4802H. Honors Research. (2.0 cr.; A-F or Audit; prereq BBE upper div honors, #; fall, spring, every year)

BEB 4900. Intern Reports. (2.0 cr. [max 4.0 cr.]; S-N or Audit; prereq [CSE or CFANS] student in BBE; fall, spring, summer, every year)
Reports on intern work assignments reviewed by faculty/industry advisers.

BEB 5001. Chemistry of Biomass and Biomass Conversion to Fuels and Products. (4.0 cr.; A-F or Audit; =BBE 4001; prereq Grad student or #; fall, every year)

BEB 5023. Process Control and Instrumentation. (3.0 cr.; =BBE 4023W; prereq Grad student or #; fall, every year)
Fundamental principles in system dynamics/control. Emphasizes process systems and problems faced by process engineers.

BEB 5095. Special Problems. (1.0-5.0 cr.; #; fall, spring, summer, every year)
Advanced individual-study project. Application of engineering principles to specific problem.

BEB 5202. Wood and Fiber Science. (3.0 cr.; A-F or Audit; spring, every year)
Wood as a bio-material. Wood's anatomical/structural system compared with other plant-derived materials. Wood's physical properties/characteristics in various applications. Non-wood fibers, bio-product characteristics.

BEB 5203. Environmental Impacts of Food Production. (3.0 cr.; A-F or Audit; prereq intended for non-engineering students; Credit will not be granted if credit has been received for AGET 5203; fall, spring, every year)
Crop production intensity, animal raising options, food processing waste alternatives, pest control.

BEB 5301. Applied Surface and Colloid Science. (3.0 cr.; =BBE 4301; prereq Grad student or #; fall, every year)

BIBE 5302. Biodegradation of Bioproducts. (3.0 cr.; =BIBE 4302; prereq Grad student or #; spring, every year) Organisms and their importance to bio-based products: deterioration, control, bioprocesses for benefit.

BIBE 5303. Introduction to Bio-based Materials Science. (3.0 cr.; =BIBE 4303; prereq Grad student or #; spring, every year) Principles of materials science, their application to bio-based materials. Project required.


BIBE 5333. Off-road Vehicle Design. (4.0 cr.; A-F only; =BIBE 4333; prereq ([2001, 4303) or [AEM 2021, AEM 3031], [3012 or &3012 & CE 3502 or &CE 3502], upper div CSE) or #; spring, every year) Mechanics involved in designing/testing off-road vehicle. Vehicle mechanics, traction, performance. Complexity/modeling of vehicle interaction with soil, muskeg, snow. Case study or literature review. Develop paper for publication.

BIBE 5401. Bioproducts Engineering. (3.0 cr.; A-F or Audit; prereq Grad student or #; fall, every year) Unit operations of bioproducts engineering/manufacture. Project required.

BIBE 5402. Bio-based Products Engineering Lab I. (1.0 cr.; A-F or Audit; =BIBE 4402; prereq Grad student or #; spring, every year) Laboratory exercises in bio-based products engineering.

BIBE 5403. Bio-based Products Engineering Lab II. (1.0 cr.; A-F or Audit; =BIBE 4403; prereq Grad student or #; fall, every year) Laboratory exercises in bio-based products engineering.

BIBE 5404. Biopolymers and Biocomposites Engineering. (3.0 cr.; A-F or Audit; =BIBE 4404; prereq grad student or #; fall, every year) Structure/properties of biopolymers. Engineering of composites from biopolymers/plant-based materials.

BIBE 5407. Bioproducts: Manufacturing and Applications. (3.0 cr.; =BIBE 4407; prereq Grad student or #; fall, every year) Manufacturing and product service considerations for wood/bio-based products.

BIBE 5412. Biocomposites and Biomass Energy. (4.0 cr.; =BIBE 4412W; prereq Grad student or #; spring, every year) Manufacturing processes, end-use applications of bio-based products.

BIBE 5413. A Systems Approach to Residential Construction. (4.0 cr.; =HSG 4413, BIBE 4413; prereq Grad student or #; spring, every year) Dynamic/interrelated issues of energy, moisture control, indoor air quality in residential bldgs. Emphasizes design, construction, and operational aspects to provide an energy efficient, durable structure, and healthy living environment. Interaction between moisture and wood products within building system.

BIBE 5414. Advanced Residential Building Science. (4.0 cr.; =BIBE 4414; prereq Grad student or #; fall, every year) Building science theory, advanced applications for residential buildings. Focuses on heat/mass transfer.

BIBE 5416. Building Testing & Diagnostics. (2.0 cr.; =BIBE 4416; prereq Grad student or #; spring, every year) Theoretical basis for performance testing. Diagnostics applications for residential structures. Focuses on existing structures and retrofit/remedial applications. Digital differential pressure gauges, blower doors, airflow hoods/ Grids, duct pressure testing, infrared thermography. Hands-on sessions for equipment use, problem solving.

BIBE 5480. Special Topics. (3.0-4.0 cr. [max 12.0 cr.]; =BIBE 3480; prereq Sr or grad student; fall, spring, every year) Topics specified in Class Schedule.

BIBE 5503. Marketing of Bio-based Products. (4.0 cr.; A-F or Audit; =BIBE 3503; prereq Grad student or #; fall, every year) Introduction to marketing function as it relates to current/emerging bio-based products industries (building materials, paper, fuels, etc.). Product positioning, pricing, promotion, and channel management within strategic planning and environmental marketing management.

BIBE 5504. Bio-based Products Development and Management. (3.0 cr.; A-F or Audit; prereq Grad student or #; spring, every year) Concepts of new product development and product management and their application to bio-based products.

BIBE 5513. Watershed Engineering. (3.0 cr.; A-F or Audit; prereq 3023, upper div CSE; fall, every year) Application of engineering principles to managing surface runoff from agricultural, range, and urban watersheds. Design of facilities and selection of land use practices for controlling surface runoff to mitigate problems of flooding and degradation of surface-water quality.

BIBE 5523. Ecological Engineering Design. (3.0 cr.; A-F only; =BIBE 4523; prereq [[CHEM 1022 or CHEM 1062, CHEM 1066], BIBE 3012, grad student or #; spring, every year) Application of ecological engineering to design of remediation systems. Artificial ecosystems, ecosystem/wetland restoration, constructed wetlands, biological engineering for slope stability, waste treatments. Restoring ecological service of watersheds.

BIBE 5535. Assessment and Diagnosis of Impaired Waters. (3.0 cr.; A-F only; =BIBE 4535; prereq Grad student or #; fall, every year) Assessing impaired waters and developing TMDL for conventional pollutants. Preparing/communicating legal, social and policy aspects. TMDL analysis of real-world impaired waters problem. Field trip to impaired waters site.

BIBE 5608. Environmental and Industrial Microbiol. (3.0 cr.; A-F only; =BIBE 4608; prereq [BIOL 1001 or BIOL 1009], CHEM 1011; fall, every year) Use of microbes/enzymes to detoxify contaminants in field or in containment facilities. Contaminants, sources, fates. Biological organisms, pathways, catalysts utilized in bioremediation. Site inspection practices, bioremediation technologies, application in real-world situations.

BIBE 5713. Biological Process Engineering. (3.0 cr.; A-F only; =BIBE 4713; prereq [3003, [4013 or &4013], [upper div CSE or grad student]] or #; spring, every year) Material/energy balances. Homogeneous reactions of bioprocess engineering and biological systems. Fermentation engineering, reactor design fundamentals. Filtration, centrifugation, separation, absorption, extraction, chromatography. Biorefining. Conversion of biomass into bioenergy, biochemicals, and biomaterials.

BIBE 5723. Food Process Engineering. (3.0 cr.; A-F or Audit; =BIBE 4723; prereq [4013 or &4013], [upper div CSE or grad student]] or #; spring, every year) Food processing engineering. Applications of material balance, energy balance, fluid dynamics, and heat/mass transfer to refrigeration, freezing, psychrometrics, dehydration, evaporation, non-thermal processing, and separation. Development/control for food products.

BIBE 5733. Renewable Energy Technologies. (3.0 cr.; A-F or Audit; =BIBE 4733; prereq Grad student or #; spring, every year) Energy security and its environmental, economic and societal impacts. Current and emerging technologies for production and use, characteristics of renewable energy, key methods for efficient production, current and probable future, and impact on sustainable development.

Business Administration (BA)
Curtis L. Carlson School of Management

BA 1905. Freshman Seminar. (2.0-3.0 cr. [max 6.0 cr.]; A-F only; prereq Fr; fall, every year) Topics vary.
BA 1910W. Freshman Seminar, WI. (2.0 cr. [max 6.0 cr.]; A-F only; prereq freshman; fall, spring, every year)
Topics vary. See Class Schedule.

BA 3000. Career Skills. (1.0 cr.; S-N only; prereq CSOM [soph or upper div] major, MACC, M BT; fall, spring, summer, every year) Career planning. Use of Carlson School of Management's Business Career Center. Awareness, knowledge, skills associated with career/job search process.

BA 3100. Global Seminar. (3.0 cr. [max 9.0 cr.]; prereq Approved application; spring, summer, offered periodically) Three-week, faculty-led program. Students spend May session or January session examining international business topics first-hand. Topics/locations vary. For current offerings, contact Learning Abroad Center.

BA 3998. Independent Study. (1.0-4.0 cr. [max 12.0 cr.]; prereq CSOM upper div, #, fall, spring, summer, every year) Student-initiated project or independent study.

BA 3999. Internship Seminar. (1.0 cr. [max 3.0 cr.]; S-N only; prereq Approved internship; #, fall, spring, summer, every year) This course helps students integrate internship experiences with relevant assignments to create helpful next steps toward their career learning and development.

BA 4501. Carlson Funds Enterprise: Growth. (3.0 cr. [max 6.0 cr.]; Student Option No Audit; prereq & MBA 6501, CSOM [jr or sr], approved application; fall, spring, every year) Lectures, assignments, modules. Hands-on real-money experience through Golden Gopher Growth Fund.

BA 4502. Carlson Funds Enterprise: Fixed Income. (3.0 cr. [max 6.0 cr.]; Student Option No Audit; prereq & MBA 6502, CSOM [jr or sr], approved application; fall, spring, every year) Lectures, assignments, modules. Hands-on real-money experience through Golden Gopher Fixed Income Fund.

BA 4503. Carlson Ventures Enterprise. (2.0 cr. [max 6.0 cr.]; Student Option No Audit; prereq & MBA 6503, CSOM [jr or sr], approved application; fall, spring, every year) Modeled after early stage venture capital funds. Due diligence process. Starting/growing high-growth ventures. University-based technologies, start-up companies, and experts. Business analysis/development. Assistance to non-University-based start-up companies seeking initial equity capital.

BA 4504. Carlson Consulting Enterprise. (3.0 cr. [max 6.0 cr.]; Student Option No Audit; prereq & MBA 6504, CSOM [jr or sr], approved application; fall, spring, every year) Connects cutting-edge ideas/technologies from classroom to real problems presented by clients. Students work collaboratively with clients to integrate strategy/technology. How to lead complex change initiatives.

BA 4505. Brand Enterprise. (3.0 cr. [max 6.0 cr.]; Student Option No Audit; prereq & MBA 6505, CSOM [jr or sr], approved application; fall, spring, every year) Students assist companies/organizations with marketing/brand challenges. Applying theory and industry best practices. Working collaboratively in real world environment. Critical thinking, applied marketing skills.

BA 4990H. Honors Thesis Seminar I. (2.0 cr.; A-F only; prereq CSOM honors, 2nd sem jr; spring, every year) Conducting rigorous academic research. How to develop honors thesis from initial question of interest. Honors thesis proposal, research question, review of literature, study design.

BA 4991H. Honors Thesis Seminar II. (2.0 cr.; A-F only; prereq 4990H, CSOM honors, sr; spring, every year) Students refine research methodology, develop results, and derive preliminary conclusions. Draft of honors thesis, with preliminary results and clear agenda for final analysis.

BA 4994H. Directed Research. (1.0-4.0 cr.; A-F only; prereq Honors; fall, spring, every year) Honors directed research.

Business Law (BLAW)
Curtis L. Carlson School of Management

BLAW 3058. The Law of Contracts and Agency. (4.0 cr.; A-F or Audit; prereq 40 or more credits; fall, spring, summer, every year) Origin of law, its place in and effect on society; history and development of law; system of courts; legal procedure. Law of contracts as the basic law affecting business transaction. Laws affecting the sale of goods and contracts and the law of agency.

Carlson Executive MBA (CMBA)
Curtis L. Carlson School of Management

CMBA 5554. International Residency. (1.5 cr.; A-F only; spring, every year) Students travel to an international location for nine days, engage in discussions with international colleagues, to apply program concepts and develop broader sensitivity to cultural/social differences. Pre-trip preparation, on-site discussion, and trip assignment are also required. Held in late March.

CMBA 5611. Statistics and Decision Making. (3.0 cr.; A-F only; fall, every year) Exploratory data analysis, inferential procedures, statistical process control, regression analysis.


CMBA 5613. Organizational Behavior. (3.0 cr.; A-F only; fall, every year) Theories/frameworks for analyzing behavior of individuals, groups, and the organization itself. Providing leadership in organizations. Organizational structure, culture, politics, and human resource management.

CMBA 5614. Operations Management. (3.0 cr.; A-F only; fall, every year) Strategic impact of operations decisions. Strategy, process design, productivity/quality management, business process re-engineering, forecasting, demand management, inventory, production planning, scheduling, supply chain, international operations.

CMBA 5621. Financial Management. (3.0 cr.; A-F only; spring, every year) Students apply concepts of risk, return, and valuation to decisions that a corporate financial officer or person in small business must make about sources/uses of funds during changing financial markets.

CMBA 5622. Economics. (3.0 cr.; A-F only; spring, every year) Fundamental micro/macro economic tools/applications. Determination of interest rates, GDP, employment, prices (inflation), Federal Reserve policy, how does it affects business. Timely readings.

CMBA 5623. Marketing Management. (3.0 cr.; A-F only; spring, every year) Developing/implementing a firm's strategy in target markets. Applying analytic concepts and decision tools to product offering, distribution, pricing, and communication program.

CMBA 5624. Strategic Management. (3.0 cr.; A-F only; spring, every year) Shaping mission objective, product-market choice, and organizational character. Allocating resources, managing conflicting stakeholder interest. Situational analysis, strategy development, written/oral presentation.

CMBA 5625. Entrepreneurship and Innovation. (3.0 cr.; A-F only; spring, every year) Entrepreneurial role of employee-management in increasing organizational value through creation/formation of new businesses, products, or markets within entities ranging from early stage companies to social ventures to F500 corporations.

CMBA 5710. Leadership. (1.5 cr.; A-F only; fall, every year) Self-awareness/insight concerning personal leadership/core values. Increase capabilities to understand potential personal derailment patterns/create effective strategies to address challenges. Develop lifelong executive leadership practices/habits for high performance in demanding circumstances.

CMBA 5711. Negotiation. (3.0 cr.; A-F only; fall, every year) Securing agreements between two or more parties who are interdependent and are seeking to maximize their own outcomes. Negotiation in various settings. Simulations, role-playing, cases.

CMBA 5712. Information Technology Management. (1.5 cr.; A-F only; fall, every year)
teamwork, self/peer assessment; health professions; professional identity/integrity; relationships between professions and those they serve. Includes online modules.

Center for Spirituality and Healing (CSPH)
Academic Health Center Shared

CSPH 1000. Topics in Whole Life Wellbeing. (1.0-4.0 cr.; fall, spring, summer, every year)
Special topics offerings in Integrative Health/Wellbeing. Contact department for semester offerings.

CSPH 1001. Principles of Holistic Health and Healing. (2.0 cr.; fall, spring, every year)
Principles/measures of holistic health that promote health and well being. Theory, how holistic health is incorporated into health care delivery system. Application/integration of holistic health into daily personal life.

CSPH 1101. Self, Society, and Environment: An Integral Systems Approach to Personal Wellbeing and Engagement. (3.0 cr.; fall, spring, every year)
Complexity theory approach to internal/external systems that influence lives/health. Interalated workings of mind, psyche, and body. Means of bringing these into dynamic balance. Environmental/social systems.

CSPH 3000. Topics in Integrative Health. (1.0-4.0 cr.; max 16.0 cr.; fall, spring, every year)
Special offerings in Integrative Health. Contact department for semester offerings.

CSPH 3001. Introduction to Integrative Healing. (3.0 cr.; prereq 60 credits or #; fall, spring, every year)
Current US health care system/US cultural views of health/wellness. Various complementary/alternative medical systems/practices that might be integrated into current way of thinking about health/wellness/treatment of illness/disease.

CSPH 3101. Creating Ecosystems of Well-Being. (2.0 cr.; fall, spring, every year)
Information, practices, and tools that enable individuals and communities to build capacity for well-being. Factors and ecosystems that contribute to health, happiness, and well-being. Students develop a personal plan for health and well-being and one for a community.

CSPH 3201. Introduction to Mindfulness-Based Stress Reduction. (2.0 cr.; spring, every year)
Techniques by which stress endemic in a fast-paced competitive culture can be reduced or worked with constructively. Students practice/apply techniques of mindfulness. Recent medical-scientific literature on physiological/psychological elements in the stress response.

CSPH 3211. Living on Purpose: An Exploration of Self, Purpose, and Community. (2.0 cr.; prereq 30+ credits completed or #; fall, spring, every year)
Explore questions of meaning/purpose. Explore other people's ways of living on purpose.
CSPH 5102. Art of Healing: Self as Healer. (1.0 cr.; prereq Jr or sr or grad student or #; fall, spring, every year)
Introduction to individual transformational journey as part of health science education. Students become aware of their responsibility/resources to facilitate development of the self. Research data, experience of self that is part psychoneuroimmunology, mind-body-spirit approaches. Lecture, scientific literature, meditation, imagery, drawing, group interaction.

CSPH 5111. Ways of Thinking about Health. (2.0 cr.; S-N or Audit; prereq Jr, Sr, or grad student standing); #; fall, every year)

CSPH 5115. Cultural Awareness, Knowledge and Health. (3.0 cr.; prereq Jr or sr or grad student or #; spring, every year)
How knowledge can become resource for individual, family, community health. Interactive glimpse of wisdom of cultural communities. Develop capacity to see culture within professional education/practice. Cultural constructs underpinning medical system, role of culture in interaction between practitioner/patient, role of reconnection to cultural heritage in healing.

CSPH 5121. Whole Systems Healing: Health and the Environment. (2.0 cr.; prereq Jr or sr or grad student; fall, spring, every year)
Selected interfaces between human health and the environment. Using complexity theory as a theoretical framework, students use phenomenological methodologies to analyze and describe the interrelated dynamics of human and natural systems. Case studies. Develop strategies to optimize the healthy functioning of human/environmental systems.

CSPH 5201. Spirituality and Resilience. (2.0 cr.; prereq Jr or sr or grad student or #; spring, summer, every year)
Links between resilience and spirituality. Applications of resilience/health realization model to students’ personal/professional lives. Review of literature, theory, and research.

CSPH 5211. Peacemaking and Spirituality: A Journey Toward Healing and Strength. (2.0-3.0 cr.; prereq Jr or sr or grad student or #; fall, summer, every year)
Influence of spirituality upon process of resolving conflict and making peace in intense interpersonal/intrapersonal conflicts in multiple health care and social work settings, including in families, between patients/clients and nurses/social workers, within communities, among friends, between co-workers, or within ourselves.

CSPH 5212. Peacebuilding Through Mindfulness: Transformative Dialogue in the Global Community. (3.0 cr.; prereq Jr or sr or grad student or #; spring, summer, every year)
Contemplative/mindfulness practice. Tapping into reservoir of strength, compassion, and wisdom that fosters expressions of unconditional love, reconciliation, and forgiveness. Shifting from ego centered cognitive analysis/assessment to heart centered presence and deep listening grounded in humility/compassion. Native American circle process, including use of talking piece.

CSPH 5215. Forgiveness and Healing: A Journey Toward Wholeness. (3.0 cr.; prereq Jr or sr or grad student or #; spring, summer, every year)
Impact of forgiveness on process of inter-/intra-personal healing. Forgiveness/healing in health care and social work settings from multiple spiritual/secular traditions.

CSPH 5221. Significant Spiritual Texts of the 20th Century. (3.0 cr.; prereq Jr or sr or grad student or #; fall, spring, every year)
Diverse “spiritual classics” (i.e., elements of western canon that have proven over time to be resources of values), Resources of meaning for inner-life healers. How to establish a personal library for life-long journey of spiritual development.

CSPH 5225. Meditation: Integrating Body and Mind. (2.0 cr.; prereq Jr or sr or grad student or #; )
Meditation as a physical, emotional, intellectual, and spiritual inquiry. Students examine a variety of texts and develop ability to enter a state of calm, meditative awareness.

CSPH 5226. Advanced Meditation: Body, Brain, Mind, and Universe. (1.0 cr.; prereq [5225, Jr or sr or grad student] or #; )
Students work to integrate meditation practice into daily life, cultivating awareness of the fundamental oneness of body, brain, mind, and universe. Mind-body interactions in health. “Hard problem” of consciousness in brain science. Emergence of compassion, wisdom, and healing in non-discursive awareness.

CSPH 5301. Cultures, Faith Traditions, and Health Care. (2.0 cr.; A-F or Audit; prereq Jr or sr or grad student or #; spring, every year)
Culturally/spiritually based health care practices of selected native/immigrant populations in Minnesota. Clinical implications. Personal/professional conflicts for delivery of competent care to culturally diverse groups by those trained in Western health care.

CSPH 5311. Introduction to Traditional Chinese Medicine. (2.0 cr.; A-F or Audit; prereq Jr or sr or grad student or #; spring, summer, every year)
Philosophical roots of Shamanism, Confucianism, Taoism, and Buddhism. Influence of these philosophies on Chinese medicine. Evolution of concepts of the tao, Yin-Yang, microcosm, macrocosm. Development of herbal medicine, Tui Na, Qi Gong, acupuncture, moxibustion. Traditional Chinese medicine etiology of disease, physiology, diagnosis, therapy, disease prevention, ethics, psychology, cosmology.

CSPH 5313. Acupressure. (1.0 cr.; fall, summer, every year)

CSPH 5315. Traditional Tibetan Medicine: Ethics, Spirituality, and Healing. (2.0 cr.; prereq Jr or sr or grad student or #; )
Ethics, spirituality, and healing from perspective of traditional Tibetan medicine. Belief that illness results from imbalance and that treating illness requires correcting underlying imbalance. How to apply these principles, integrate them into clinical practice, and consult with a traditional Tibetan doctor.

CSPH 5317. Yoga: Ethics, Spirituality, and Healing. (2.0 cr.; summer, every year)
Students test claim that systematic yoga practice leads to optimal health. Yoga’s philosophy, scientific evidence, practical application. Students propose research-based programs for integrating yoga into personal/professional life.

CSPH 5318. Tibetan Medicine, Ayurveda, and Yoga in India. (4.0 cr. [max 12.0 cr.]; Student Option No Audit; prereq [5315, 5317] or #; fall, summer, every year)
Students study with expert practitioners in India. Using critical thinking, philosophical knowledge, cultural practices, scientific evidence, and research-based programs to integrate these traditions into personal/professional life.

CSPH 5321. Public Health Priorities in the Developing World. (2.0 cr.; [INMD 7567]; prereq Jr or sr or grad student or #; summer, every year)
Primary public health problems, priorities, and interventions in developing countries. Issues related to culture/indigenous health systems and of concern to health care providers who work abroad or with refugee communities in countries of resettlement.

CSPH 5325. Latinos: Culture and Health. (3.0 cr.; prereq Jr or sr or grad student or #; fall, spring, every year)
How Latino world view (cosmovision) affects health and compares with U.S. perspective. Differences in perception of time, family involvement, community "belonging,” gender roles, and communication styles. Folkloric beliefs. Specific issues such as AIDS, pregnancy, women’s issues, pharmacy, and nutrition. Health issues of workers. Cultural competency.

CSPH 5331. Foundations of Shamanism and Shamanic Healing. (2.0 cr.; S-N or Audit; prereq Jr or sr or grad student or #; )
3 ½-day retreat intensive. Shamanic philosophical, ritual etiquette, Core beliefs common to all shamanic healing practices. Cross-cultural healing beliefs/practices, unique psychology for understanding them, their use with contemporary healing practices and for personal growth.
CSPH 5332. Global Healing Traditions: Amazonia Plant Spirit Medicine. (2.0 cr.; S-N or Audit; prereq [5331, [grad student or jr or sr in health science or practicing health professional]] or #; )
Non-biomedical traditional healing paradigms as practiced in other parts of the world. Focuses on indigenous healing practices in Peru as directed by a local shaman.

CSPH 5341. Overview of Indigenous Hawaiian Healing. (2.0 cr.; fall, every year)
Traditional Hawaiian healing. ho`olomilomi (massage), la`au lapa`au (herbal medicine) and ho`oponopono (conflict resolution). Hawaiian epistemology, traditions, and cultural values compared with western. The science of traditional ecological knowledge for healing and self-reliance.

CSPH 5343. Ayurveda Medicine: The Science of Self-healing. (2.0 cr.; fall, every year)

CSPH 5401. People, Plants, and Drugs: Introduction to Ethnopharmacology. (3.0 cr.; prereq Jr or sr or grad student or #; fall, spring, summer, every year)
Biologically active substances used in traditional cultures. Ethnopharmacology's past, current, and potential contributions to human knowledge. Concrete examples.

CSPH 5405. Plants in Human Affairs. (4.0 cr.; prereq Jr or sr or grad student or #; )
Twelve-day, intensive course. Introduction to ethnobotany/ethnopharmacology. Lectures, field trips, presentations by local experts.

CSPH 5411. Dietary Supplements: Regulatory, Scientific, and Cultural Perspectives. (3.0 cr.; prereq Jr or sr or grad student or #; spring, summer, offered periodically)

CSPH 5421. Botanical Medicines in Integrative Healthcare. (3.0 cr.; prereq Jr or sr or grad student or #; fall, every year)
Widely-used botanical medicines from biomedical perspective. Alternative therapeutic systems presented according to bodily systems/processes. Evidence for therapeutic use. Botanical characteristics, traditional uses, chemical properties, dosage, hazards/safety issues, quality control.

CSPH 5423. Botanical Medicines: Foundations and Practical Applications. (1.0 cr.; summer, every year)

CSPH 5431. Functional Nutrition: An Expanded View of Nutrition, Chronic Disease, and Optimal Health. (2.0 cr.; prereq [Jr or sr or grad student][ in Health Sciences or #; ])
Principles of nutrition related to metabolic function. Model attempts to reduce chronic disease by looking for underlying causes/triggers and to intervene to restore function and achieve optimal health. Emphasizes importance of nutrition as a component of self-care.

CSPH 5501. Clinical Aromatherapy: Therapeutic Use of Plant Essential Oils. (3.0 cr.; prereq Jr or sr or grad student or #; intended for students in health sciences or practicing health professionals; [basic science, health science knowledge, computer skills, internet skills] recommended; fall, spring, every year)

CSPH 5503. Aromatherapy Fundamentals. (1.0 cr.; prereq Jr or sr or grad student; spring, summer, every year)
For health professional students/practicing health professionals. Essential oil therapy and current aromatherapy practices in clinical settings. Key safety/toxicity issues. Critique scientific/historical evidence about the therapeutic qualities of six essential oils in common use by the public and in clinical settings.

CSPH 5511. Interdisciplinary Palliative Care: An Experiential Course in a Community Setting. (2.0 cr.; prereq #; fall, spring, every year)
Multidisciplinary student teams partner with interdisciplinary community hospice teams in delivery of care to patients in a variety of settings. Series of seminars employs self-analysis/case studies.

CSPH 5521. Therapeutic Landscapes. (3.0 cr.; prereq [Jr or sr or grad student] in [health sciences or therapeutic recreation or horticulture or landscape architecture] or health professional or #; spring, every year)
Principles of therapeutic design for specific population requirements. Therapeutic landscape design. Incorporates interdisciplinary interaction between horticulture, landscape architecture, and health science departments.

CSPH 5522. Therapeutic Horticulture. (3.0 cr.; prereq 5101 or Hort 5072 or #; )
Central elements of therapeutic horticulture in context of multiple health care settings. Evidence-based history, principles, precepts, and practical application of therapeutic horticulture. Various plant/plant-related modalities from current research findings are related to populations, using therapeutic horticulture as a treatment intervention.

CSPH 5523. Applications in Therapeutic Horticulture. (2.0 cr.; Student Option No Audit; summer, every year)
How to develop comprehensive program plans in therapeutic horticulture. Evidence-based principles, facilitation techniques. Documentation, assessment, program development techniques, evaluation. Leadership training, program plan components, book reviews, readings, comprehensive exam.

CSPH 5533. Introduction to Energy Healing. (2.0 cr.; prereq Jr or sr or grad student or #; fall, every year)
Healing techniques that use energetic systems in body to enhance body's ability to heal. Therapeutic touch, healing touch, Reiki, acupuncture, reflexology, magnets, homeopathy, other modalities. Scientific theories on mechanisms of energetic medicine and ways to measure energy. Students interact with practitioners of energy healing.

CSPH 5535. Reiki Healing. (1.0 cr.; S-N only; prereq Jr or sr or grad student or #; )
Historical, principles, precepts, and practical application of Reiki energy healing. Alternative energy healing modalities, current research findings. Activation of the Reiki energy, hand positions to perform a treatment. Students provide Reiki treatments, discuss findings.

CSPH 5536. Advanced Reiki Healing: Level II. (1.0 cr.; S-N only; prereq 5535, #; spring, every year)
Principles/application of Reiki energy healing. Four levels of healing. Emphasizes healing at spiritual level. Activation of Reiki energy. Symbols that allow for energy transfer through space/time. Using second level Reiki energy for both distance healing and standard Reiki treatment. Students provide Reiki treatments, discuss findings. Current literature, research findings.

CSPH 5541. Emotional Healing and Happiness: Eastern and Western Approaches to Transforming the Mind. (2.0 cr.; prereq Sr or grad student or #; fall, every year)

CSPH 5545. Mind-Body Healing Therapies. (2.0 cr.; A-F or Audit; prereq Grad student or jr or sr or #; )
Philosophies/paradigms. Four modalities commonly used in allopathic nursing, medicine and other health professions (biofeedback, hypnosis, imagery/visualization, meditation). Experiential and group discussion format.

CSPH 5555. Introduction to Body and Movement-based Therapies. (2.0 cr.; prereq Jr or sr or grad student or #; )
Theories/approaches of selected somatic therapies, including dance, movement, and body-based therapies. Historic/theoretical
perspectives on use of movement, dance, and somatic re-patterning. Demonstrations of techniques. Application of techniques to specific populations/settings.

CSPH 5561. Overview of the Creative Arts in Health and Healing. (2.0 cr.; prereq Jr or sr or grad student; summer, every year)

How creative arts therapies are integrated into health care. Art therapy, poetry therapy, dance/movement therapy, music therapy. Guided experiential exercises, discussions, readings, individual learning interventions, lectures.

CSPH 5601. Music, Health and Healing. (2.0 cr.; prereq Jr or sr or grad student or #; fall, summer, every year)


CSPH 5605. Movement and Music for Well-being and Healing. (2.0 cr.; fall, every year)


CSPH 5611. Healthy Humor. (1.0 cr.; prereq Jr or sr or grad student or #)

Use of humor to enhance communication, treatment, and relationships with patients. How to create a positive work environment and outlook. Physiologic effects/benefits of humor/laughter. Humor and spirituality. Connection between positive outlook and health.

CSPH 5621. Foundations of Integrative Imagery, Phase I. (2.0 cr.; A-F only; prereq Grad student in health sciences or licensed health care professional; fall, summer, every year)


CSPH 5631. Healing Imagery I. (2.0 cr.; prereq Jr or sr or grad student; spring, every year)

How imagery and imagery interventions are implemented for healing and to promote health/well-being. Experience/create imagery interventions. Instructional strategies include experiential, discussions, readings, lecture, and individual learning interventions.

CSPH 5641. Animals in Health Care: The Healing Dimensions of Human/Animal Relationships. (3.0 cr.; prereq Jr or sr or grad student; summer, every year)


CSPH 5701. Fundamentals of Health Coaching I. (4.0 cr.; A-F only; prereq Admitted to Integrative Therapies and Healing Practice certificate program's health coaching track or #; fall, every year)


CSPH 5702. Fundamentals of Health Coaching II. (4.0 cr.; A-F or Audit; prereq 5701; spring, every year)

Basic tenets of health coaching model. Tools for self development, deep listening, and effective communication. Core building blocks for optimal health from a holistic perspective. Identifying/benchmarking stages/patterns of change, interfacing with interdisciplinary health care providers, locating resources to assist clients in decision making, and educating clients on self-care practices.

CSPH 5703. Advanced Health Coaching Practicum. (3.0 cr.; A-F only; prereq 5101, 5102, 5701, 5702, admitted to Postbaccalaureate Certificate in Integrative Therapies/Healing Practices Health Coaching Track; fall, every year)

Case-based. Identify/utilize broad-based resources in guiding/supporting individual client cases. Application of theory/process from earlier courses. Ethical issues, professional boundaries, referral processes, client selection.

CSPH 5704. Business of Health Coaching. (2.0 cr.; A-F only; prereq 5101, 5102, 5701, 5702, admitted to postbaccalaureate certificate in integrative therapies/healing practices health coaching track; fall, every year)

Applying health coaching knowledge/skills in service delivery venues or private practice. Starting business. Business models. Student determine structure/venue appropriate for them. Legal/ethical considerations.

CSPH 5705. Health Coaching Professional Internship. (2.0 cr.; S-N only; prereq 5701, 5702, 5703, admitted to postbaccalaureate certificate in integrative therapies/healing practices health coaching track, [5101, 5102, 5704 recommended]; spring, every year)

120 hours of health coaching practice. Students work with individual clients in acute/longitudinal encounters, provide wellness teaching, design career plan.

CSPH 5707. Coaching People with Clinical Conditions. (2.0 cr.; prereq CSPH 5701; practicing health professional admitted to one of the following programs: Integrative Health and Wellbeing Coaching Master's or Integrative Therapies and Healing Practices Certificate-Health Coaching track or Doctorate of Nursing Practice; or instructor consent; spring, every year)

This course equips healthcare professionals with an overview of clinical conditions most prevalent in society today and skills to use that knowledge in coaching. For each condition, we will study a description of the condition, primary effects, secondary effects, daily lifestyle challenges, self-management of the condition, treatment options and treatment protocols.

In this course you will learn and practice coaching skills to facilitate a client's process to increase awareness of their condition, learn self management techniques, have empowering conversations with healthcare providers, consider treatment options, and build support networks. We will differentiate between disease management and coaching for client self-efficacy in managing their clinical conditions. Students will be assigned to triads for scenario practices and online discussions which are supervised by the Instructor.

CSPH 5708. Mind-Body Science and the Art of Transformation . (1.0 cr.; fall, spring, summer, every year)

Explore how utilizing transformative practices changes in our physical brain, thoughts, beliefs, bodies, emotions and paradigms and create sustainable shifts towards optimal health, wellness and living. This course will include knowledge and discoveries from multiple disciplines including but are not limited to psychologists, scientists, quantum physicist, philosophers, healers, educators. The mind-body research has accelerated dramatically in the past couple decades and will provide students with an opportunity to discover new ways of understanding our human brains and bodies. This in turn provides new insight and innovation into human behavior and sustainable transformative change.

CSPH 5711. Optimal Healing Environments. (3.0 cr.; prereq Jr or sr or grad student or #; fall, every year)

Development/implementation of optimal healing environments. Evidence base supporting structural, architectural, human, and care processes. Emphasizes identifying models of optimal healing environments and leadership strategies that support diffusion of innovation.

Chemical Engineering (CHEN)
Institute of Technology

CHEN 1001. Advances in Chemical Engineering and Materials Science. (1.0 cr. [max 2.0 cr.]; S-N or Audit; [MATS 1001]; prereq Recommended for [chemical engineering, materials science/engineering] majors; fall, every year)

Survey of important advances in chemical engineering, materials science/engineering. Design problems, career opportunities. Lectures, demonstrations, interactive exercises.

CHEN 2001. Material and Energy Balances. (4.0 cr.; A-F or Audit; prereq &CHEM 2301 or equiv., &MATH 2374 or equiv., &PHYS 1302 or equiv., CSE student, C- or better in all pre-reqs; fall, every year)

Description/analysis of chemical engineering systems. Units/dimensions, materials balances on systems with/without chemical reactions, elementary phase equilibria/diagrams, energy balances. Elementary treatment of multistage steady-state equilibrium operations.

CHEN 2594. Directed Research Lower Division. (1.0-4.0 cr. [max 6.0 cr.]; Student Option No Audit; prereq #, DUGS consent; fall, spring, summer, every year)
Independent lab research under faculty supervision for students not yet taking junior level ChEn courses.

CHEN 3005. Transport Phenomena: Momentum and Heat. (4.0 cr.; A-F only; prereq [2001 or 3005 or 3006, 3101, 3102, 3201, 3401W, Chem 2311, Chem 2312]; [max 6.0 cr.; Student Option No Audit; prereq ChEn major or %], C- or better in all pre-reqs; fall, every year) Fluid statics/dynamics. Applications to chemical engineering systems, conduction, diffusion. Principles/applications of heat transfer in chemical engineering systems.

CHEN 3006. Mass Transport and Separation Processes. (4.0 cr.; A-F only; prereq [2001 or 4001], [3005 or 4005], [3101 or 4101], [upper div ChEn major or %], C- or better in all pre-reqs; spring, every year) Introduction to principles of mass transfer. Mass transfer operations used in separation processes, unit operations.

CHEN 3041. Industrial Assignment I. (2.0 cr.; A-F; prereq [MATS 3041]; upper div Div, completion of required courses in ChEn prog through fall sem of 3rd yr, GPA of at least 2.80, registered in co-op prog; fall, spring, summer, every year) Industrial work assignment in engineering co-op program. Formal report on technical project related to industrial work.

CHEN 3101. Chemical Engineering Thermodynamics. (4.0 cr.; A-F only; prereq 2001, CHEM 4501, [Math 2373 or equiv.], [upper div ChEn major or %], C- or better in all pre-reqs; fall, every year) Applications of thermodynamics/chemical equilibrium to problems in chemical engineering.

CHEN 3102. Reaction Kinetics and Reactor Engineering. (4.0 cr.; A-F only; prereq [2001 or 4001], [3101 or 4101], [upper div ChEn major or %], C- or better in all pre-reqs; spring, every year) Chemical equilibrium/kinetics applied to chemical engineering systems. Behavior/design of chemical reactors, interaction between chemical/physical rate processes. Mathematical modeling, design of reactors.

CHEN 3201. Numerical methods in ChEn applications. (3.0 cr.; A-F only; prereq [2001 or 4001], [3005 or 4005], [3006 or 4006 or &3006 or &4006], [upper div ChEn major or %], C- or better in all pre-reqs; spring, every year) Numerical methods/applications in heat/mass transfer, advanced chemical engineering applications.

CHEN 3401W. Junior Chemical Engineering Lab. (2.0 cr.; A-F only; prereq [WRIT 1301 or equiv.], 2001, 3005, &3006, 3101, &3102, 3201, [CHEM 2121 or equiv.], [CHEM 2311 or CHEM 2312H], upper div ChEn major, CSE student, C- or better in all pre-reqs; spring, every year) Efficient design, structure, measurement, planning, analysis, presentation of experiments/results. Energy balances, fluid flow, heat/mass transfer. Design of new systems using data obtained in lab. Oral/written presentations.

CHEN 3701. Introduction to Biomolecular Engineering. (3.0 cr.; A-F or Audit; prereq 2001, [[Chem 2302 & 2302] or equiv.], [Math 2373 or equiv.;] high school biology recommended; C- or better in all pre-reqs, fall, every year) Fundamentals of biological systems, from biomolecules to interplay of biomolecules that give rise to processes of life. Students apply chemical engineering principles to analysis of living systems.

CHEN 4041. Industrial Assignment II. (2.0 cr.; A-F only; [=MATS 4041]; prereq 3041, GPA of at least 2.80, registration in co-op prog; fall, spring, summer, every year) Industrial assignment in engineering co-op program. Application of chemical engineering principles to engineering design problems related to industrial work. Formal written report and presentation.

CHEN 4214. Polymers. (3.0 cr.; A-F or Audit; prereq [MATS 3111, [3101 or 4101 or MATS 4001], [upper div MATS or ChEn]] or #; spring, every year) Polymer structure-property relations: structure/morphology of crystalline/amorphous states. Crystalization kinetics. Vitrification and the glass transition. Mechanical properties, failure, permeability, optical/electrical properties, polymer composites, effect of processing on properties.

CHEN 4223W. Polymer Laboratory. (2.0 cr.; =MATS 4223W, CHEM 2223W; prereq 4214 or CHEM 4214 or CHEM 4221 or MATS 4214 or #; spring, every year) Synthesis, characterization, and physical properties of polymers. Free radical, condensation, emulsion, anionic polymerization. Infrared spectroscopy/gel permeation chromatography. Viscoelasticity, rubber elasticity, crystalization.

CHEN 4401W. Senior Chemical Engineering Lab. (3.0 cr.; A-F only; prereq [3005 or 4005], [3006 or 4006], [3101 or 4101], [3102 or 4102], [2001 or 4001], [3201 or 4201], [3401, CHEM 2311], [2121 or CHEM 4121], [English composition requirement, upper div ChEn major or %], [C- or better in all pre-reqs; fall, every year]) Principles/techniques of efficient design, structure, measurement, planning, analysis, presentation of experiments. Energy balances, fluid flow, heat transfer, mass transfer. Design of new systems using experimental data obtained in lab. Oral/written presentations.

CHEN 4402W. Chemical Engineering Lab II. (2.0 cr.; prereq 4006, 4101, 4401W, upper div ChEn major; spring, every year) Principles/techniques of efficient design, structure, measurement, planning, analysis, and presentation of experiments and experimental results. Experimental problems in energy balances, fluid flow, heat transfer, and mass transfer. Design of new systems using data obtained in lab. Oral/written presentations.

CHEN 4501W. Chemical Engineering Design I. (3.0 cr.; prereq [2001, 3005, 3006, 3101, 3102, 3201, 3401W, Chem 2311, Chem 2312]; fr writing requirement, upper div ChEn major or %, [C- or better in all pre-reqs]; fall, every year) Engineering economics of process evaluation, including time/bases for cost estimation. Engineering design through group projects. Case studies.

CHEN 4502W. Chemical Engineering Design II. (2.0 cr.; A-F or Audit; prereq 4401W, 4501W, [upper div ChEn major or %], [C- or better in all pre-reqs]; spring, every year) Introduction to product design. Case studies, special topics.

CHEN 4593. Directed study. (1.0-4.0 cr. [max 6.0 cr.]; Student Option No Audit; prereq ChEn major upper division, #; fall, spring, summer, every year) Directed study under faculty supervision.

CHEN 4594. Directed Research. (1.0-4.0 cr. [max 6.0 cr.]; Student Option No Audit; upper div ChEn; fall, spring, summer, every year) Independent lab research under faculty supervision.

CHEN 4594H. Directed Research - Honors. (1.0-4.0 cr. [max 6.0 cr.]; A-F only; prereq instr and DUGS consent, upper div ChEn major; fall, spring, summer, every year) Independent lab research under faculty supervision for upper division students wanting honors experience.

CHEN 4601. Process Control. (3.0 cr.; A-F only; prereq [3102 or 4102], [upper div ChEn major or %], C- or better in all pre-reqs; fall, every year) Analysis of dynamic behavior/design of linear control systems for chemical processes. Dynamic response/stability of linear ODE systems, tuning of PID controllers, synthesis of feedback, feedforward/feedforward controller.

CHEN 4701. Advanced Undergraduate Applied Math I: Linear Analysis. (3.0 cr.; A-F only; [=CHEN 8201]; prereq [3102 or 4102], ChEn major upper div; fall, every year) Integrated approach to solving linear mathematical problems (linear algebraic equations, linear ordinary/partial differential equations) using theoretical/numerical analysis based on linear operator theory. Undergraduate version of 8201.

CHEN 4702. Advanced Undergraduate Rheology. (2.0 cr.; A-F only; prereq [3005 or 4005], #; spring, every year) Deformation/flow of non-Newtonian/viscoelastic fluids, plastic materials, perfectly elastic solids. Phenomenological/molecular interpretation of rheology of elastomers, polymer melts, polymer solutions. Application of rheology to polymer processing.

CHEN 4704. Advanced Undergraduate Physical Rate Processes I: Transport. (3.0 cr.; A-F only; prereq 3005 or 4005, #; spring, every year) Fluid statics/dynamics. Applications to chemical engineering systems, conduction, diffusion. Principles/applications of heat transfer in chemical engineering systems.

Courses listed in this catalog are current as of December 12, 2014. For up-to-date information, visit www.catalogs.umn.edu
NEW or experimental special topics.

**CHEN 5751. Biochemical Engineering.** (3.0 cr.; A-F or Audit; pre req [3005 or 4005], ChEn major upper div; fall, spring, every year)
Chemical engineering principles applied to analysis/design of complex cellular/enzyme processes. Qualitative framework for design of cells for production of proteins, synthesis of antibodies with mammalian cells, or degradation of toxic compounds in contaminated soil.

**CHEN 5753. Biological Transport Processes.** (3.0-4.0 cr.; A-F or Audit; pre req [3005 or 4005] or &1062; spring, every year)

**CHEM 1015. Introductory Chemistry: Lecture.** (3.0 cr.; pre req [High school chemistry or equiv]); two yrs high school math, not passed chem placement exam, Internet access; high school physics recommended; fall, spring, summer, every year)
Lectures online, exams on campus. Matter/energy, atoms, compounds, solutions, chemical reactions, mole/chemical calculations, gases, liquids, solids, chemical bonding, atomic/molecular structure, acids, bases, equilibria. Physical/chemical properties of hydrocarbons and organic compounds. Problem solving.

**CHEM 1017. Introductory Chemistry: Laboratory.** (1.0 cr.; A-F only; = [CHEM 1017H]; fall, spring, summer, every year)
Basic laboratory skills while investigating physical and chemical phenomena closely linked to lecture material. Experimental design, data collection and treatment, discussion of errors, and proper treatment of hazardous wastes.

**CHEM 1062. Chemical Principles II.** (3.0 cr.; = [CHEM 1072H]; pre req Grade of at least C- in 1061 or equiv, &1066; registration for 1066 must precede registration for 1062; fall, spring, summer, every year)

**CHEM 1065. Chemical Principles I Laboratory.** (1.0 cr.; A-F only; = [CHEM 1075H]; pre req &1061; fall, spring, summer, every year)
Basic laboratory skills while investigating physical and chemical phenomena closely linked to lecture material. Experimental design, data collection and treatment, discussion of errors, and proper treatment of hazardous wastes.

**CHEM 1066. Chemical Principles II Laboratory.** (1.0 cr.; A-F only; = [CHEM 1076H]; pre req &1062; fall, spring, summer, every year)
Basic laboratory skills while investigating physical and chemical phenomena closely linked to lecture material. Experimental design, data collection and treatment, discussion of errors, and proper treatment of hazardous wastes.

**CHEM 1071H. Honors Chemistry I.** (3.0 cr.; A-F only; = [CHEM 1061]; pre req Honors student, permission of University Honors Program, &1075H; registration for 1075H must precede registration for 1071H; fall, every year)

**CHEM 1072H. Honors Chemistry II.** (3.0 cr.; A-F only; = [CHEM 1062]; pre req 1071H, &1076H; Honors student, registration for 1076H must precede registration for 1072H; spring, every year)
Advanced introduction. Chemical kinetics/reaction mechanisms, chemical/physical equilibria, acids/bases, entropy/second law of thermodynamics, electrochemistry/corrosion; descriptive chemistry of elements; coordination chemistry; biochemistry.

**CHEM 1075H. Honors Chemistry I Laboratory.** (1.0 cr.; A-F only; = [CHEM 1065]; fall, every year)
Develop laboratory skills while investigating physical and chemical phenomena closely linked to lecture material. Experimental design, data collection and treatment, discussion of errors, and the proper treatment of hazardous wastes. Prereq &1071H, honors student, permission of University Honors Program.
CHEM 1076H. Honors Chemistry II Laboratory. (1.0 cr.; A-F only; =CHEM 1066; prereq 1076H, honors student; spring, every year)

Develop laboratory skills as experiments become increasingly complex. Data collection/treatment, discussion of errors, proper treatment of hazardous wastes, experiment design.

CHEM 1905. Freshman Seminar. (1.0-3.0 cr.; A-F or Audit; prereq freshman; fall, every year)
Topics vary. See freshman seminar topics.

CHEM 1910W. Freshman Seminar: Writing Intensive. (1.0-3.0 cr. [max 4.0 cr.]; A-F or Audit; prereq freshman; fall, spring, every year)
Topics vary. See freshman seminar topics.

CHEM 2094. Directed Research. (1.0-3.0 cr.; prereq #; fall, spring, summer, every year)
Learning experience in areas not covered by regular courses. Individually arranged with faculty member.

CHEM 2101. Introductory Analytical Chemistry Lecture. (3.0 cr.; prereq 1022 or equiv; fall, summer, every year)
Primarily for chemistry majors. Methods/concepts of measurement by chemical/ instrumental analysis, including titrimetry, quantitative spectrophotometric analysis, chromatographic separations, equilibrium/rate methods.

CHEM 2111. Introductory Analytical Chemistry Lab. (2.0 cr.; prereq 2101 or & 2101; fall, summer, every year)
Lab for 2101. High precision methods, acidiometry and complexometry, single and multicomponent analysis by spectrophotometry, analysis of mixtures by ion exchange and gas chromatography, enzymatic and rate methods.

CHEM 2121. Process Analytical Chemistry. (3.0 cr.; A-F or Audit; prereq [2302 or &2302], [4501 or &4501], CSE student; spring, every year)
Strategies/techniques for analysis. Use of modern instruments, including spectrophotometry, chromatography, and electrochemistry.

CHEM 2301. Organic Chemistry I. (3.0 cr.; =CHEM 2331H; prereq C- or better in 1062/1066 or 1072H/1076H or equiv or B or better in 1071H/1075H, 1072H/1076H; fall, spring, every year)

CHEM 2302. Organic Chemistry II. (3.0 cr.; =CHEM 2304, BIOC 2331, CHEM 2332H; prereq Grade of at least C- in 2301; fall, spring, summer, every year)
Reactions, synthesis, and spectroscopic characterization of organic compounds, organic polymers, and biologically important classes of organic compounds such as lipids, carbohydrates, amino acids, peptides, proteins, and nucleic acids.

CHEM 2304. Organic Chemistry II for the Life Sciences. (3.0 cr.; =BIOC 2331, CHEM 2332H, CHEM 2302); prereq Grade of at least C- in 2301; designed for life sciences majors; fall, spring, every year)

CHEM 2311. Organic Lab. (4.0 cr.; =CHEM 2312H; prereq Grade of at least C- in [2302, 2304] or [2302, 2303]); prereq Grade of at least C- in [2302, 2304]; fall, spring, summer, every year)
Lab techniques in synthesis, purification, and characterization of typical organic compounds.

CHEM 2312H. Honors Organic Lab. (5.0 cr.; A-F only; =CHEM 2311); prereq [2302 or &2301], [Chem or ChemE or BioC] major; #; fall, every year
Honors organic chemistry lab.

CHEM 2331H. Honors Elementary Organic Chemistry I. (3.0 cr.; A-F only; =CHEM 2301); prereq At least B+ in 1072H, UHP student; fall, every year)

CHEM 2332H. Honors Elementary Organic Chemistry II. (3.0 cr.; A-F only; =CHEM 2304, BIOC 2331, CHEM 2302); prereq At least C- in 2331H, UHP student; spring, every year)
Continuation of 2331H. Reactions, synthesis, and spectroscopic characterization of organic compounds, organic polymers, and their role in biologically important classes of organic molecules such as lipids, carbohydrates, amino acids, peptides, proteins, and nucleic acids.

CHEM 2910. Special Topics in Chemistry. (1.0 cr. [max 6.0 cr.]; S-N or Audit; prereq 1 sem 1xxx chemistry or #; fall, every year)
Topics in chemistry. Opportunities and current research.

CHEM 2910H. Special Topics in Chemistry. (1.0 cr. [max 6.0 cr.]; S-N or Audit; prereq One sem 1xxx chemistry or #; fall, every year)
Topics in chemistry. Opportunities, current research.

CHEM 2920. Special Topics In Chemistry. (1.0 cr. [max 6.0 cr.]; S-N or Audit; prereq 1 sem 1xxx chemistry or #; spring, every year)
Topics in chemistry. Opportunities and current research.

CHEM 2920H. Special Topics In Chemistry. (1.0 cr. [max 6.0 cr.]; S-N or Audit; spring, every year)
Topics in chemistry. Opportunities, current research.

CHEM 3001. Chemical Literature and Information Retrieval. (1.0 cr.; S-N or Audit; prereq 2302 or & 2302 or #; spring, every year)
Forms of chemical literature, relationships among them. Major information sources in chemistry. Basic search techniques for print/electronic sources, choosing sources most appropriate for various information needs.

CHEM 4001. Chemistry of Biomass and Biomass Conversion to Fuels and Products. (4.0 cr.; A-F or Audit; prereq 2301, [jr or sr or #]; fall, every year)
Chemical principles underlying structure, properties, processing, performance of plant materials.

CHEM 4011. Mechanisms of Chemical Reactions. (3.0 cr.; prereq [2302, 4501] or equiv; fall, every year)

CHEM 4021. Computational Chemistry. (3.0 cr.; prereq [4502 or equiv]; #; spring, every year)

CHEM 4066. Chemistry of Industry. (3.0 cr.; prereq Chem sr or grad student or #; spring, every year)
Industrial and polymer chemistry technology. Relation of basic properties to industrial utility. Economics, social problems, industrial environment.

CHEM 4094V. Directed Research. (1.0-5.0 cr. [max 75.0 cr.]; fall, spring, summer, every year)
Learning experience in areas not covered by regular courses. Individually arranged with faculty member.

CHEM 4094W. Directed Research. (1.0-5.0 cr. [max 75.0 cr.]; prereq Any 3xxx or 4xxx chem course, #; fall, spring, summer, every year)
Learning experience in areas not covered by regular courses. Individually arranged with faculty member.

CHEM 4101. Modern Instrumental Methods of Chemical Analysis. (3.0 cr.; A-F or Audit; prereq 2101, 2111, 2311, 4501; fall, every year)
Basic electronic, optical, computer technologies in design of chemical instrumentation. Advanced topics in spectroscopy (e.g., FT-nmr, FT-IR, atomic absorption/emission). Electrochemistry. Mass spectrometry.

CHEM 4111W. Modern Instrumental Methods of Chemical Analysis Lab. (2.0 cr.; A-F or Audit; prereq 4101, chemistry major; spring, every year)
Instrumental techniques, including spectroscopic methods, electrochemical methods, and analysis based on separation. Use of computers in data collection and reduction.
CHEM 4201. Materials Chemistry. (3.0 cr.; [CHEM 8201]; prereq [4502 or equiv], 4701 or #; fall, every year)
Crystal systems, unit cells, phase diagrams, defects/interfaces, optical/dielectric properties, electrical/thermal conductivity, X-ray diffraction, thin film analysis, electronic structure, polarons/phonons, solid state chemistry, liquid/molecular crystals, polymers, magnetic/optical materials, porous materials, ceramics, piezoelectric materials, biomedical materials, catalysts.

CHEM 4214. Polymers. (3.0 cr.; A-F or Audit; prereq [MATS 3011, CHEN 3101 or CHEN 4101 or MATS 4001], [upper div MatS or ChEn or CHEM]] or #; spring, every year)

CHEM 4221. Introduction to Polymer Chemistry. (3.0 cr.; [CHEM 8221, CHEN 5221, CHEM 8221, MATS 8221, MATS 5221]; prereq [2302, 4501] or #; fall, every year)
Condensation, radical, ionic, emulsion, ring-opening, metal-catalyzed polymerizations. Chain conformation, solution thermodynamics, molecular weight characterization, physical properties.

CHEM 4223W. Polymer Laboratory. (2.0 cr.; [MATS 4223W, CHEM 4223W]; prereq 4221 or 4214 or CHEM 4214 or MATS 4214 or #; spring, every year)

CHEM 4301. Applied Surface and Colloid Science. (3.0 cr.; prereq 3501, [r or sr or #]; spring, every year)
Principles of surface/colloid science, application to understanding manufacturing/performance of bio-based products.

CHEM 4311W. Advanced Organic Chemistry Lab. (4.0 cr.; prereq 2311; fall, spring, every year)
Reactions, techniques, and instrumental methods in synthetic organic chemistry.

CHEM 4321. Organic Synthesis. (3.0 cr.; prereq [2302 or equiv], 4501, #; fall, every year)
Fundamental concepts, reactions, reagents, structural/stereochemical issues, mechanistic skills for organic chemistry.

CHEM 4322. Advanced Organic Chemistry. (3.0 cr.; prereq [2302 or equiv], 4501, #; spring, every year)
Topics vary by instructor. Examples: natural products, heterocycles, asymmetric synthesis, organometallic chemistry, polymer chemistry.

CHEM 4352. Physical Organic Chemistry. (3.0 cr.; prereq 4501, [4011 or 8011]; spring, every year)
Fundamental concepts and mechanistic tools for analysis of organic reaction mechanisms. Solvation, reactive intermediates, gas phase chemistry. Photochemistry/strained-ring chemistry.

CHEM 4361. Interpretation of Organic Spectra. (3.0 cr.; prereq [2302 or equiv], 4501, #; fall, every year)
Application of nuclear magnetic resonance, mass, ultraviolet, and infrared spectral analyses to organic structural problems.

CHEM 4411. Introduction to Chemical Biology. (3.0 cr.; prereq [2302 or equiv], 4501; fall, every year)
Chemistry of amino acids, peptides, proteins, lipids, carbohydrates, and nucleic acids. Structure, nomenclature, synthesis, reactivity. Techniques to characterize biomolecules.

CHEM 4412. Chemical Biology of Enzymes. (3.0 cr.; prereq 2302, [3501 or equiv]; spring, offered periodically)
Enzyme classification with examples from current literature. Strategies to decipher enzyme mechanisms. Chemical approaches to control enzyme catalysis.

CHEM 4413. Nucleic Acids. (3.0 cr.; prereq 2302, [3501 or equiv]; spring, offered periodically)

CHEM 4501. Introduction to Thermodynamics, Kinetics, and Statistical Mechanics. (3.0 cr.; A-F or Audit; [CHEM 3501]; prereq [1062/1066 or 1071H/1075H], [MATH 2263 or &MATH 2263 or MATH 2374 or &MATH 2374], [PHYS 1302 or PHYS 1402 or PHYS 1502V]; fall, spring, every year)

CHEM 4502. Introduction to Quantum Mechanics and Spectroscopy. (3.0 cr.; A-F or Audit; [CHEM 3502]; prereq [1062/1066 or 1072H/1076H], [MATH 2263 or &MATH 2263 or MATH 2374 or &MATH 2374] or &MATH 2243 or &MATH 2374], [PHYS 1302 or PHYS 1402 or PHYS 1502V]; fall, spring, every year)

CHEM 4511W. Advanced Physical Chemistry Lab. (3.0 cr.; prereq 4501, 4502, chemistry major; fall, every year)
Experiments illustrating principles and methods of thermodynamics, reaction kinetics, and quantum mechanics.

CHEM 4601. Green Chemistry. (3.0 cr.; prereq [2302, 4501] or equiv; spring, every year)
Survey key aspects of green chemistry in modern research and development both in academia and industry, as well as relevant implications for the environment, technology, and public policy.

CHEM 4701. Inorganic Chemistry. (3.0 cr.; prereq [2311 or &2311], [4501 or 4502 or &4502]; fall, spring, every year)
Periodic trends. Structure/bonding in compounds where s and p electrons are important. Descriptive chemistry of solids and transition metal compounds. Transition metal chemistry. Topics in main group and materials chemistry.

CHEM 4711W. Advanced Inorganic Chemistry Lab. (3.0 cr.; A-F or Audit; prereq 4701, chem major; spring, every year)
Lab experiments in inorganic/organometallic chemistry illustrating synthetic/spectroscopic techniques.

CHEM 4715. Physical Inorganic Chemistry. (3.0 cr.; prereq 4701 or equiv, chem major or #; fall, every year)
Physical methods (e.g., IR, UV-VIS, ESR, Mossbauer and mass spectroscopy, magnetic measurements, X-ray diffraction) and concepts applied to inorganic and organometallic systems.

CHEM 4725. Organometallic Chemistry. (3.0 cr.; prereq 4701 or equiv, chem major or #; fall, offered periodically)
Synthesis, reactions, structures, and other properties of main group and transition metal organometallic compounds; electronic and structural theory, emphasizing their use as stoichiometric and homogeneous catalytic reagents in organic and inorganic systems.

CHEM 4735. Bioinorganic Chemistry. (3.0 cr.; prereq 4701 or equiv, chem grad or #; fall, offered periodically)
Role of metal ions in biology. Emphasizes structure, function, and spectroscopy of metalloproteins and their synthetic analogs.

CHEM 4745. Advanced Inorganic Chemistry. (3.0 cr.; prereq 4701, chem major; #; spring, offered periodically)
Topics in main group and transition metal chemistry. Emphasizes synthesis, structure, physical properties, and chemical reactivity.

CHEM 4894H. Senior Honors Thesis. (1.0-3.0 cr. [max 6.0 cr.]; A-F only; prereq Honors student, #; fall, spring, summer, every year)
Written thesis under direction of chemistry project advisor.

CHEM 5210. Materials Characterization. (4.0 cr.; prereq grad student or #; spring, every year)
Modern tools/techniques for both bulk- and thin-film characterization. Topics may include ion-solid interactions, Rutherford back scattering, secondary ion mass spectrometry, solid-state NMR, x-ray photoelectron spectroscopy, small-angle x-ray/neutron scattering, transmission/scanning electron/probe microscopy, near-field scanning optical microscopy, porosimetry, adsorption techniques, and ellipsometry.
CHEM 5245. Introduction to Drug Design. (3.0 cr.; A-F or Audit; = [MEDEC 5245, PHAR 6245]; prereq 2302 or equiv.) Concepts that govern design/discovery of drugs. Physical, bioorganic, medicinal chemical principles applied to explain rational design and mechanism of action drugs.

CHEM 5755. X-Ray Crystallography. (4.0 cr.; A-F or Audit; prereq Chem grad student or #; spring, every year) Essentials of crystallography as applied to modern, single crystal X-ray diffraction methods. Practical training in use of instrumentation in X-ray crystallography facility in Department of Chemistry. Date collection, correction/refinement, structure solutions, generation of publication materials, use of Cambridge Crystallographic Structure Database.

Models of inclusive/just education. Students tutor/mentor Chicanos/Latinos, dialogue with Chico/Latino educators.

CHIC 1901. Freshman Seminar. (3.0 cr.; A-F or Audit; prereq freshman; fall, every year) Topic specified in Class Schedule.

CHIC 1902. Freshman Seminar. (3.0 cr.; prereq Fr; fall, spring, offered periodically) Topic specified in Class Schedule.

CHIC 1905. Freshman Seminar. (3.0 cr.; A-F or Audit; prereq Freshman; fall, spring, offered periodically) Topic specified in Class Schedule.

CHIC 1907W. Freshman Seminar. (3.0 cr.; A-F only; prereq Fr; fall, every year) Topic specified in Class Schedule.

CHIC 1908W. Freshman Seminar. (3.0 cr.; A-F or Audit; prereq freshman; fall, every year) Topic specified in Class Schedule.

CHIC 3208. Mexico On My Mind. (3.0 cr.; = [ARTH 3208]; fall, spring, every year) Images of art from Pre-Columbian cultures to modern Mexico/Chicano art in United States. How Mexico/its people have represented themselves/been represented by others. Role images play in community, national, international politics through history.

CHIC 3212. Chicana Studies: La Chicana in Contemporary Society. (3.0 cr.; = [GWSS 3410]; fall, spring, every year) Scholarly/creative work of Chicanas or politically defined women of Mexican American community. Interdisciplinary. Historical context, cultural process, and autoethnography.

CHIC 3213. Chicana Music and Art. (3.0 cr.; A-F or Audit; spring, every year) Survey of diverse forms of cultural expressiveness in Mexican American music/art. History of various types of artistic production and musical forms in their regional specificity. Social/economic implications of several genres, styles, and traditions.

CHIC 3221. Introduction to Chicana/o Studies: Critical Paradigms. (3.0 cr.; spring, every year) Prevailing paradigms of analysis, methodologies of research, and guiding theoretical concepts that have shaped Chicano studies. Chicano history, culture, and meanings, including migration, repatriation, community formation, Chicano movement. Contemporary trends in art and culture.

CHIC 3223. Chicana/o and Latina/o Representation in Film. (3.0 cr.; spring, every year) Introduction to Chicano/a and Latina/o visual representation. Depiction of Latina/o experience, history, and culture in film. Analyzing independent/commercial films as texts that illuminate deeply held beliefs about race, class, ethnicity, gender, and national origin.

CHIC 3225. Service Learning in the Chicano/ Latino Community. (3.0 cr.; A-F only; = [CHIC 3275]; fall, spring, every year) Normative/applied ethics used to reflect on personal/societal responsibilities and to analyze U.S. educational systems. Institutional/social constraints on equitable educational opportunities for Chicano/Latino students. Models of inclusive/just education. Students tutor/mentor Chicanos/Latinos, dialogue with Chicanos/Latino educators.


CHIC 3375. Folklore of Greater Mexico. (3.0 cr.; fall, spring, every year) Scholarly survey and exploration of the sociocultural function of various types of folklore in Greater Mexico. Ways in which folklore constructs and maintains community, as well as resists and engenders cultural shifts.

CHIC 3423. Central American Revolutions. (3.0 cr.; A-F or Audit; = [HIST 3423]; fall, spring, every year) Social, political, and economic issues that have shaped Central American history for nearly two centuries. Colonial histories, capitalist development, ethnic/racial conflict, foreign intervention, Catholic Church, civil war throughout region. Readings/discussions cover events in Guatemala, Honduras, El Salvador, Nicaragua, Costa Rica, and Panama.


CHIC 3446. Chicana/o History II: WWII, El Movimiento, and the New Millennium. (3.0 cr.; = [HIST 3446]; spring, every year) Experiences of people of Mexican descent in the U.S. Notions of citizenship from WWII, Chicano civil rights movement. Impact of immigration patterns/legislation. Cultural wars, changing demographics. Social, economic, and political changes that influenced day-to-day life of Mexican Americans. Meaning of racialized “Mexican” identity. How different groups of Mexicans have understood their relationships to other Americans and other Latino groups.
**CHIC 3452. Xicana/Indigena Studies: History, Culture, and Politics.** (3.0 cr.; spring, every year) Historical, cultural, and political processes impacting Chicanas/os and their understanding of being indigenous to the North American continent. History, culture, and identity formation as dynamic processes intimately related to present and future constructions of Mexican American identities and sociopolitical perspectives.

**CHIC 3507W. Introduction to Chicana/o Literature.** (3.0 cr.; =ENGL 3507W; fall, spring, every year) Cultural, intellectual, and sociopolitical traditions of Mexican Americans as they are represented in creative literature. Genres/forms of creative cultural expression and their significance as representations of social, cultural, and political life in the United States. Novels, short stories, creative non-fiction, drama, essay, poetry, and hybrid forms of literature.

**CHIC 3672. Chicana/o Experience in the Midwest.** (3.0 cr.; spring, every year) Experiences of people generally defined as Chicanas or Latinos living in the Midwest. Individual/group identity. Focuses on construction of Chicano-Latino experience. How identity affirmation, migration stories, immigration status, historical memory, and cultural traditions are impacted by being in the Midwest.

**CHIC 3752. Chicanas and Chicanos in Contemporary Society.** (3.0 cr.; spring, every year) Introduction to sociological analysis of theoretical/methodological approaches to Chicano/a and Latino/a communities. Socioeconomic conditions, education, cultural change, the family, gender relations, political experiences. Theories, issues, methods of sociological research. Debates regarding qualitative/quantitative research methods.

**CHIC 3771. Latino Social Power and Social Movements in the U.S..** (3.0 cr.; fall, offered periodically) How Latinos have collectively resisted social domination. Theories of social power/movements. Resistance by Latinos during 60s/70s. Current organized efforts to curb immigration, establish English as official language, and limit immigrant rights.

**CHIC 3852. Chicana/o Politics.** (3.0 cr.; =POL 3752; fall, spring, every year) Theory/practice of Chicana/o politics through an analysis of Mexican American experience, social agency, and response to larger political systems and behaviors using social science methods of inquiry. Unequal power relations, social justice, and the political economy.

**CHIC 3862. American Immigration History.** (3.0 cr.; A-F or Audit; =AAS 3862, HIST 3862; fall, offered periodically) Global migrations to U.S. from Europe, Asia, Latin America, and Africa, from early 19th century to present. Causes/cultures of migration. Migrant communities, work, and families. Xenophobia, assimilation/integration, citizenship, ethnicity, race relations. Debates over immigration. Place of immigration in America's national identity.

**CHIC 3888. Immigration and the U.S. Latina/o Experience: Diaspora, Identity, and Community.** (3.0 cr.; =HIST 3445; fall, every year) Experiences of migrants from Latin America to the United States in 20th/21st century. Migrant engagements with US society. Pre-existing Latina/o and other ethnic communities. Experiences within political, economic, and social aspects of life at local/global level.

**CHIC 3900. Topics in Chicano Studies.** (3.0 cr. [max 6.0 cr.]; A-F only; fall, spring, every year) Topics vary by section of course.

**CHIC 3993. Directed Studies.** (1.0-9.0 cr.; =[GWSS 4232, GLBT 4232]; fall, spring, every year) Guided individual reading, research, and study. Students often do preliminary readings and research in conjunction with plans for education abroad programs.

**CHIC 4231. Color of Public Policy: African Americans, American Indians, Asian Americans & Chicanos in the U.S..** (3.0 cr.; =[AFRO 4231, AMIN 4231, AAS 4231]; fall, offered periodically) Examination of the structural or institutional conditions through which people of color have been marginalized in public policy. Critical evaluation of social theory in addressing the problem of contemporary communities of color in the United States.

**CHIC 4232. Chicana/o - Latina/o Gender and Sexuality Studies.** (3.0 cr.; =[GWSS 4232, GLBT 4232]; fall, spring, odd years) Critical thinking of Chicanas/os and Latinas/os around construction of gender. Politics of sexual identity. How the self is gendered in relationship to sexual, racial, class, and national identities under different social structural conditions. Way in which the "borders" that define/confine sexual norms shift over time.

**CHIC 4275. Theory in Action: Community Engagement in a Social Justice Framework.** (3.0 cr.; fall, every year) Theoretical frameworks of social justice and community engagement for work outside classroom with/ in Latina/o community. Worker issues/organizing. Placements in unions, worker organizations. Policy initiatives on labor issues. Students reflect on their own identity development, social location, and position of power/privilege.

**CHIC 4401. Chicana/Latina Cultural Studies.** (3.0 cr.; fall, offered periodically) Diversity of cultures that are called "Hispanic"; women in these cultures; Chicanas and Latinas living in the United States or migrating from their home nations to the United States.

**CHIC 4901W. Senior Paper.** (3.0 cr.; A-F only; spring, every year) Capstone experience. Students produce original research paper or creative project on a topic determined in consultation with a faculty adviser.

**CHIC 5374. Migrant Farmworkers in the U.S.: Families, Work, and Advocacy.** (4.0 cr.; spring, every year) Socioeconomic/political forces that impact migrant farmworkers. Effects of the laws and policies on everyday life. Theoretical assumptions/strategies of unions and advocacy groups. Role/power of consumer. How consuming cheap food occurs at expense of farmworkers.

**CHIC 5920. Topics in Chicana(o) Studies.** (3.0 cr.; prereq Sr or grad student; fall, spring, every year) Multidisciplinary themes in Chicana(o) studies. Issues of current interest.

**CHIC 5993. Directed Studies.** (1.0-3.0 cr.; =[GWSS 4232, GLBT 4232]; fall, spring, every year) Guided individual reading, research, and study for completion of the requirements for a senior paper or honors thesis.
CPSY 4302. Infant Development. (3.0 cr.; A-F or Audit; prereq 2301 or #; fall, spring, summer, every year) Perceptual learning and the development of sensory and perceptual processes.

CPSY 4343. Cognitive Development. (3.0 cr.; A-F or Audit; prereq 2301; fall, spring, every year) Cognitive processes; relevant theory, research literature, and methodology.

CPSY 4344. Language Development and Communication. (3.0 cr.; A-F or Audit; prereq 2301; spring, every year) Structure and function of language; factors influencing development; methodological problems, language scales, theories.

CPSY 5413. Early Childhood and Public Policy. (3.0 cr.; A-F only; prereq Student in ECE or ECSE; fall, every year) Trends in early education, including diversity, special needs, legislation, public policy, and educationally appropriate practice.

CPSY 5252W. Facilitating Social and Emotional Learning in Early Childhood Education. (3.0 cr.; A-F only; prereq Student in ECE or ECSE; spring, every year) Strategies for facilitating growth in social/ emotional aspects of development. Addresses guidance/classroom management issues.

CPSY 5253. Facilitating Cognitive and Language Learning in Early Childhood Education. (3.0 cr.; A-F only; prereq Student in ECE or ECSE; fall, every year) Overview of cognitive and language characteristics of children ages 0-8 years and of how teachers can plan curriculum to facilitate children's development in these areas.

CPSY 5254. Facilitating Creative and Motor Learning in Early Childhood Education. (2.0 cr.; A-F only; prereq Student in ECE or ECSE; spring, every year) Unique/diverse qualities and characteristics children possess while progressing through universal sequence of physical growth/ development and creative development. Students engage in inquiry, research/planning, and reflection as they complete the action-oriented and applied assignments with small groups of children.
and participate in small discussion groups and follow-up activities.

CPSY 5501. Foundations in Infant and Early Childhood Mental Health I. (3.0 cr.; A-F only; prereq [Baccalaureate degree in an early-childhood-related field from an accredited U.S. institution or documented equival], experience in early childhood [research or practice]; fall, odd years) History, theory, research, concepts, and issues in infant mental health. Issues pertinent to difficulties in development. Readings, visual material. Expert guest lectures.

CPSY 5503. Foundations in Infant and Early Childhood Mental Health II. (3.0 cr.; A-F only; prereq 5501; spring, even years) History, theory, research, concepts, and issues in infant mental health. Typical development. Difficulties in development. Expert guest lectures. Readings, visual material.

CPSY 5506. Infant Observation Seminar I. (1.0 cr.; Student Option No Audit; prereq 5501; #, spring, even years) How an infant develops in context of family relationships over a 9-12 month period. Students observe an infant for one hour a week, write a narrative, and discuss observations.

CPSY 5508. Infant Observation Seminar II. (1.0 cr.; Student Option No Audit; prereq 5506; summer, even years) How an infant develops in context of family relationships over a 9-12 month period. Students observe an infant for one hour a week, write a narrative, and discuss observations.

CPSY 5511. Infant Observation Seminar III. (1.0 cr.; Student Option No Audit; prereq 5508; fall, even years) How an infant develops in context of family relationships over 9-12 month period. Students observe an infant for one hour a week, write a narrative, and discuss observations.

CPSY 5513. Assessment in Infant and Early Childhood Mental Health: DC 0-3R. (2.0 cr.; prereq [Baccalaureate degree in early-childhood-related field from accredited U.S. institution or documented equival], [experience in early childhood research or practice]; summer, even years) Infant Mental Health diagnostic manual DC 0-3R. Assessment using the manual. Lectures, discussions, cooperative learning, class exercises, case studies.

CPSY 5515. Assessment in Infant and Early Childhood Mental Health: NCAST. (2.0 cr.; S-N only; prereq [Baccalaureate degree in early-childhood-related field from accredited U.S. institution or documented equival], [experience in early childhood research or practice]; summer, even years) Achieving reliability in two observational measures of parent-child interaction: (1) nursing child assessment feeding (2) teaching scales. Discussion, lecture, videotapes, listening/observation tasks.

CPSY 5518. Prevention and Intervention in Infant and Early Childhood Mental Health I. (3.0 cr.; A-F only; prereq 5501, 5503, 5506, 5508; fall, even years) Students design prevention/intervention programs and apply evidence-based strategies in workplace/practicum settings. Readings, in-class reflective practice groups.

CPSY 5521. Prevention and Intervention in Infant and Early Childhood Mental Health II. (3.0 cr.; A-F only; prereq 5518; spring, even years) Students design prevention/intervention programs and apply evidence-based strategies in workplace/practicum settings. Readings, in-class reflective practice groups.

CPSY 5522. Reflective Supervision in Infant and Early Childhood Mental Health: Community-based . (1.0 cr.; S-N only; prereq 5518 or 5521; spring, odd years) Principles/strategies of reflective supervision/consultation. Discussion, final assignment designated by instructor.

CPSY 5525. Reflective Supervision in Infant and Early Childhood Mental Health: Clinical. (1.0 cr.; S-N only; prereq 5518 or 5521; spring, odd years) Principles and strategies of reflective supervision/consultation. Discussion, final assignment designated by instructor.

CPSY 5596. Field Experience in Child Development. (1.0-12.0 cr.; S-N only; fall, spring, summer, offered periodically) Emphasizes field experiences focusing on the development of children as individuals or members of groups; may include interactions with children in natural settings, or research on applied topics or with atypical populations.

CAPY 5623. Assessment and Treatment Interventions: Anxiety and Depression in Children and Adolescents. (1.0 cr.; fall, spring, offered periodically) Characteristics of depression and suicidal behavior in children/adolescents. Methods of crisis intervention, treatment, and prevention.


CAPY 5660. ADHD Throughout the Life Span: Perspectives on Diagnosis, Assessment, and Developmental Course. (1.0-2.0 cr. ; = [CAPY 5660, CAPY 5669]; prereq Upper div; fall, summer, every year) ADHD, from its earliest presentation to its later adult manifestations. Clinical depression, diagnostic criteria. Disorders that commonly coexist with ADHD. Standard assessment procedures for making a diagnosis. Developmental changes in clinical procedures.


CAPY 5670. Preventing Violence and Antisocial Behavior in Children and Adolescents: Interventions, Practices. (1.0 cr.; = [CAPY 5662]; prereq Community and school-based intervention programs aimed at the prevention of antisocial behavior are reviewed and evaluated.; fall, offered periodically) Community-/school-based intervention programs aimed at preventing antisocial behavior.

CAPY 5671. Suicide Prevention: Examining What Interventions May Alter Suicide Risk. (1.0 cr.; fall, offered periodically) Suicide is examined from a range of perspectives by understanding differences across sex, development, and culture. Suicide prevention techniques are discussed and controversies in the field will be highlighted. Group participation is encouraged.

CAPY 5672. Children's Exposure to Domestic Violence: Effects on Child Functioning, Treatment Implications. (1.0 cr.; spring, offered periodically) Effects of exposure to domestic violence in context of development, from infancy to
late adolescence. Assessment strategies, best practices in intervention/prevention for vulnerable children and adolescents. Multidisciplinary approaches to working with children exposed to violence (e.g., judicial, medical, law enforcement partnerships).

CAPY 5673. Prevention Programming: Learning the Skills to Implement a Preventive Intervention. (1.0 cr.; fall, every year)
Early intervention to reduce antisocial and risk taking behaviors (e.g., suicide, unsafe sex) in teenagers. "Early Risers Skills for Success" program as model for teaching techniques of early prevention. Social-emotional skill training, academic enrichment, monitoring/mentoring, behavioral management techniques group settings, techniques to support/educate parents of a risk children.

CAPY 5674. Serious Emotional Disturbance in Children and Adolescents. (1.0 cr.; spring, every year)
Anxiety, mood, behavioral and trauma disorders. Case examples. Cognitive behavioral therapy, play therapy, behavior modification, parent-child interaction therapy, family Therapy. Discussion, exercises, session videotapes.

CAPY 5675. Childhood Psychiatric Disorders: Case Studies and Interventions. (1.0 cr.; spring, every year)
Anxiety, mood, behavioral and trauma disorders. Case examples. Cognitive behavioral therapy, play therapy, behavior modification, parent-child interaction therapy, family Therapy. Discussion, exercises, session videotapes.

China Executive MBA (CHMB)
Curtis L. Carlson School of Management

CHMB 5800. Organizational Behavior. (3.0 cr.; A-F only; fall, every year)
Theories/frameworks for analyzing behavior of individuals, groups, and the organization itself. Emphasizes making decisions and developing action plans that enable managers to provide effective leadership. Personnel selection, reward/compensation systems, collective bargaining.

CHMB 5801. Financial Accounting. (3.0 cr.; A-F only; fall, every year)
External accounting system used by firms to measure their economic performance and financial position. Students analyze corporate financial reports to discover impact of significant economic events. Rise of financial reporting standards and financial intermediaries in efficient allocation of capital in a modern economy. Discussions, cases.

CHMB 5802. Statistics and Decision Making. (3.0 cr.; A-F only; fall, every year)
Exploratory data analysis, basic inferential procedures, statistical process control, regression analysis.

CHMB 5803. Operations Management. (3.0 cr.; A-F only; fall, every year)
How to manage operations function in manufacturing/service organizations.

CHMB 5804. Managerial Accounting. (3.0 cr.; A-F only; spring, every year)
How to analyze accounting for use in management decisions. Planning and control. Transfer pricing, performance measurements, cost behavior, cost allocation, activity based costing, standard costs.

CHMB 5805. Financial Management. (3.0 cr.; A-F only; spring, every year)
Theory/practice of finance from analytical approach. Students apply basic financial concepts of risk, return, and valuation to decisions that a corporate financial officer or person engaged in small business must make about sources/uses of funds during changing financial markets.

CHMB 5806. Marketing Management. (3.0 cr.; A-F only; spring, every year)
Developing/implementing most appropriate combination of variables to carry out a firm's strategy in its target markets. Applying analytic perspectives, concepts, and decision tools of marketing to decisions in product offering, distribution, pricing, and communication.

CHMB 5807. Business Strategy. (3.0 cr.; A-F only; spring, every year)

CHMB 5808. Strategic Marketing. (3.0 cr.; A-F only; spring, every year)
Product markets in which an organization should compete. Sustainable competitive advantage that should be developed. Matching marketing strategy with the environment. Coordination between marketing and other business functions. Organization/management of marketing. Case studies.

CHMB 5809. Advanced Financial Management. (3.0 cr.; A-F only; spring, every year)
Executive level corporate financial policy. Students are challenged to apply basic principles of finance on their own initiative. Rigorous case-oriented approach.

CHMB 5811. Information Technology Management. (3.0 cr.; A-F only; spring, every year)
Managing information resources/technology. Students gain exposure to various information technologies, examine their applications, explore competitive advantages associated with information technology, and address organizational/managerial implications.

CHMB 5813. Ethics and Leadership. (3.0 cr.; A-F only; fall, spring, every year)
Role that ethics can play in corporate strategy. Key concepts include stakeholder management, individual/collective responsibility, and international business ethics. Theoretical considerations applied to issues such as a business’s responsibility to the environment, truthful/tasteful advertising, obligations to local community, and managing a diverse workforce.

CHMB 5814. Business, Government, and Macroeconomics. (3.0 cr.; A-F only; spring, every year)
Analyzing major economic events, predicting their ramifications. Changes in monetary/fiscal policies, unemployment, international financial markets, country risk, financial crises. Implications of macroeconomic policies and global trends for economic growth. Topics are presented within an integrated conceptual framework and are supported by experiences of the U.S., Europe, Japan, and envelopeing countries.

CHMB 5815. International Human Resources Management. (3.0 cr.; A-F only; spring, every year)
Topics reflect the strengths, talents, and interests of the class. Integrates different aspects of the curriculum while not being limited by a specific area or paradigm.

CHMB 5816. International Residency. (6.0 cr.; A-F only; fall, spring, every year)
Students travel to an international location for 11 days and engage in discussions with international colleagues, apply program concepts, and develop a broader sensitivity to cultural/social differences. Pre-trip preparation, on-site discussion, and trip assignment are required.

Chinese (CHN)
College of Liberal Arts

CHN 1011. Beginning Modern Chinese I. (6.0 cr.; CHN 4001; fall, summer, every year)
Speaking/reading modern standard Chinese through structured practice.

CHN 1012. Beginning Modern Chinese II. (6.0 cr.; CHN 4002; prereq 1011 or equiv or #; spring, summer, every year)
Speaking/reading modern standard Chinese through structured practice.

CHN 1015. Accelerated Beginning Modern Chinese. (5.0 cr.; CHN 4005; prereq Oral/aural skills or speaker of other Chinese dialect recommended; fall, every year)
Reading, writing, standard pronunciation. Meets with 4035.

CHN 1016. Accelerated Intermediate Modern Chinese. (5.0 cr.; CHN 4006; prereq 1012 or 1015; oral/aural skills or speaker of other Chinese dialect recommended; spring, every year)
Continuation of CHN 1015. Mandarin Chinese course designed primarily for students with oral/aural skills but with little or no exposure to reading and writing. Also for speakers of other Chinese dialects and others with prior experience. Concentration on reading, writing, and standard pronunciation. Equivalent to two semesters, Chinese 3021-3022. Upon
CHN 3021. Intermediate Modern Chinese I. (5.0 cr.; =CHN 4003; prereq 1012 or 1015 or equiv or #; fall, every year)
Modern standard Chinese skills developed further through conversations, writing, reading.

CHN 3022. Intermediate Modern Chinese II. (5.0 cr.; =CHN 4004; prereq 3021; spring, every year)
Modern standard Chinese skills developed further through conversation/reading.

CHN 3031. Advanced Modern Chinese I. (4.0 cr.; =CHN 4007; prereq 3022 or equiv or #; fall, every year)
Reading/analysis of 20th-century texts.

CHN 3032. Advanced Modern Chinese II. (4.0 cr.; =CHN 4008; prereq 3031 or equiv or #; spring, every year)
Reading/analysis of 20th-century texts.

CHN 3201. Chinese Calligraphy. (2.0 cr.; fall, spring, every year)
Appreciation and execution of Chinese calligraphy through guided practice.

CHN 3202. Intermediate Chinese Calligraphy. (2.0 cr.; prereq 3201 or #; spring, every year)
Advanced techniques of composing Chinese characters using regular style of Chinese calligraphy.

CHN 3290. Chinese Language Teaching Tutorial. (1.0 cr. [max 2.0 cr.]; S-N only; prereq Grade of A in 3032; fall, spring, every year)
Students tutor beginning students of Chinese and are part of department's Chinese language team.

CHN 3993. Directed Studies. (1.0-5.0 cr. [max 15.0 cr.]; Student Option No Audit; prereq #, %, @; fall, spring, every year)
Guided individual study of Chinese language or linguistics.

CHN 4001. Beginning Modern Chinese I. (3.0 cr.; =CHN 1011; prereq Grad student; fall, every year)

CHN 4002. Beginning Modern Chinese II. (3.0 cr.; =CHN 1012; prereq 4001, grad student; spring, every year)
Speaking/reading modern standard Chinese through structured practice. Meets with 1012.

CHN 4003. Intermediate Modern Chinese I. (3.0 cr.; =CHN 3021; prereq 4002, grad student; fall, every year)
Modern standard Chinese skills developed through conversations, writing, reading. Meets with 3021.

CHN 4004. Intermediate Modern Chinese II. (3.0 cr.; =CHN 3022; prereq 4003, grad student; spring, every year)
Modern standard Chinese skills developed through conversation/reading. Meets with 3022.

CHN 4005. Accelerated Beginning Modern Chinese. (3.0 cr.; =CHN 1015; prereq Grad student; #; oral/aural skills or other Chinese dialect recommended; fall, every year)
Mandarin Chinese. Reading, writing, standard pronunciation.

CHN 4006. Accelerated Intermediate Modern Chinese. (3.0 cr.; =CHN 1016; prereq [1012 or 1015], grad student) or #; oral/aural skills or other Chinese dialect recommended; spring, every year)

CHN 4007. Advanced Modern Chinese I. (3.0 cr.; =CHN 3031; prereq 4004, grad student; fall, every year)
Reading/analysis of 20th-century texts. Meets with 3031.

CHN 4008. Advanced Modern Chinese II. (3.0 cr.; =CHN 3032; prereq 4007, grad student; spring, every year)
Reading/analysis of 20th-century texts. Meets with 3032.

CHN 4041. Advanced Readings in Modern Chinese I. (4.0 cr.; prereq 3032 or #; fall, every year)
Writings of different styles. Short stories/essays written since 1949 that reflect Chinese society.

CHN 4042. Advanced Readings in Modern Chinese II. (4.0 cr.; prereq 3032 or #; spring, every year)
Writings of different styles. Short stories/essays written since 1949 that reflect Chinese society.

CHN 5011. Research Methods. (4.0 cr.; prereq 3032 or 3112; )
Introduction to the sources and approaches of research in language and literature.

CHN 5040. Readings in Chinese Texts. (3.0 cr. [max 12.0 cr.]; A-F or Audit; prereq 4042 or equiv or #; fall, spring, every year)
Students read authentic materials of various types to increase reading/speaking ability. Topics specified in Class Schedule.

CHN 5120. Topics in Chinese Linguistics. (4.0 cr. [max 8.0 cr.]; prereq 4121 or 4125; )
Studies of the structure and change in the Chinese language.

CHN 5211. Introductory Classical Chinese I. (3.0 cr.; =JPN 5211, KOR 5211; prereq Two years of an East Asian language (Chinese, Japanese, Korean) or equivalent or #; fall, offered periodically)
Reading excerpts from canonical Chinese texts. Transnational nature of Classical Chinese and its importance in study of East Asian cultures. Taught in English.

CHN 5212. Introductory Classical Chinese II. (3.0 cr.; =JPN 5212, KOR 5212; prereq 5211 and two years of an East Asian language (Chinese, Japanese, Korean) or its equivalent or #; spring, offered periodically)
Reading excerpts from canonical Chinese texts. Transnational nature of Classical Chinese.

CHN 5393. Directed Study. (1.0-5.0 cr. [max 18.0 cr.]; fall, spring, every year)
Guided individual reading or study. Prereq-instr consent, dept consent, college consent.

Civil Engineering (CE)
Institute of Technology

CE 5. Refresher Course for Civil Engineers. (0.0 cr.; S-N or Audit; prereq BCE or equivalent degree or completion of Parts I and II of the State Board Examination; spring, every year)
Review of civil engineering fundamentals required to pass the Minnesota Professional Engineering Examination in civil engineering.

CE 1101. Orientation to Civil, Environmental, and Geo-Engineering. (1.0 cr.; S-N or Audit; prereq Lower div; fall, every year)
Introduction to civil, environmental, geo-engineering practice. Presentations made by faculty members/professional engineers, followed by discussion on topics related to future challenges.

CE 3101. Computer Applications in Civil Engineering I. (3.0 cr.; A-F or Audit; prereq MATH 1272, PHYS 1301, CSE; fall, spring, every year)

CE 3102. Uncertainty and Decision Analysis in Civil Engineering. (3.0 cr.; A-F or Audit; prereq MATH 1372 or equiv; fall, spring, every year)
Stochastic models, their usefulness in reasoning about uncertainty in civil engineering. Techniques for identifying, fitting, validating models using data samples. Testing hypotheses about, bounding uncertainty attached to, engineering parameters. Branches of civil engineering.

CE 3111. CADD for Civil Engineers. (2.0 cr.; A-F only; prereq 3201; fall, spring, every year)
Introduction to AutoCAD and land development desktop software. Students complete all tasks to design two-lane roadway using civil engineering design software, including topography, plan/profile, contours, cross sections, and quantity calculations.

CE 3201. Transportation Engineering. (3.0 cr.; prereq PHYS 1301, 3101, 3102; fall, spring, every year)
Applying laws of motion to vehicles, vehicle performance, determining constraints for highway designs. Traffic flow principles, their relation to capacity and level of service. Geometric design, pavement design, transportation planning.

CE 3202. Surveying and Mapping. (2.0 cr.; A-F or Audit; prereq MATH 1271, MATH 1272).
Courses listed in this catalog are current as of December 12, 2014. For up-to-date information, visit www.catalogs.umn.edu

[CE 3301. Soil Mechanics I. (3.0 cr.; A-F or Audit; prereq CSE, AEM 3031; fall, spring, every year)]

CE 3401. Linear Structural Analysis. (3.0 cr.; A-F or Audit; prereq Grade of at least C- in AEM 3031, CSE; fall, spring, every year) Analysis of determinate/indeterminate trusses and frames and of deformation by virtual work. Application of energy, slope-deflection, and moment distribution methods to indeterminate structures. Influence lines. Design.

CE 3402W. Civil Engineering Materials. (3.0 cr.; A-F or Audit; prereq Grade of at least C- in AEM 3031 or BBE 3001; IT; fall, spring, every year) Concepts of behavior mechanisms for civil engineering materials such as concrete, metals, asphalt, plastics, and wood. Standard specifications for material properties. Techniques for testing.

CE 3501. Environmental Engineering. (3.0 cr.; A-F or Audit; prereq Chem 1022, Phys 1302; fall, spring, every year) Introduction to environmental engineering. Quantitative approach to environmental problems. Scientific background for understanding roles of engineers and scientists.


CE 3541. Environmental Engineering Laboratory. (3.0 cr.; A-F only; prereq 3501; fall, every year) Experiments focused on physical, chemical, microbiological measurements used in analysis of air, water, solid samples. Applications to water treatment, waste water treatment, hazardous waste treatment/remediation, air pollution, environmental sensing.

CE 4000H. Honors Research Seminar. (1.0 cr. [max 2.0 cr.]; A-F only; = [GEOE 4000H]; prereq Upper div CE; fall, spring, every year) Research seminars in civil and geological engineering given by faculty members and visiting scholars.

CE 4011. Special Topics. (1.0-4.0 cr. [max 12.0 cr.]; A-F only; prereq Upper div CSE; fall, spring, summer, every year) Topics/credits vary.

CE 402H. Honors Selected Reading. (1.0 cr. [max 2.0 cr.]; A-F only; = [GEOE 402H]; prereq Upper div CE, honors; fall, every year) Selected readings, student presentations.

CE 409H. Senior Honors Thesis. (2.0 cr.; A-F only; = [GEOE 409H]; prereq Upper div CE; fall, every year) Writing thesis under direction of CE faculty member.

CE 4102W. Capstone Design for Civil Engineering. (4.0 cr.; A-F or Audit; prereq 4301, 4401, 4501, 4502; fall, spring, every year) Teams formulate/solve civil engineering problems. From conceptual stage through preliminary planning, public hearings, design, environmental impact statements, final plans/specifications, and award of contracts.

CE 4121. Computer Applications in Civil Engineering II. (3.0 cr.; A-F or Audit; prereq 3101, MATH 2243, MATH 2263, [CE or upper div GeoE]; spring, offered periodically) Advanced application of computer tools/methods in solving ordinary/partial differential equations from civil engineering problems. Spreadsheet, MatLab programming. Methods may include finite differences, boundary element, finite element, and control volume finite element.

CE 4170. Independent Study I. (1.0-4.0 cr.; prereq #; fall, every year) Special studies in planning, designing, or analyzing civil engineering systems. Lab problems, literature studies, or reports supervised by staff.

CE 4180. Independent Study II. (1.0-4.0 cr.; prereq #; spring, every year) Special studies in the planning, design, or analysis of civil engineering systems. Individual lab research problems, literature studies, reports. Supervised by staff.

CE 4190. Engineering Co-op Assignment. (2.0-6.0 cr.; S-N or Audit; prereq Upper div CE, approval of department co-op director; fall, spring, summer, every year) Formal written report of work during six-month professional assignment.

CE 4194H. Senior Honors Thesis. (2.0 cr.; A-F only; = [GEOE 4194H]; prereq Upper div CE; fall, every year) Writing thesis under direction of CE faculty member.

CE 4201. Highway Design. (3.0 cr.; A-F or Audit; prereq CE or upper div GeoE or grad, 3202, 3201 or #; spring, every year) Vertical and horizontal alignment, earthwork computations, highway capacity, forecast of traffic volume demand, impact of vehicle type on geometric design, intersection design.

CE 4211. Traffic Engineering. (3.0 cr.; prereq 3201 or Stat 3021 or equiv; spring, offered periodically) Principles of vehicle/driver performance as they apply to safe/efficient operation of highways. Design/use of traffic control devices. Capacity/level of service. Trip generation, traffic impact analysis. Safety/traffic studies.

CE 4251. Pavement Analysis, Design, and Rehabilitation. (4.0 cr.; prereq [3201, 3301, 3402, upper div CSE] or grad student or #; fall, every year) Concepts/principles in rigid/flexible pavement design. Traffic loads, soil considerations, material characteristics for highway/airfield pavement design. Rehabilitating flexible/rigid pavement systems.


CE 4401. Steel and Reinforced Concrete Design. (4.0 cr.; A-F or Audit; prereq Grade of at least C- in 3401, 3402, [upper div CSE or grad student]; fall, spring, every year) Limit-states design. Steel: tension, compression, flexure, combined compression/
flexure, connections. Concrete: beams in flexure/shear, one-way slabs, T-beams, development length, serviceability.

CE 441. Matrix Structural Analysis. (3.0 cr.; A-F or Audit; prerequisite [Grade of at least C- in 3101, 3401] or in a CSci programming course, [upper div CSE or grad student] or #; spring, every year) Analysis of linear structural systems by matrix methods, stiffness, and flexibility methods. Introduction to computerized structural analysis of trusses/frames, including coding in programming language.

CE 4412. Reinforced Concrete Design II. (3.0 cr.; A-F or Audit; prerequisite [Grade of at least C- in 4401, [upper div CSE or grad student]] or #; 4411 recommended; spring, every year) Advanced design of reinforced concrete structures: footings, retaining walls, columns with slenderness effects and biaxial loading, torsion, continuous systems, two-way floor systems.

CE 4413. Steel Design II. (3.0 cr.; A-F or Audit; prerequisite [Grade of at least C- in 4401, [upper div CSE or grad student]] or #; 4411 recommended; fall, every year) Design of steel and composite steel/concrete structures, including multistory frames and plate-girders bridges. Beam-columns, torsion, connections, frames.


CE 4502. Water and Wastewater Treatment. (3.0 cr.; A-F or Audit; prerequisite 3501 or CHEN 2001; fall, spring, every year) Theory of chemical, physical, and biological processes in treating water and wastewater. Sequencing of processes. Design of treatment facilities. Impact on society.

CE 4511. Hydraulic Structures. (3.0 cr.; A-F or Audit; prerequisite 4501; fall, offered periodically) Hydraulic design procedures for culverts, dams, spillways, outlet works, and river control works. Drop structures, water intakes, bridge works. Drop structures, water intakes, bridge works. Stop structures, water intakes, bridge works. Design of culverts, spillways, and outfall works. Analysis of weir flows and sluices. Design of various types of weirs, spillways, and outlet works. Design of bridge piers and abutments. Design of crib and drop structures.

CE 4512. Open Channel Hydraulics. (4.0 cr.; A-F or Audit; prerequisite CSE or grad, 3502 or #; fall, spring, offered periodically) Theories of flow in open channels, including gradually varied and rapidly varied flows, steady and unsteady flows. Computational methods for unsteady open channel flows, applications to flood routing. Introduction to moveable bed mechanics.

CE 4561. Solid Hazardous Wastes. (3.0 cr.; prerequisite CSE or grad, Chem 1022, 3501 or #; spring, every year) Solid and hazardous waste characterization; regulatory legislation; waste minimization; resource recovery; chemical, physical, and biological treatment; thermal processes; disposal practices. Analysis and design of systems for treatment and disposal.

CE 4562. Environmental Remediation Technology. (3.0 cr.; A-F or Audit; prerequisite [3501, 4501 or #; spring, offered periodically]) Technologies designed for removal of pollutants from groundwater and soils. Advances in technological design. Emerging technologies such as in situ bioremediation, phytoremediation. Role of environmental biotechnology in pollution abatement.

CE 5094. Civil Engineering Research. (1.0-4.0 cr.; prerequisite; fall, spring, every year) Research or independent study in concrete, structural steel, soils, hydraulics, hydrology/ municipal, environmental, or transportation problems. Investigations, reports, tests, designs.

CE 5180. Special Topics. (1.0-4.0 cr.; A-F or Audit; prerequisite; fall, spring, offered periodically) Topics vary depending on faculty and student interests.

CE 5211. Traffic Engineering. (3.0 cr.; prerequisite 3201, Stat 3021 or equiv; spring, offered periodically) Principles of vehicle and driver performance as they apply to the safe and efficient operation of highways. Design and use of traffic control devices. Capacity and level of service. Trip generation and traffic impact analysis. Safety and traffic studies.

CE 5212. Transportation Policy, Planning, and Deployment. (4.0 cr.; prerequisite 5201; fall, spring, every year) Techniques of analysis and planning for transportation services. Demand-supply interactions. Evaluating transportation alternatives. Travel demand forecasting. Integrated model systems. Citizen participation in decision-making.


CE 5214. Transportation Systems Analysis. (4.0 cr.; prerequisite 3201; fall, every year) Systems approach, its application to transportation engineering/planning. Prediction of flows and level of service. Production functions, cost optimization, utility theory, demand modeling, transportation network analysis, equilibrium assignment, decision analysis, multidimensional evaluation of transportation projects.


CE 5341. Wave Methods for Nondestructive Testing. (4.0 cr.; A-F or Audit; prerequisite [Math 2263 or Math 2374 or equiv], [or grad student] in civil engineering) or #.) Emphasizes skills relevant for civil engineers. Mathematical principles explained in an engineering setting. Applications from various areas in civil engineering.

CE 5411. Applied Structural Mechanics. (3.0 cr.; A-F or Audit; prerequisite [Upper div CSE or grad student] or #; fall, every year) Principal stresses and failure criteria in 3 dimensions. Introduction to plane elasticity, energy methods, torsion of beams, and bending of unsymmetrical beams.

CE 5414. Prestressed Concrete Design. (3.0 cr.; A-F or Audit; prerequisite [Grade of at least C- in 4401, [upper div CSE or grad student]] or #; fall, every year) Design of prestressed concrete structures. Time dependent effects, behavior, flexure, shear, torsion, deflections, continuous systems.

CE 5415. Masonry Structures. (3.0 cr.; A-F or Audit; prerequisite [Grade of at least C- in 3401, [upper div CSE or grad student]] or #; 4401 recommended; fall, offered periodically) Masonry materials and their production. Mortars, grouts. Design of unreinforced, reinforced, and prestressed masonry structural systems. Walls, columns, lintels, arches. Codes/specifications, testing, inspection.

CE 5511. Urban Hydrology and Land Development. (4.0 cr.; A-F or Audit; prerequisite CE 4501; fall, every year) Urban hydrology for small watersheds and the management of storm water quality and quantity.

CE 5541. Environmental Water Chemistry. (3.0 cr. [max 4.0 cr.]; A-F or Audit; prerequisite 3501, Chem 1021, Chem 1022; fall, every year) Introduction to water chemistry. Physical chemical principles, geochemical processes controlling chemical composition of waters, behavior of contaminants that affect the suitability of water for beneficial uses.

CE 5542. Experimental Methods in Environmental Engineering. (3.0 cr.; A-F or Audit; prerequisite 3501, Chem 1021, Chem 1022; fall, spring, offered periodically) Tools necessary to conduct research in environmental engineering and chemistry.
Theory of operation of analytical equipment. Sampling and data handling methods, statistical analyses, experimental design, laboratory safety. Lecture, laboratory.

CE 5543. Introductory Environmental Fluid Mechanics. (4.0 cr.; A-F or Audit; prereq 3502 or AEM 4201 or ChEn 3005; fall, odd years) Divergence theorem, Convective flux, Mass conservation, Biological reactions, Random walk and diffusive flux, Receptors and channels, Momentum conservation, Navier-Stokes equations, Boundary layer, Chemotaxis, Phototaxis, Shear dispersion, Turbulent flows.

CE 5551. Environmental Microbiology. (3.0 cr.; A-F or Audit; prereq [Upper div or grad] student; fall, every year) Role of microorganisms in environmental bioremediation, pollution control, water/wastewater treatment, biogeochemistry, and human health. Lecture.

CE 5552. Environmental Microbiology Laboratory. (1.0 cr.; A-F only; prereq 5551 or &5551; fall, every year) Basic microbiological techniques: isolation, identification/enumeration of bacteria, BOD, biodegradable kinetics, disinfection. Lab.

CE 5561. Air Quality Engineering. (3.0 cr.; A-F only; prereq Grad student in engineering or #; spring, every year) Introduction to air pollution problems/solutions, local to global. Quantitative analysis of chemistry and physics of atmospheric pollutants. Sources, sinks, and controls; atmospheric transport and transformation; air quality management and regulation; health impacts; global issues.

CE 5570. Design for Sustainable Development: Discovery. (3.0-9.0 cr.; A-F only; prereq Juniors or seniors with minimum 3.0 GPA or grad student; fall, every year) Intensive, experiential learning opportunity on infrastructure, development, environment issues in Delhi, India.

CE 5571. Acara Global Venture Design: Grand Challenges. (3.0-4.0 cr. [max 8.0 cr.]; A-F only; prereq #; fall, spring, every year) Project-based course focused on designing venture solutions to global grand challenges related to environment, health, development. Identify specific social-environmental problem. Design financially-viable venture solution. Collaborate with professional mentors/technical experts. Create venture plan, may pitch for funding. Course is part of Acara program.

CE 5572. Acara Social Venture Launchpad: Ideas to Impact. (2.0 cr. [max 4.0 cr.]; A-F only; prereq #; spring, every year) Project-based Acara entrepreneurship course in which students refine existing venture solutions to social-environmental challenges. Students work on business model/develop effective pitch. Teams interact with entrepreneurs, investors/Acara staff.

CE 5573. Design for Sustainable Development: Create II. (1.0-5.0 cr. [max 10.0 cr.]; S-N only; spring, every year) Weekly discussion on social or environmental venture.

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Classical Civilization (CLCV)

College of Liberal Arts

CLCV 3711. Classics of Literary Criticism. (3.0 cr.; prereq 1 course in literature, 2nd course in literature or philosophy or #; fall, spring, every year) Principles of criticism as expounded and employed in major critical works by writers such as Plato, Aristotle, Horace, Longinus, Sir Philip Sidney, John Dryden, Samuel Johnson, David Hume, William Wordsworth, Samuel Taylor Coleridge, and T. S. Eliot.

CLCV 3950. Topics in Classical Civilization. (3.0-4.0 cr. [max 9.0 cr.]; fall, spring, every year) Topics specified in the Class Schedule.


CLCV 3994. Directed Research in Classical Civilization. (1.0-4.0 cr.; prereq #; fall, spring, every year) Directed Research in Classical Civilization.

CLCV 3996. Directed Instruction in Classical Civilization. (1.0-4.0 cr.; prereq #; fall, spring, every year) Directed Instruction in Classical Civilization.

Classical and Near Eastern Studies (CNES)

College of Liberal Arts


CNES 1002. World of Greece. (3.0 cr.; fall, spring, every year) Ancient Greek civilization, from second millennium BCE to Roman period. Art/archaeology, philosophy, science, literature, social/political institutions. Focuses on connections with contemporary cultures corresponding to Ancient Near East.

CNES 1003. World of Rome. (3.0 cr.; spring, every year) Roman civilization, from Etruscan origins to late antiquity. Cultural diversity of Mediterranean civilization. Ways of life, social, and political institutions as evidenced by literature, art, architecture, history, and material culture.

CNES 1042. Greek and Roman Mythology. (4.0 cr.; = [CNES 1042H]; fall, spring, summer, every year) Introduction to stories/study of Greek/Roman mythology.

CNES 1042H. Honors Course: Greek and Roman Mythology. (4.0 cr.; A-F only; = [CNES 1042]; prereq Honors or #; fall, spring, every year) Introduction to stories/study of Greek/Roman mythology.

CNES 1046. Technical Terminology for the Health Professions. (3.0 cr.; fall, spring, summer, offered periodically) Greek/Latin prefixes, suffixes, roots basic to vocabulary of health professions. Taught through computer-assisted instruction.

CNES 1082. Jesus in History. (3.0 cr.; fall, every year) Jesus of Nazareth in his original setting. Modern approaches to the historical Jesus. Perspectives/needs of early gospel writers, effects on portrayals of Jesus. Shifting representations of Jesus in new historical/cultural situations. Meets with Clas 1082.

CNES 1082H. Honors Course: Jesus in History. (4.0 cr.; A-F only; prereq Honors; fall, every year) Jesus of Nazareth in his original setting. Modern approaches to historical Jesus. Perspectives/needs of early gospel writers, effects on portrayals of Jesus. Shifting representations of Jesus in new historical/cultural situations. Meets with 1082.


CNES 1903. Freshman Seminar. (3.0 cr.; prereq Fr; fall, spring, offered periodically) Topics specified in Class Schedule.

CNES 1905. Freshman Seminar. (3.0 cr.; prereq Fr; spring, offered periodically) Topics specified in Class Schedule.

CNES 1909W. Freshman Seminar. (3.0 cr.; fall, spring, offered periodically) Topics specified in Class Schedule.

CNES 1910W. Freshman Seminar. (3.0 cr.; prereq Fr or up to 30 cr; fall, every year) Topics specified in Class Schedule.

CNES 3042. Myths, Legends, and Literature of the Ancient Near East and Egypt. (3.0 cr.; spring, even years) Poetry, dialogues, tales of gods/men from ancient Sumer, Akkad, Egypt, Anatolia, Levant. Themes of mortality/trascendence, cosmic/political power, subjectivity, doubt.

CNES 3070. Topics in Ancient Religion. (3.0 cr. [max 18.0 cr.]; = [RELA 3070]; fall, offered periodically) Study of a specific aspect of religion in Classical and Near Eastern antiquity such as healing cults, magic and divination, Gnosticism, or prophecy and authority. Topics specified in the Class Schedule.
CNES 3071. Greek and Hellenistic Religions. 
(3.0 cr.; =[CNES 3071, RELS 3071, RELS 5071]; fall, even years)
Greek religion from the Bronze Age to Hellenistic times. Sources include literature, art, and archaeology. Homer and Olympian deities, ritual performance, prayer/sacrifice, temple architecture, death and the afterlife, mystery cults, philosophical religion. Near Eastern salvation religions.

(3.0 cr.; =[RELS 3072]; fall, spring, offered periodically)

CNES 3073. Roman Religion and Early Christianity.
(3.0 cr.; spring, offered periodically)

(3.0 cr.; =[CNES 5076]; fall, spring, odd years)
How/what we can know about Paul. What his message was. How he was later understood by friends/foes.

CNES 3081W. Classical Epic in Translation.
(3.0 cr.; =CLCV 3081W, CNES 5081W); fall, spring, odd years)

CNES 3082W. Greek Tragedy in Translation.
(3.0 cr.; fall, spring, even years)

CNES 3083W. Ancient Comedy.
(3.0 cr.; fall, offered periodically)
Greek/Roman comic drama (e.g., Aristophanes, Menander, Plautus, Terence).

CNES 3101. Ancient Greece: Poet and Hero in the Age of Homer.
(3.0 cr.; spring, offered periodically)
Homer and his epic poetry. Trojan war. Greek lyric poets (Sappho, Pindar). Early Greek philosophy.

(3.0 cr.; fall, offered periodically)
Emergence of democracy in shadows of two brutal wars: one foreign, one civil. Democracy, war, empire through lens of tragedy, comedy, art from fifth-century Athens.

(3.0 cr.; spring, odd years)
Achievements of Alexander the Great, their effect on Greek-speaking world. Greek colonization of Egypt. Hellenistic art, literature, philosophy.

CNES 3104. Ancient Rome: Kings and Consuls.
(3.0 cr.; spring, odd years)
Roman Republic from origins to Caesar's death.

(3.0 cr.; fall, offered periodically)
The Roman Empire. "Silver Age" of Latin literature, rise of Christianity. Art/architecture.

CNES 3107. Age of Constantine the Great.
(3.0 cr.; fall, offered periodically)

CNES 3108. Age of St. Augustine of Hippo.
(3.0 cr.; spring, even years)
Cultural diversity A.D. 363 to circa 500 A.D. Replacement of Roman Empire in Western Europe by barbarian kingdoms, consolidation of Constantinople as capital in East. Literature, art, thought resulting from new dominance of Christianity, particularly Augustine of Hippo.

CNES 3109. The Age of Justinian and Muhammad (c.500-c.700 A.D.).
(3.0 cr.; =RELCS 3542); spring, offered periodically)
Uses sources written between 500 and 700 A.D. to consider history, art, religion, and architecture of Golden Age of Byzantium, superpower relations with Persian Empire. Way that Arab invasions from mid-7th century altered configuration of Mediterranean world and Near East.

CNES 3115. Midrash: Jewish Biblical Interpretation.
(3.0 cr.; =CNES 3115, JWST 3115, CNES 5115, RELS 5115, JWST 5115); fall, spring, offered periodically)
Jewish law as a mirror of society and as a way to actualize its value. Original socioreligious contexts and current applications. Biblical interpretations addressing moral, theological, legal, and literary problems.

CNES 3125. Art and Archaeology of Ancient Greece.
(3.0 cr.; =ARTH 3152); fall, spring, offered periodically)
Civilization of ancient Greece as revealed through art/ material culture. Case studies of selected monuments/sites.

CNES 3162. Roman Art and Archaeology.
(3.0 cr.; =ARTH 3162); fall, odd years)
Introduction to art and material culture of Roman world: origin, change, continuity. Progress/decay in later empire, its legacy to modern world.

CNES 3182. Egypt and Western Asia: Art and Archaeology of Ancient Egypt and Western Asia.
(3.0 cr.; =Spring, every year)
Art, architecture, and archaeology of Egypt, East Africa, Asia Minor, Mesopotamia, Iran, and Central Asia from the Neolithic through Late Antiquity (ca. 7,000 B.C.E.-650 C.E.). Relationship between the visual material and the social, intellectual, political, and religious contexts. Evolution of, and exchanges and differences among, the visual cultures of these time periods and regions.

CNES 3201. The Bible: Context and Interpretation.
(3.0 cr.; =JWST 1201, RELS 1201, CNES 1201, JWST 3201; prerequisite Knowledge of Hebrew not required; fall, spring, every year)

CNES 3202. Prophecy in Ancient Israel.
(3.0 cr.; =RELCS 3202, ANE 1002, JWST 3202; prerequisite 1201 or 3201 or RELS 1001; spring, even years)

CNES 3203. The Bible: Wisdom, Poetry, and Apocalyptic.
(3.0 cr.; =ANE 1003, RELS 3203, JWST 3203); fall, offered periodically)

CNES 3204. The Dead Sea Scrolls.
(3.0 cr.; =JWST 5204, JWST 3204, RELS 5204, RELS 5204, CNES 5204); spring, offered periodically)
Dead Sea Scrolls and Qumran. Contents of Dead Sea Scrolls, significance for understanding development of the Bible. Background of Judaism and Christianity. Archaeological site of Qumran.

CNES 3205. Women, Gender, and the Hebrew Bible.
(3.0 cr.; =RELCS 3205, JWST 3205); spring, even years)
How men, woman, gender, sexuality is portrayed in Hebrew Bible. Social/religious roles/status of women in ancient Israel. Reading biblical texts from academic point of view.

CNES 3206. Ancient Israel: From Conquest to Exile.
(3.0 cr.; =CNES 5502, JWST 3502, RELS 3502, HIST 3502); fall, offered periodically)
Israelite history in context of what is known from Egyptian, Canaanite, Mesopotamian sources. Issues raised by archaeological data related to Israelite conquest of Canaan.

CNES 3503. History and Development of Israelite Religion I.
(3.0 cr.; =CNES 5503, ANE 5503, ANE 3503); fall, offered periodically)

CNES 3535. Death and the Afterlife in the Ancient World.
(3.0 cr.; =CNES 5535, RELS 3535); fall, odd years)
Beliefs, attitudes, and behaviors related to death and the afterlife found in the cultures of the ancient Mediterranean and Near East. Literature, funerary art/epitaphs. Archaeological evidence for burial practices and care of dead.

CINES 3601. Sexuality and Gender in Ancient Greece and Rome. (3.0 cr.; = [CINES 5601]; spring, even years)
What we know (or think we know) about ancient Greek and Roman ideas about sexuality and gender roles. Evidence/methodologies by which it is analyzed.

CINES 3950. Aspects of Ancient Culture. (3.0 cr. [max 9.0 cr.]; fall, spring, every year)
Selected topics in the cultural history of antiquity (e.g., women in antiquity, Roman diplomacy, slavery, education). Topics specified in Class Schedule.

CINES 3951W. Major Project. (4.0 cr.; prereq Three 3000 ANE courses, [major in ANE or CNEA or RelS]; #; fall, spring, every year)
Research project pertaining to ancient world, using documents or primary sources along with secondary sources. Students select project in consultation with faculty member.

CINES 3993. Directed Studies. (1.0-4.0 cr.; [max 16.0 cr.]; prereq #; fall, spring, summer, every year)
Guided individual reading or study.

CINES 4051. Ancient Near East and Egypt: Neolithic to 1500 BCE. (3.0 cr.; A-F or Audit; = [HIST 4051]; prereq Previous coursework in ancient history recommended; )
Lands of Western Asia and Northeast Africa from Neolithic through Middle Bronze Age. Interdependent technological/political developments such as agriculture, state formation, and writing. Use of literature/art as vehicles for articulating concepts. Changing relationships among cultures/polities of ancient Near East and regions beyond.

CINES 4052. Ancient Near East and Egypt: 1500 to 323 BCE. (3.0 cr.; A-F or Audit; = [HIST 4052]; prereq 4051 or prev coursework in ancient history recommended; )
Lands of Western Asia and Northeast Africa from Late Bronze Age to death of Alexander in 323 BCE. Growth/decline of empires. Diplomatic relations and sociopolitical transformations among Late Bronze and Iron Age states. New military technologies. Developments in religion/theology.

CINES 5013. Introduction to Roman Law. (3.0 cr.; prereq Grad student or #; fall, spring, offered periodically)
Survey of Roman law from social and historical perspectives. Basic concepts of Roman private law and legal procedure.

CINES 5051. Before Herodotus: History and Historiography of Mesopotamia and the Ancient Near East. (3.0 cr.; A-F or Audit; = [HIST 5051]; prereq Previous coursework in Ancient Near Eastern history recommended; fall, spring, offered periodically)
Seminar. Historical method/sources for Ancient Near Eastern history. Historical tradition and historiographic texts of Mesopotamia and neighboring regions of Ancient Near East/their relationship to the works of classical historians such as Herodotus. Use of these sources in modern historiography of Ancient Near East.

CINES 5070. Topics in Ancient Religion. (3.0 cr. [max 18.0 cr.]; prereq Sr or grad student or #; fall, spring, offered periodically)
Specific aspect of religion in Classical and Near Eastern antiquity, such as healing cults, magic/divination, Gnosticism, or prophecy/authority. Topics specified in Class Schedule.

CINES 5071. Greek and Hellenistic Religions. (3.0 cr.; = [RELS 3071, CNES 3071, RELS 5071]; spring, offered periodically)

CINES 5072. The New Testament. (3.0 cr.; fall, spring, offered periodically)

CINES 5073. Roman Religion and Early Christianity. (3.0 cr.; spring, offered periodically)

CINES 5076. Apostle Paul: Life, Letters, and Legacy. (3.0 cr.; = [CNES 3076]; fall, spring, odd years)
How what we can know about Paul. What his message was. What he was fighting. How he was later understood by friends/foes.

CINES 5080. New Testament Prosemar. (3.0 cr. [max 18.0 cr.]; prereq 1082 or 3072 or equiv; fall, spring, offered periodically)
Study of some specific aspect of the New Testament and related literature. The class is organized as a discussion seminar. Topics specified in Class Schedule.

CINES 5083. Ancient Comedy. (3.0 cr.)
Greek/Roman comic drama (e.g., Aristophanes, Menander, Plautus, Terence).

CINES 5115. Midrash: Jewish Biblical Interpretation. (3.0 cr.; = [RELS 3115, JWST 3115, RELS 5115, CNES 3115, JWST 5115]; fall, spring, offered periodically)
Jewish law studies as mirror of society and as way to actualize its value. Original socioreligious contexts, current applications. Biblical interpretations addressing moral, theological, legal, and literary problems.

CINES 5185. Hellenistic and Iranian Asia: Art and Archaeology of Hellenistic, Scythian, Kushan, and Sogdian Asia. (3.0 cr.; fall, spring, every year)
Transformations of Greek architecture, sculpture, painting, mosaic, decorative arts beginning of eastern Mediterranean/ Hellenistic Asia. Art/archaeology of post-Hellenistic Iranian world. Religious, political, historical contexts of archaeological sites, monuments, art objects.

CINES 5188. Art and Archaeology of Early Christianity and the Late Roman Empire. (3.0 cr.; fall, spring, offered periodically)

CINES 5192. Persia and the Ancient Iranian World: Art and Archaeology of Achaemenid Persia and Sasanian Persia. (3.0 cr.; fall, spring, every year)
Art, archaeology of ancient Persia and the wider ancient Iranian world from the rise of the Achaemenid empire in 650 BCE to the advent of Islam in the seventh century CE.

CINES 5204. The Dead Sea Scrolls. (3.0 cr.; = [JWST 5204, JWST 3204, RELS 5204, CNES 3204]; fall, spring, offered periodically)
Introduction to Dead Sea Scrolls and Qumran. Content of Dead Sea Scrolls, significance for understanding development of the Bible. Background of Judaism and Christianity. Archaeological site of Qumran.

CINES 5502. Ancient Israel: From Conquest to Exile. (3.0 cr.; = [JWST 3502, RELS 5052, HIST 3502, CNES 3502]; prereq Knowledge of Hebrew not required; 5501 recommended; fall, offered periodically)
Israelite history in context of what is known from Egyptian, Canaanite, and Mesopotamian sources. Focuses on issues raised by archaeological data related to Israelite conquest of Canaan.

CINES 5503. History and Development of Israelite Religion I. (3.0 cr.; = [ANE 5503, CNES 5503, ANE 5503]; fall, offered periodically)

CINES 5513W. Scripture and Interpretation in Israelite Religion and Judaism. (3.0 cr.; A-F or Audit; = [JWST 5513W, RELS 5513W, CNES 5513]; prereq At least one upper level course (3xxx or higher) in academic biblical or religious studies; spring, even years)

CINES 5535. Death and the Afterlife in the Ancient World. (3.0 cr.; = [RELS 3535, CNES 3535]; fall, offered periodically)
Beliefs, attitudes, and behaviors related to death and afterlife found in cultures of ancient Mediterranean and Near East. Literature, funerary art/epitaphs. Archaeological evidence for burial practices and care of dead.

**CNS 5601. Sexuality and Gender in Ancient Greece and Rome.** (3.0 cr.; [CNS 3601]; spring, even years) What we know (or think we know) about ancient Greek/Roman ideas about sexuality and gender roles. Nature of evidence/methodologies by which it is analyzed.

**CNS 5713. Introduction to Ugaritic.** (3.0 cr.; prereq Adv Hebr, previous study of biblical texts or #) Ugaritic alphabetic cuneiform script, morphology, and syntax. Reading of representative samples of Ugaritic literature. Attention to linguistic and cultural issues and links to biblical and other Ancient Near Eastern texts.

**CNS 5786. Theorizing City and Space in the Mediterranean and Western Asia.** (3.0 cr.; spring, even years) Development of greatest cities of Eastern Mediterranean/Western Asia from age of Alexander to rise of Islam. Methodological/theoretical approaches to study of cities where as much evidence exists in texts as archaeological form.

**CNS 5794. Introduction to Classical and Near Eastern Studies.** (1.0 cr.; S-N or Audit; prereq grad major or minor or #; fall, every year) Introduction to core research materials and reference materials in the various disciplines which make up classical studies.

**CNS 5796. Classical Texts: Approaches and Methods.** (3.0 cr.; prereq CNS grad student or #; fall, odd years) Methods/approaches, from antiquity to present, for reading/interpreting Greek/Latin literary texts.

**CNS 5993. Directed Studies.** (1.0-4.0 cr.; max 12.0 cr.; fall, spring, summer, every year) Guided individual reading or study. Prereq-instr consent, dept consent, college consent.

**CNS 5994. Directed Research.** (1.0-12.0 cr.; fall, spring, every year) Guided individual research. Prereq-instr consent, dept consent, college consent.

**CNS 5996. Directed Instruction.** (1.0-12.0 cr.; fall, spring, every year) Guided individual research. Prereq-instr consent, dept consent, college consent.

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**Clinical Laboratory Science (CLS) Medical School**

**CLSP 4101. Diagnostic Microbiology I.** (2.0 cr.; A-F or Audit; prereq One microbiology course with lab, one biochem course, enrolled year 4 CLSP student, #; spring, every year) Overview of lab-aided diagnosis of bacterial, mycobacterial, viral, fungal, parasitic infectious diseases.

**CLSP 4102. Principles of Diagnostic Immunology.** (2.0 cr.; A-F or Audit; prereq One microbiology course with lab, one biochem course, enrolled year 4 CLSP student, #; fall, every year) Techniques used in laboratory diagnosis of infectious disease. Isolating/identifying bacteria/yeast. Antibacterial susceptibility testing. Lecture.

**CLSP 4103. Diagnostic Microbiology: Laboratory.** (2.0 cr.; A-F or Audit; prereq One microbiology course with lab, one biochem course, enrolled CLSP student, #; fall, every year) Techniques used in lab diagnosis of infectious disease. Isolating/identifying bacteria/yeast. Antimicrobial susceptibility testing. Lab.

**CLSP 4201. Hematology I.** (3.0 cr.; A-F or Audit; prereq Enrolled year 4 CLSP student, #; fall, every year) Theory/application of basic principles in clinical hematology. Lecture, lab.

**CLSP 4202. Hematology II.** (2.0 cr.; A-F or Audit; prereq [4201 or 5201], enrolled year 4 CLSP student, #; spring, every year) Fundamentals of examining blood/bone marrow. Emphasizes identification of normal, immature, abnormal cells. Correlation of clinical/lab findings. Lecture, lab.

**CLSP 4203. Hemostasis.** (1.0 cr.; A-F or Audit; prereq [4201 or 5201], enrolled year 4 CLSP student, #; spring, every year) Theory/application of concepts/techniques in hemostasis/coagulation. Lecture, Lab. Online course.

**CLSP 4263. Comparative Hemostasis.** (1.0 cr.; A-F or Audit; spring, every year)
Theory and application of specific concepts and techniques in hemostasis and coagulation.

CLSP 4301. Urinalysis. (1.0 cr.; A-F only; prereq Enrolled year 4 CLSP student; spring, every year)

Procedures for physical, chemical, microscopic examination of urine. Lecture, lab.

CLSP 4302. Clinical Chemistry I: Lecture and Lab. (3.0 cr.; A-F or Audit; prereq Two organic chem courses with lab, one biochem course, #; fall, every year)

Assessing renal/metabolic disease/dysfunction, electrolyte, and acid-base balance. Principles/processes for quality management in clinical lab. Lecture online only, lab.

CLSP 4304. Clinical Chemistry II: Lecture. (2.0 cr.; A-F or Audit; prereq [4302 or 5302], two organic chem courses with lab, one biochem course, spring, every year)

Principles/application of clinical chemistry. Correlation of clinical/lab findings.

CLSP 4305. Clinical Chemistry II: Laboratory. (2.0 cr.; A-F or Audit; prereq [4302 or 5302], two organic chem courses with lab, one biochem course, spring, every year)

Principles/application of lab procedures in clinical chemistry.

CLSP 4401. Immunology. (3.0 cr. [max 6.0 cr.]; A-F or Audit; prereq BIOC 3021, #; fall, every year)

Basic principles of human immune function, clinical applications, clinical techniques (including flow cytometry).

CLSP 4402. Molecular Diagnostics. (2.0 cr. [max 4.0 cr.]; A-F only; spring, every year)

Theory/application of molecular diagnostics in clinical lab. Lecture, lab.

CLSP 4501. Introduction to Transfusion Medicine. (2.0 cr.; A-F or Audit; spring, every year)

Principles of blood grouping, antibody identification, compatibility testing, donor testing for transfusion medicine.

CLSP 4511. Applied Diagnostic Microbiology. (2.0 cr.; S-N or Audit; prereq 4102, 4101 enrolled CLSP student, #; summer, every year)

Isolation, identification, and antimicrobial susceptibility testing of clinically significant microbes from patient specimens.

CLSP 4702. Applied Clinical Hematology/Hemostasis. (2.0 cr.; S-N or Audit; prereq 4201, 4202, 4203, enrolled CLSP student, #; fall, summer, every year)

Application of basic methods/techniques in clinical hematology, cellular morphology, and hemostasis.

CLSP 4703. Applied Clinical Chemistry and Urinalysis. (2.0 cr.; S-N or Audit; prereq 4301, 4302, 4304, 4305, enrolled CLSP student, #; fall, summer, every year)

Application of basic methods/techniques in clinical chemistry lab.

CLSP 4704. Applied Transfusion Medicine. (2.0 cr.; S-N or Audit; prereq 4501, 4502, enrolled CLSP student, #; fall, summer, every year)

Application of basic methods/techniques in transfusion medicine lab.

CLSP 4901. Special Laboratory Methods. (1.0-3.0 cr. ; prereq CLSP student, #; fall, spring, every year)

Individual assignment to special project in research lab or clinical lab.

Clinical Physiology and Movement Science (CPMS)

College of Education and Human Development

CPMS 5101. Introduction to Clinical Physiology and Movement Science. (3.0 cr. [max 6.0 cr.]; A-F or Audit; fall, offered periodically)

Overview of clinical physiology and clinical movement science. For students in such diverse fields as bioengineering, kinesiology, neuroscience, physical therapy, physiology, psychology, public health, occupational therapy.

CPMS 5201. Colloquium in Clinical Physiology and Movement Science. (1.0 cr. [max 4.0 cr.]; S-N or Audit; prereq Undergrad level in basic anatomy and physiology is highly recommended; fall, spring, every year)

Interdisciplinary course meets 1st and 3rd week of the month. Current research areas, scientific methods, and interpretation of results in the areas of clinical movement science and clinical physiology.

College of Food, Agri & Natural Resource Sciences (CFAN)

College of Food, Agricultural and Natural Resource Sciences

CFAN 1101. Dean's Engaged Leaders Seminar. (3.0 cr.; A-F only; prereq #; fall, every year)

Students explore their role in building inclusive community spaces. Development of leadership skills in academic, social, and public service contexts. Hands-on learning/real-world applications in culturally diverse communities. Field trips, guest speakers, and discussions.

CFAN 1201. Discovering Majors and Careers. (1.0 cr.; A-F only; spring, every year)

Five stages in the career discovery process: self-assessment, exploration, decision making, experiencing, and implementing. Determining next steps in academic/career process.

CFAN 1501. Biotechnology, People, and the Environment. (3.0 cr.; A-F or Audit; spring, every year)

Basic concepts in genetic engineering as a foundation for studying the impact of biotechnology on agriculture, medicine, industry, and the environment. Controversial aspects of biotechnology related to public policy issues are discussed.

CFAN 1901. Topics: Freshman Seminar. (1.0-3.0 cr.; A-F or Audit; prereq freshman; fall, spring, every year)

Interdisciplinary seminar. Topics specified in Class Schedule.

CFAN 1902. Topics: Freshman Seminar. (3.0 cr.; prereq freshman; fall, every year)

Interdisciplinary seminar. Topics specified in Class Schedule.

CFAN 1903. Topics: Freshman Seminar. (1.0-3.0 cr.; A-F or Audit; prereq freshman; fall, every year)

Interdisciplinary seminar. Topics specified in Class Schedule.

CFAN 1904. Topics: Freshman Seminar. (1.0-3.0 cr.; A-F or Audit; prereq freshman; fall, every year)

Interdisciplinary seminar. Topics specified in Class Schedule.

CFAN 1908W. Topics: Freshman Seminar. (3.0 cr.; A-F or Audit; prereq freshman; fall, every year)

Interdisciplinary seminar. Topics specified in Class Schedule.

CFAN 1910W. Freshman Seminar: Topics. (1.0-3.0 cr.; A-F only; prereq freshman; fall, spring, every year)

Interdisciplinary seminar. Topics specified in Class Schedule.

CFAN 2201. Secure & Succeed in Internships. (2.0 cr.; A-F only; prereq sophomore or junior; fall, spring, every year)

Identify skills, opportunities, interests, values related to internship. Network with potential employers. Apply to current openings/secure internship.

CFAN 3000. Directed Studies in International Agriculture. (2.0-4.0 cr. [max 8.0 cr.]; A-F or Audit; prereq #; fall, spring, summer, every year)

Oral presentations, discussion of students' research papers. Literature review of selected topics. Discussions with students/staff about their experiences in international agriculture.

CFAN 3000H. Honors Topics in CFANS. (2.0-4.0 cr. [max 8.0 cr.]; A-F or Audit; prereq Honors; fall, spring, summer, every year)

Oral presentations, discussion of students' research papers. Literature review of selected topics. Discussions with students/staff about their experiences in international agriculture.
CFAN 3001. Pests and Crop Protection. (3.0 cr.; A-F or Audit; prereq Biol 1009 or equiv or #; spring, every year) Introduction to biology/identification of insects, weeds, and diseases that affect agricultural crops. Management of these organisms based on principles of integrated pest management.

CFAN 3096. Making the Most of your Internship. (1.0 cr.; A-F only; prereq Secured internship; #; spring, summer, every year) Enhanced quality internship experience. Insight about self, world of work, individual learning styles. Communicate skills/learning.

CFAN 3100H. Honors Experience. (2.0-3.0 cr. [max 6.0 cr.]; A-F only; prereq #; fall, spring, summer, every year) Developed by student and CFANS faculty mentor. May include foreign study-travel, research, position or policy paper, or any experience demonstrating advanced study/service/understanding.

CFAN 3201. Career and Internship Preparation. (1.0 cr.; A-F only; prereq Soph or jr or sr grad student; fall, spring, every year) Self exploration, networking, industry research, job/internship search, resumes, cover letters, interviewing, salary negotiation, goal setting.

CFAN 3301. Grad & Prof School:Success Strategies for Prep/Admin. (1.0 cr.; fall, spring, every year) Intended for junior/senior of all majors with interests in career exploration/pursuit of either graduate or professional school education. Addresses needs of multicultural students, those from diverse backgrounds, those who may be first generation college students.

CFAN 3333. Insects, Microbes and Plants. (3.0 cr.; A-F only; fall, every year) Fundamental concepts of ecology/evolution to address challenges in managing insects/microbes. Grapple with real problems/debate current controversies.

CFAN 3480. Topics in CFANS. (1.0-4.0 cr. [max 8.0 cr.]; fall, spring, summer, every year) Lectures by visiting scholar or regular staff member. Topics specified in Class Schedule.

CFAN 3500. International Field Studies Seminar. (1.0-3.0 cr. [max 6.0 cr.]; A-F or Audit; prereq #; fall, spring, every year) Interface of agriculture with various natural resource, environmental, economic, food safety, public policy, ethical issues transcending national borders. Seminars take place in other countries or regions of world, providing global perspective. Active learning, lectures, discussion tutorials, field trips, reports, exams.

CFAN 3501. Costa Rica--Sustainable Development. (3.0 cr.; A-F or Audit; prereq #; spring, every year) Costa Rica's development strategy. Agriculture, tourism, energy, and urbanization show synergies and tension between economic, social, and environmental impacts. Sustainability and how organizations maximize benefits associated with sustainable development.

CFAN 3502. Bahamas--Tropical Marine Biology and Shark Ecology. (2.0 cr.; A-F or Audit; prereq #; spring, summer, every year) Ecology of sharks and natural history of South Bimini Island. Marine ecosystems. Local flora and fauna. Local culture and development policy on the ecosystems.

CFAN 3503. Switzerland--Mountain Agriculture. (3.0 cr.; A-F or Audit; prereq #; spring, summer, every year) Spring-time agriculture in a mountain ecosystem; management of farm enterprises to be productive in the context of Europe; how Switzerland has developed agri-tourism; interact with farmers, researchers, professionals and government officials who share expertise and interest in agricultural issues.

CFAN 3504. Vertebrate Research Design and Field Survey Techniques. (3.0 cr.; A-F or Audit; prereq #; spring, every year) Thai culture and conservation challenges. Two-day barge trip learning culture before traveling to Thailand's premier conservation research site. Camera-trapping techniques, prey assessment methods, and radio telemetry approaches to the study of large mammals.

CFAN 3505. French Language and Culture. (1.0 cr. [max 3.0 cr.; A-F or Audit; prereq #; spring, summer, every year) French language/way of life. Heritage of French culture.

CFAN 3508. Europe--Global Environmental Leadership. (3.0 cr.; A-F or Audit; prereq #; spring, summer, every year) Decision-making on critical issues within the European Union common policy frameworks. Lectures and field settings provide background, principles, and managerial approaches embedded in EU environmental law and policy. Constructed wetlands and lake restoration.

CFAN 3509. South Africa: One Country, Two Food Systems. (3.0 cr.; A-F or Audit; prereq #; spring, every year) Food systems in the central provinces of South Africa/how food is delivered to different groups. Transforming the agricultural sector to address food security. Approaches implemented since 1994: local production systems, education/land ownership for black farmers, new markets.

CFAN 3510. From Rainforest to Reef: Wildlife Medicine and Conservation in Belize. (3.0 cr.; A-F only; spring, every year) Introduction to key topics in wildlife medicine. Students will learn medical issues and approaches, the role of the veterinarian in wildlife conservation, zoo medicine, and wildlife rescue & rehabilitation. This program is held at the Belize Wildlife & Referral Clinic. A founder of the BWRC teaching facility with BWRC's founder and wildlife veterinarian, Dr. Isabelle Paquet-Durand. Labs include distance immobilization, suture, spay & neuter, necropsy, comparative anatomy, radiography, parasitology and blood analysis. Field visits are conducted with Dr. Isabelle to the Belize Zoo and to avian, reptile, primate, and manatee centers. Students are introduced to preventative medicine and common diseases for many of these species. A spay & neuter lab reviews theory and suture practice, this is followed by a spay & neuter clinic organized in the field or at BWRC. Students also have the opportunity to observe, and when possible, assist the BWRC veterinary staff during their daily operations.


CFAN 3513. The Natural History of Norway. (3.0 cr.; A-F only; spring, summer, every year) Students travel to the Nord Trøndelag region of central Norway. Physical geography, ecology, and management of natural resources, flora, and fauna. Region's rich culture/history and its close ties to Minnesota.

CFAN 3514. Machu Picchu: Biodiversity & Climate Change in Peru. (3.0 cr.; A-F only; summer, every year) Southeastern Peruvian Andes. Inca civilizations. Biodiversity assessment in headwaters of Amazon. What it means to be World Heritage Site.


CFAN 3840. Nepal: Language, Rural Society and Natural History. (4.0 cr.; A-F only; spring, every year) First course in 5 course (16 credit) semester series. Introduction to Nepali language/rural culture under guidance of Dr. Narayan Kaji Shrestha. Survey of biodiversity in lowlands of Nepal conducted by Dr. J.L. David Smith.

CFAN 3900. Topics in International Agriculture. (1.0-4.0 cr. [max 25.0 cr.]; A-F or Audit; prereq #; fall, spring, every year) International, on-site, classroom, and field-study of agricultural systems. Sites vary. Can include language study.

CFAN 4293. Directed Study. (1.0-5.0 cr. [max 15.0 cr.]; prereq #; fall, spring, every year) Study/project on topic of personal interest in consultation with faculty member. Initial proposal, reports of accomplishments.

CFAN 4801H. Honors Thesis. (3.0 cr.; A-F only; fall, spring, every year) Students work closely with a faculty member to develop and complete the honors thesis. Available to all CFANS majors. Prereq: Candidate for graduation with honors through CFANS in any major, college consent.

CFAN 5201. Career and Job Search Preparation for Graduate Students. (1.0 cr.; A-F or Audit; prereq #; spring, every year)
Freshman research or creative opportunity with faculty. Prereq: Available only to CLA freshmen receiving a CLA Research Opportunity.

CLA 1052. CLA Freshman Research.
(1.0-2.0 cr.; spring, every year)
Freshman research or creative opportunity with faculty. Prereq: Only available to CLA freshmen receiving a CLA Research Opportunity.

CLA 1200. Topics.
(1.0-5.0 cr.; fall, spring, offered periodically)
Topics specified in Class Schedule.

CLA 1301. SEAM First Year Seminar.
(2.0 cr.; A-F or Audit; prereq SEAM; fall, every year)
Exploration of issues related to students’ academic/career interests. Multiculturalism, other skills. Small-group discussions.

CLA 1302. SEAM First-Year Colloquium.
(2.0 cr.; A-F or Audit; prereq SEAM; fall, offered periodically)
Introduction to resources that enhance academic/professional interests. Focus on multiculturalism. Small group discussions led by professional staff, guest speakers.

CLA 1901. Topics: Freshman Seminar.
(1.0-4.0 cr.; A-F or Audit; prereq freshman; fall, odd years)
Interdisciplinary seminar. Topics specified in Class Schedule.

CLA 1902. Topics: Freshman Seminar.
(3.0 cr.; max 6.0 cr.; A-F or Audit; prereq: Freshman; fall, spring, offered periodically)
Topics specified in Class Schedule.

CLA 1903. Freshman Seminar.
(3.0 cr.; A-F or Audit; prereq: Freshman; fall, spring, offered periodically)
Interdisciplinary seminar. Topics specified in Class Schedule.

CLA 1904. Topics: Freshman Seminar.
(3.0 cr.; A-F or Audit; prereq Fr; fall, spring, offered periodically)
Freshman seminar. Topics specified in Class Schedule.

CLA 1905. Topics: Freshman Seminar.
(3.0 cr.; A-F or Audit; prereq: Freshman; fall, spring, offered periodically)
Freshman seminar. Topics specified in Class Schedule.

CLA 1906W. Topics: Freshman Seminar.
(1.0-4.0 cr.; A-F or Audit; prereq: Freshman; fall, spring, every year)
Interdisciplinary seminar. Topics specified in Class Schedule.

CLA 1907W. Topics: Freshman Seminar.
(1.0-4.0 cr.; A-F or Audit; prereq: Freshman; fall, spring, every year)
Interdisciplinary seminar. Topics specified in Class Schedule.

CLA 1908W. Topics: Freshman Seminar.
(3.0 cr.; A-F or Audit; prereq: Freshman; fall, spring, offered periodically)
Interdisciplinary seminar. Topics specified in Class Schedule.

CLA 1909W. Topics: Freshman Seminar.
(3.0 cr.; A-F or Audit; prereq Fr; fall, spring, every year)
Topics specified in Class Schedule.

CLA 1910W. Topics: Freshman Seminar.
(3.0 cr. [max 6.0 cr.]; A-F or Audit; prereq Freshman; fall, spring, offered periodically)
Topics specified in Class Schedule.

CLA 2005. Introduction to Liberal Education and Responsible Citizenship.
(3.0 cr.; A-F only; prereq 1005; spring, every year)

CLA 3500. Topics.
(1.0-4.0 cr.; max 8.0 cr.); fall, spring, every year)
Topics specified in Class Schedule.

CLA 3600. The Renaissance.
(3.0 cr.; [ARTH 3600, MEST 3600, FRIT 3600, HIST 3600]; spring, offered periodically)
Relationships between the visual arts, literature, science, philosophy, and politics in Europe from about 1300-1600. Works of artists, writers and intellectuals (e.g., Michelangelo Buonarotti, Niccolo Machiavelli, Michel de Montaigne), different artistic and literary forms (e.g., the portrait, the sonnet, the essay), and broad thematic issues that include the individual, antiquity, the state, and discovery. Team taught.

CLA 2005. Introduction to Liberal Education and Responsible Citizenship.
(3.0 cr.; A-F only; prereq Bachelor's degree in engineering; fall, spring, every year)
For engineering graduates who are preparing for the Engineer-In-Training examination, the first of two written exams required for registration as a professional engineer. Review of mathematics, chemistry, materials, statics, dynamics, strength of materials, thermodynamics, electric circuits, fluid mechanics, and engineering economics.

CSE 1001. First Year Experience.
(1.0 cr.; A-F only; prereq CSE, fr; fall, every year)
Resources and strategies for college success. Majors and career opportunities offered in the physical sciences, mathematics, and engineering. Personal responsibility, academic integrity, and level of academic rigor required for success. Personal action plan for achievement in CSE.

CSE 1001H. First Year Experience.
(1.0 cr.; A-F only; prereq CSE, fr, honors; fall, every year)
Resources and strategies for college success. Majors and career opportunities offered
in the physical sciences, mathematics, and engineering. Personal responsibility, academic integrity, and level of academic rigor required for success. Personal action plan for achievement in CSE.

CSE 1002. Project-based Inquiry. (1.0-2.0 cr.; A-F only; prereq 1001; spring, every year) Faculty-mentored project. Individual or team study that aligns with instructor's interests. Negotiation of deliverables/conduct of open-ended investigation into topic of interest to develop model, conduct experiment, or fabricate design. Presentation of results/findings.

CSE 1101. Environmental Issues and Solutions. (4.0 cr.; prereq High school chemistry or equiv, one yr high school algebra; fall, spring, every year) Importance of science in understanding/solving various environmental problems. Case studies. Laboratory exercises.


CSE 1411. Exploring Careers in Science and Engineering. (1.0 cr. [max 2.0 cr.]; A-F only; fall, spring, every year) Assess interests, values, skills, strengths, personality preferences to determine careers/work environments. Become familiar about fields in engineering, science, or other industries through informational interviewing/industry guest speakers. Techniques for gaining experience in chosen field.

CSE 1413. Preparing for Careers in Science and Engineering. (1.0 cr.; fall, spring, every year) Research companies, industries, careers related to major. Gain experience related to career objective. Discover resources for finding internships/full-time job opportunities. Gain interviewing skills. Develop resume/cover letter.

CSE 1511. Introduction to Engineering Design. (3.0 cr.; S-N only; fall, spring, summer, every year) History, career opportunities, portfolios, visualization, geometry, modeling, construction, analysis, documentation. Part of Project Lead the Way curriculum.

CSE 1512. Principles of Engineering. (3.0 cr.; S-N only; fall, spring, summer, every year) Communication/documentation, design process, engineering systems, strength of materials, testing, reliability, statics/dynamics. Part of Project Lead the Way curriculum.

CSE 1513. Digital Electronics. (3.0 cr.; S-N only; fall, spring, summer, every year) Fundamentals of digital electronics, number systems, gates, Boolean algebra, circuit design, adding, flip-flops, shift registers/counters, families/specifications, microprocessors, design topic. Part of Project Lead the Way curriculum.

CSE 1514. Computer Integrated Manufacturing. (3.0 cr.; S-N only; fall, spring, summer, every year) Computer modeling, rapid prototyping, CNC machining, precision measurements, CAM software, robotics, control systems, rationale for CIM, components of CIM systems. Part of Project Lead the Way curriculum.

CSE 1515. Overview of Civil Engineering and Architecture. (3.0 cr.; S-N only; fall, spring, summer, every year) Introduction to civil engineering and architecture, project planning, site planning, structural engineering, student presentations. Part of Project Lead the Way curriculum.

CSE 1901. Freshman Seminar, Environment. (1.0-3.0 cr. [max 4.0 cr.; A-F or Audit; prereq freshman; fall, spring, every year) Topics vary. See Class Schedule.

CSE 1904. Freshman Seminar: Global Perspective. (1.0-3.0 cr. [max 4.0 cr.; A-F or Audit; prereq freshman; spring, offered periodically) Topics vary. See Class Schedule.

CSE 1905. Freshman Seminar. (1.0 cr. [max 2.0 cr.]; A-F only; prereq freshman; fall, spring, every year) Topics vary. See class schedule.

CSE 1906. Freshman Seminar: Environment/Writing Intensive. (1.0-3.0 cr. [max 4.0 cr.; A-F or Audit; prereq freshman; fall, offered periodically) Topics vary. See Class Schedule.

CSE 1909W. Freshman Seminar, International Perspective/Writing Intensive. (1.0-3.0 cr. [max 4.0 cr.; A-F or Audit; prereq freshman; spring, offered periodically) Topics vary. See Class Schedule.

CSE 1910W. Freshman Seminar, Writing Intensive. (1.0-3.0 cr. [max 4.0 cr.; A-F or Audit; prereq FYFR; fall, spring, offered periodically) Topics vary. See Class Schedule.

CSE 2096. Field Study; Internship, Industrial Assignment. (1.0 cr. [max 2.0 cr.]; S-N only; fall, spring, every year) Provide students participating in academic-related experience, limiting ability to enroll for full-time status during semester, ability to maintain active student status with University.

CSE 4096. Field Study; Internship, Industrial Assignment. (1.0 cr. [max 2.0 cr.]; S-N only; fall, spring, summer, every year) Provide students participating in academic-related experience, limiting ability to enroll for full-time status during semester, ability to maintain active student status with University.

CSE 4101W. Communication Skills and Professional Practice. (3.0 cr.; A-F or Audit; prereq Upper div CSE or #; spring, offered periodically) Non-technical skills/topics important in engineering/scientific work environment. Group/team dynamics, intellectual property, running meetings, professional ethics, effective communication, negotiation. Emphasizes realistic work scenarios requiring public speaking, teamwork, and writing.

CSE 5101. Introduction to Engineering Design for Teachers. (3.0 cr.; Student Option No Audit; summer, every year) History, career opportunities, portfolios, visualization, geometry, modeling, construction, analysis, documentation. Part of Project Lead the Way curriculum. Prereq-college consent.

CSE 5102. Principles of Engineering for Teachers. (3.0 cr.; Student Option No Audit; summer, every year) Communication/documentation, design process, engineering systems, strength of materials, testing, reliability, statics/dynamics. Part of Project Lead the Way curriculum. Prereq-college consent.

CSE 5103. Digital Electronics for Teachers. (3.0 cr.; Student Option No Audit; summer, every year) Fundamentals of digital electronics, number systems, gates, Boolean algebra, circuit design, adding, flip-flops, shift registers/counters, families/specifications, microprocessors, design topic. Part of Project Lead the Way curriculum. Prereq-college consent.

CSE 5104. Civil Engineering and Architecture. (3.0 cr.; Student Option No Audit; summer, every year) Overview of civil engineering and architecture, their interrelationship/dependence on each other. Students use software to solve real world problems. Project/site planning. Project documentation/presentation. Part of Project Lead the Way. Prereq-college consent.

CSE 5105. Gateway to Technology. (3.0 cr.; Student Option No Audit; summer, every year) Activity-oriented middle school curriculum to help students in grades six-eight explore math, science, and technology. Five independent, nine-week units: design/modeling, automation/robotics, magic of electrons, science of technology, and flight/space. Prereq-college consent.

Communication Studies (COMM)  
College of Liberal Arts

COMM 1101. Introduction to Public Speaking. (3.0 cr.; [COMM 1101H, PSTL 1461; fall, spring, every year) Public communication processes, elements, and ethics. Criticism of and response to public discourse. Practice in individual speaking designed to encourage civic participation.

COMM 1101H. Honors: Introduction to Public Speaking. (3.0 cr.; A-F only; [PSTL 1461, COMM 1101]; prereq Honors; fall, spring, every year) Public communication processes, elements, and ethics. Criticism of and response to public discourse. Practice in individual speaking designed to encourage civic participation.

COMM 1313W. Analysis of Argument. (3.0 cr.; fall, spring, every year)
Strategies for analyzing, evaluating, generating arguments. Problems in listening/responding to argument.

COMM 1901. Freshman Seminar. (3.0 cr.; prereq Fr; fall, spring, every year)
Topics specified in Class Schedule.

COMM 1902. Freshman Seminar. (3.0 cr.; max 6.0 cr.; A-F or Audit; prereq freshman; fall, every year)
Freshman seminar. Topics specified in Class Schedule.

COMM 1904. Freshman Seminar. (3.0 cr.; max 6.0 cr.; A-F or Audit; prereq Fr; fall, every year)
Topics specified in Class Schedule.

COMM 1907W. Freshman Seminar. (3.0 cr.; max 6.0 cr.; A-F or Audit; prereq freshman; fall, every year)
Topics specified in Class Schedule.

COMM 1910W. Freshman Seminar. (3.0 cr.; max 6.0 cr.; A-F or Audit; prereq Fr; fall, every year)
Topics specified in Class Schedule.

COMM 1910H. Honors Topics in Communication Studies. (3.0 cr. [max 15.0 cr.]; =COMM 3110H; fall, spring, summer, every year)
Cases illustrating communication studies, theory, underlying issues.

COMM 3110H. Honors Topics in Communication Studies. (3.0 cr. [max 15.0 cr.]; A-F only; =COMM 3110; prereq Honors; fall, spring, summer, every year)
Cases illustrating communication studies, theory, underlying issues.

COMM 3190H. Honors Course: Research Seminar in Communication. (3.0 cr. [max 6.0 cr.; A-F only; prereq Honors candidate in comm. #; %; fall, spring, every year)
Students conduct original research in rhetoric, communication theory, or media for honors thesis. Theory, methods, research writing.

COMM 3201. Introduction to Electronic Media Production. (3.0-4.0 cr.; A-F or Audit; fall, spring, summer, every year)
Production/criticism of messages for electronic media. Theory/practice in planning, scripting, production, and criticism in various electronic media. Student productions in lab.

COMM 3202. Audio Production and Media Literacy. (3.0 cr.; prereq 3201, able to meet outside of designated course window; fall, every year)

COMM 3204. Advanced Electronic Media Production. (4.0 cr.; A-F or Audit; prereq 3201 or #; fall, spring, every year)
Video as communicative medium integrating visual/aural aesthetics. Creation of broadcast-quality production integrating message creation, audience analysis, argument development, and visual/audio scripting. Utilization of media aesthetics to develop/shape production content.

COMM 3211. Introduction to U.S. Electronic Media. (3.0 cr.; fall, spring, summer, every year)
Historical development and current issues in electronic media technologies and programming. Effects of governmental, industrial, and public organizations on message content. Problem areas of electronic media.

COMM 3231. Reality TV: History, Culture, and Economics. (3.0 cr.; spring, every year)
Social, visual, cultural, economic, historical, and ethical dimensions of reality television.

COMM 3263W. Media Literacy: Decoding Media Images and Messages. (3.0 cr.; fall, spring, summer, every year)

COMM 3401. Introduction to Communication Theory. (3.0 cr.; fall, spring, summer, every year)
Social scientific theory in human communication. Logic of scientific communication theories in interpersonal, small group, organizational, intercultural, and mediated communication.

COMM 3402. Introduction to Interpersonal Communication. (3.0 cr.; fall, spring, summer, every year)
Nature and function of communication between individuals in informal and informal relationships. Communicative interactions from theoretical and practical viewpoints.

COMM 3409. Nonverbal Communication. (3.0 cr.; fall, spring, summer, every year)
Nonverbal communication in interpersonal communication process. Nonverbal codes (touch, space, smell, eye contact) and their communicative functions (impression management, flirting, persuading, lying) in relational contexts (intimate relationships, friendships, work relationship). Theories, practices.

COMM 3411. Introduction to Small Group Communication. (3.0 cr.; fall, spring, summer, every year)
Cooperative thinking in task-oriented groups. Planning, preparing for, and participating in small groups in private and public contexts.

COMM 3422. Interviewing and Communication. (3.0 cr.; A-F or Audit; fall, spring, summer, every year)
Application of communication concepts in information interview. Planning, conducting, and evaluating informational, journalistic/elite, helping, persuasive, appraisal, and employment interviews. Class training, field experience.

COMM 3431. Persuasion Theories. (3.0 cr.; prereq Soph recommended; fall, spring, summer, every year)
Sociological, psychological, and communication perspectives. Theoretical knowledge applied to persuasion problems.

COMM 3441. Introduction to Organizational Communication. (3.0 cr.; fall, spring, summer, every year)
Functions of communication in work groups, in organizational hierarchies, and between organizations.

COMM 3451W. Intercultural Communication: Theory and Practice. (3.0 cr.; prereq Planning an intercultural experience; fall, spring, summer, every year)
Theories of and factors influencing intercultural communication. Development of effective intercultural communication skills.

COMM 3452W. Communication and the Intercultural Reentry. (3.0 cr.; prereq Return from an intercultural experience; fall, spring, every year)
Intercultural experience explored through stories and story telling, participant observation, and social scientific theory. Constructs include identity, learning styles, cultural adaptation, values, ethics.

COMM 3601. Introduction to Rhetorical Theory. (3.0 cr.; fall, spring, summer, every year)
Theoretical systems to explain/direct creation of public discourse. Traditional rhetoric to contemporary perspectives. Using theory to explain practice of public discourse.

COMM 3605W. Persuasive Speaking and Speech Writing. (3.0 cr.; prereq 1101, soph; fall, spring, summer, every year)
Performance/composition with critical inquiry into rhetoric theories. Writing, thinking, and speaking skills.

COMM 3615. Argumentation. (3.0 cr.; prereq Soph; fall, spring, summer, every year)
Argument(s) in relation to logic, dialectics, and rhetorical performance. Structured reasoning, informal conversation, familial arguments, debates in technical professions, communication ethics, and public/social argumentation.

COMM 3625. Communication Ethics. (3.0 cr.; A-F or Audit; fall, spring, every year)
Applying concepts/theories from philosophy and social science to ethical issues in interpersonal, group, organizational, intercultural, and media communication.
COMM 3631. Freedom of Speech. (3.0 cr.; fall, spring, summer, every year) Communication theories and principles that underlie the concept of freedom of speech in the United States. A variety of contexts and practices are examined in order to understand how communicative interaction should be described and, when necessary, appropriately regulated.

COMM 3635W. Famous Speeches. (3.0 cr.; A-F only; fall, every year) Speeches that became famous because of the occasion, issue, or speaker. Students analyze texts, research the issue's history and the speaker's biography/opposition, and evaluate the speech's artistry, ethical principles, effects on society, and contribution to history of ideas.

COMM 3645W. How Pictures Persuade. (3.0 cr.; A-F only; fall, every year) How words/pictures interact in graphic memoirs, political cartoons, and science to create/communicate meaning. How this interaction bears on public advocacy. Reading examples of comprehensive cognitive model of visual communication.

COMM 3676W. Communicating Terrorism. (3.0 cr.; fall, every year) Terrorism as an ethical and international problem. Different cultures' historical trajectories for terrorism. Contrasts between Algerian, Irish, and Arab terrorism.


COMM 3682W. Communicating War. (3.0 cr.; spring, every year) Claim: if ethics (right/wrong) exists in war, then right/wrong exist everywhere. Students experience this claim through its expression in various arts/humanities media of history, memoir, philosophical meditation, and film.

COMM 3970. Directed Study. (1.0-3.0 cr. [max 6.0 cr.]; fall, spring, summer, every year) Guided individual reading or study. Prereq-One Comm course, instr consent, dept consent, college consent.

COMM 3980. Directed Instruction. (3.0 cr. [max 6.0 cr.]; S-N or Audit; prereq #, %; fall, spring, summer, every year) Supervised planning/teaching of undergraduate courses.

COMM 3990. Research Practicum. (1.0-3.0 cr. [max 6.0 cr.]; fall, spring, every year) How communication research is designed, implemented, and published. Focus is on working with senior faculty on their current research projects.

COMM 3995W. Major Project. (1.0-3.0 cr.; S-N or Audit; prereq Comm major, #; fall, spring, summer, every year) Individualized instruction leading to completion of senior project.

COMM 4204. Producing for Television: Theory and Practice. (4.0 cr.; prereq 3201, 3204; fall, every year) Producing media content based on audience design, and story. Developing a thematic design. Evaluating and choosing a projected audience based on story concept and program bible. Each student completes a television program, including writing a script, preproduction planning, and considering crew and talent needs. Media producer responsibilities.


COMM 4235. Electronic Media and Ethnic Minorities—A World View. (3.0 cr.; fall, spring, summer, offered periodically) Representation and involvement of various ethnic groups (e.g., African-Americans, Native Americans in United States and Canada, Maori, Turks in Europe) in radio, TV, cable, Internet. Roles of government, industry, public organizations, and minority groups in regulating, managing, and financing ethnic media activities.

COMM 4245. Critical Television Studies. (3.0 cr.; prereq 3211; fall, offered periodically) Television as object of criticism, as cultural institution, and as omnipresent mode of commercialized popular culture. Aesthetics, semiotics, political economy, consumer culture/advertising, social representation, global television, televisuality, flow. Reception and everyday life.

COMM 4263. Feminist Media Studies. (3.0 cr.; A-F only; prereq 3211 or #; spring, every year) Issues, controversies, and practices of gender and their relationship to U.S. media. Ways in which gender is represented in and comes into play with media texts/institutions. Histories of feminism, theories/methods/political economy, case studies.

COMM 4291. New Telecommunication Media. (3.0 cr.; A-F or Audit; prereq 3211 or #) Development and current status of new telecommunication media such as cable TV, satellites, DBS, MDS, and video disk/cassettes. Technology, historical development, regulation, and programming of these media and their influence on individuals, organizations, and society.

COMM 4404W. Language Borderlands. (3.0 cr.; fall, every year) Effect of multilingualism on self identity/sense of community. Subjective/social dimensions of being multilingual. Experience of language loss.

COMM 4407. Communication and Conflict. (3.0 cr.; A-F or Audit; prereq 3401 or #; fall, every year) Aspects of conflict common across types of relationships. Theories as alternative lenses to illuminate aspects of conflict. Communication strategies to manage or resolve conflict.

COMM 4471. Communication in Marriage and Family. (3.0 cr.; prereq 3401 or 3402 or #; fall, spring, offered periodically) Contemporary theories of marriage/family communication using life-cycle approach. Role/function of communication in changing relational contexts. Ways of improving marriage/family relationships.

COMM 4602W. Contemporary Political Persuasion. (3.0 cr.; prereq 1101, 3431 or #) Contemporary political speech. Ideologies in political persuasion.

COMM 4616. African American Civil Rights Rhetoric. (3.0 cr.; prereq Jr; spring, every year) Uses the struggle of African Americans to explore and analyze philosophical concepts, political issues, moral complexities, and discursive characteristics of civil rights rhetoric.

COMM 4621W. Rhetoric of Feminism. (3.0 cr.; [GWSS 4621W]; fall, every year) History/criticism of rhetoric of feminism from 19th century to present.

COMM 5110. Special Topics in Communication Theory. (3.0 cr. [max 9.0 cr.]; fall, spring, summer, every year) Advanced theoretical problems. See department office for current offering.

COMM 5211. Critical Media Studies: Theory and Methods. (3.0 cr.; A-F only; prereq Grad student or #; spring, every year) Survey of theories, research methods, and scholars dominating critical media studies since late 1920s.


COMM 5221. Media, Race, and Identity. (3.0 cr.; prereq 3211, sr; #; fall, offered periodically) Critical media studies perspective on cultural politics of race and ethnicity. Social construction of race, politics of racism, media representations of race.

COMM 5231. Media Outlaws. (3.0 cr.; fall, even years) People working outside of mainstream media institutions who find creative/provocative ways to use media as space for cultural, political, or economic critique/resistance.

COMM 5250. Environmental Communication. (3.0 cr.; A-F only; spring, every year) Historical, cultural, material contexts within which environmental communication takes place. Understand environmental communication as well as develop communication strategies that lead to more sustainable social practices, institutions, systems.
COMM 5261. Political Economy of Media Culture. (3.0 cr.; prereq 3211 or #; fall, spring, every year) Organizational practices of media communicators. Media content as link between communicators and audiences. How viewers use/process media content.

COMM 5401. Advanced Theories of Communication. (3.0 cr.; prereq 3401 or grad; fall, fall, summer, every year) Survey of major theoretical approaches to communication including, positivism, constructivism, and systems.

COMM 5402. Advanced Interpersonal Communication. (3.0 cr.; prereq 3401 or 3402; spring, every year) Social scientific approaches to interpersonal communication. Theory, research findings.

COMM 5404. Language and Culture. (3.0 cr.; prereq 3401 or #; fall, spring, every year) How language/communication transmit cultural knowledge, attitudes, and beliefs. Connections among language, thought, and culture. Social/ethnic perspectives on study of language/communication.

COMM 5406. Communication and Gender. (3.0 cr.; =[GWSS 5300]; prereq One women's studies course, #; fall, spring, offered periodically) How gender affects verbal communication. Development of analytical skills through readings, exercises, research that raise awareness of the power of language and the influence of gender prescriptions. Comparisons across languages where possible.

COMM 5411. Small Group Communication Research. (3.0 cr.; = A-F or Audit; prereq 3411 or #; spring, every year) Survey of small group communication research; theory and practice. Group decision-making and leadership.

COMM 5421. Quantitative Methods in Communication Research. (3.0 cr.; = A-F or Audit; prereq 3401 or #; fall, every year) Social scientific methods used in studying human communication. Optional data processing laboratory for additional credit.

COMM 5431. The Process of Persuasion. (3.0 cr.; prereq 3431; fall, spring, every year) Communication campaigns (e.g., advertising, political) illustrating persuasive processes and theories. Research paper required.

COMM 5441. Communication in Human Organizations. (3.0 cr.; fall, spring, summer, every year) Communication in organizational settings. Organizational structure and dynamics and their effect upon the communication process. Individual projects.

COMM 5451W. Intercultural Communication Processes. (3.0 cr.; fall, offered periodically) Theory and research on cultural differences in values, norms, behaviors, and perceptions that affect communication across cultures internationally and domestically.

COMM 5615W. Introduction to Rhetorical Criticism. (3.0 cr.; prereq 1101; recommended; spring, every year) Analysis of public discourse using various theoretical perspectives.

COMM 5617. History and Criticism of U.S. Public Discourse: 1630-1865. (3.0 cr.; prereq Jr; fall, offered periodically) How discourse has been used to establish or maintain power. Speeches and public debates used to examine American public address from 17th century (e.g., Puritan sermons) to the Civil War.

COMM 5970. Directed Study. (1.0-3.0 cr. [max 6.0 cr.]; S-N or Audit; fall, spring, summer, every year) Guided individual reading or study. Prereq-Nine S-Xxx-5xxx Sphcr or instr consent, dept consent, college consent.

COMM 5994. Communication Research Practicum. (1.0-3.0 cr. [max 9.0 cr.]; S-N or Audit; #; fall, spring, every year) Students participate in research group.

Comparative Literature (CL) College of Liberal Arts

CL 5331. Discourse of the Novel. (3.0 cr.; =[CL 5331]; fall, offered periodically) Comparative study of the novel (eighteenth century to present): its relation to ordinary language practices, emergent reading publics, technologies of cultural dissemination, problems of subjectivity; its role in articulating international cultural relations.

CL 5555. Introduction to Semiotics. (3.0 cr.; =[CL 5555, CLSD 5555]; spring, offered periodically) Problems of the nature of the sign; sign function; sign production; signifying systems as articulated in philosophy, linguistics, anthropology, psychoanalysis, and art theory. Applying semiotics to various signifying practices (e.g., literature, cinema, daily life).

CL 5910. Topics in Comparative Literature. (3.0-4.0 cr. [max 32.0 cr.]; fall, spring, every year) Topics specified in Class Schedule.

CL 5992. Directed Reading in Comparative Literature. (1.0-3.0 cr. [max 9.0 cr.]; #; fall, spring, every year) Guided individual reading and study.

Comparative Studies in Discourse and Society (CSDS) College of Liberal Arts

CSDS 5555. Introduction to Semiotics. (3.0 cr.; =[CL 5555, CLSD 5555]; spring, offered periodically) Problems of the sign. Sign function/production. Signifying systems as articulated in philosophy, linguistics, anthropology, psychoanalysis, and art theory. Applying semiotics to various signifying practices (e.g., literature, cinema, daily life).

CSDS 5910. Topics in Comparative Studies in Discourse and Society. (3.0-4.0 cr. [max 32.0 cr.]; fall, spring, every year) Themes in comparative, sociohistorical analysis of discursive practices. Individually or team taught. Topics specified in Class Schedule.

CSDS 5993. Directed Study. (1.0-3.0 cr. [max 9.0 cr.]; #; fall, spring, every year) Guided individual reading and study.

Comparative and Molecular Biosciences (CMB) College of Veterinary Medicine

CMB 5200. Statistical Genetics and Genomics. (4.0 cr.; A-F or Audit; fall, every year) Statistical issues in genomics. Gene detection, including statistical analysis/designs for linkage study and for mapping quantitative trait loci. Linkage analysis using pedigree data for codominant/dominant markers. Using radiation hybrid mapping and single cell typing. Design issues in linkage analysis, parentage testing, and marker polymorphism.


CMB 5335. Molecular Biotechnology Laboratory for the Novice. (2.0 cr.; S-N only; summer, every year) Five day course. Understanding/applying basic concepts of biotechnology. Lectures, hands-on lab experiments.

CMB 5381. Pathogenesis of Infectious Zoonotic Diseases. (3.0 cr.; A-F only; prereq [Microbiology, biochemistry] courses or #; spring, every year) Introduction to mechanisms of transmission/pathogenesis for zoonotic infectious diseases. Lectures, review of current literature, student presentations, written reports.

CMB 5594. Directed Research in Comparative and Molecular Biosciences. (1.0-4.0 cr. [max 8.0 cr.]; prereq Jr or #; fall, spring, summer, every year) Independent study as determined by instructor. Usual activity includes conducting research in instructor's lab.


Computer Science (CSCI) College of Science and Engineering

CSCI 1001. Overview of Computer Science. (4.0 cr.; prereq Non-CSci major, non-CompE major, non-EE major; spring, every year)
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CSCI 1103. Introduction to Computer Programming in Java. (4.0 cr.; fall, every year)

CSCI 1113. Introduction to C/C++ Programming for Scientists and Engineers. (4.0 cr.; prereq Math 1271 or Math 1371 or Math 1571H or #; fall, spring, summer, every year)
Programming for scientists/engineers. C/C++ programming constructs, object-oriented programming, software development, fundamental numerical techniques. Exercises/examples from various scientific fields.

CSCI 1133H. Honors Introduction to Computing and Programming Concepts. (4.0 cr.; =CSCI 1133H; prereq &MATH 1271 or &MATH 1371 or &MATH 1571H or #; fall, spring, summer, every year)

CSCI 1133. Introduction to Computing and Programming Concepts. (4.0 cr.; =CSCI 1133; prereq &MATH 1271 or &MATH 1371 or &MATH 1571H; CSci majors, pre-majors in CSE/CLA, honors student; fall, every year)

CSCI 1913. Introduction to Algorithms, Data Structures, and Program Development. (4.0 cr.; prereq 1103 or 1113 or #; fall, spring, summer, every year)

CSCI 2011H. Honors Discrete Structures of Computer Science. (4.0 cr.; =CSCI 2011H; prereq [MATH 1271 or MATH 1371 or #]; fall, spring, every year)
Foundations of discrete mathematics. Sets, sequences, functions, big-O, propositional/predicate logic, proof methods, counting methods, recursion/reccurrences, relations, trees/graph fundamentals.

CSCI 2021. Machine Architecture and Organization. (4.0 cr.; prereq 1913 or 1933 or #; fall, spring, every year)
Introduction to hardware/software components of computer system. Data representation, boolean algebra, machine-level programs, instruction set architecture, processor organization, memory hierarchy, virtual memory, compiling, linking. Programming in C.

CSCI 2033. Elementary Computational Linear Algebra. (4.0 cr.; prereq [MATH 1271 or MATH 1371], [1113 or 1133 or knowledge of programming concepts]; fall, spring, every year)

CSCI 2041. Advanced Programming Principles. (4.0 cr.; prereq [1913 or 1933], 2011; fall, spring, every year)

CSCI 3003. Introduction to Computing in Biology. (3.0 cr.; prereq 1002H or Biol 1002 or 1009H or Biol 1009 or equiv or #; spring, every year)

CSCI 3081W. Program Design and Development. (4.0 cr.; =CSCI 4081W, CSCI 4089); prereq [1902, 2021] or #; fall, spring, every year)
Principles of programming design/analysis. Concepts in software development. Uses C/C++ language to illustrate key ideas in program design/development, data structures, debugging, files, I/O, state machines, testing, and coding standards.

CSCI 3921W. Social, Legal, and Ethical Issues in Computing. (3.0 cr.; prereq At least soph or #; fall, every year)
Impact of computers on society. Computer science perspective of ethical, legal, social, philosophical, political, and economic aspects of computing.

CSCI 3970. Industrial Student Co-op Assignment. (2.0 cr. [max 4.0 cr.]; S-N or Audit; prereq CSci, in co-op program, #; fall, spring, every year)
Industrial work assignment in a co-op program involving advanced computer technology. Reviewed by a faculty member. Grade based on final written report.

CSCI 3980. Undergraduate Colloquium. (1.0 cr. [max 2.0 cr.]; prereq Upper div CSci; can be repeated for cr; fall, spring, offered periodically)
Current computing trends and hot topics; industrial and career related topics; research topics; research projects and undergraduate research opportunities; graduate school options.

CSCI 4011. Formal Languages and Automata Theory. (4.0 cr.; prereq [1902, 2011] or #; fall, spring, every year)
Logical/mathematical foundations of computer science. Formal languages, their correspondence to machine models. Lexical analysis, string matching, parsing. Decidability, undecidability, limits of computability. Computational complexity.

CSCI 4041. Algorithms and Data Structures. (4.0 cr.; =CSCI 4041H; prereq [(1913 or 1933) and 2011] or #; cannot be taken for grad CSci cr; fall, spring, every year)
Rigorous analysis of algorithms/implementation. Algorithm analysis, sorting algorithms, binary trees, heaps, priority queues, heapsort, balanced binary search trees, AVL trees, hash tables and hashing, graphs, graph traversal, single source shortest path, minimum cost spanning trees.

CSCI 4041H. Algorithms and Data Structures. (4.0 cr.; =CSCI 4041H; prereq [(1913 or 1933) and 2011] or #; cannot be taken for grad CSci cr; fall, every year)
Rigorous analysis of algorithms/implementation. Algorithm analysis, sorting algorithms, binary trees, heaps, priority queues, heapsort, balanced binary search trees, AVL trees, hash tables/hashing, graphs, graph traversal, single source shortest path, minimum cost spanning trees.

CSCI 4061. Introduction to Operating Systems. (4.0 cr.; prereq 2021 or EE 2361; no cr for grads in CSci; fall, spring, every year)
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CSCI 4131. Internet Programming. (3.0 cr.; = [CSCI 5131]; prereq 4061, 4211 recommended, cannot be taken for grad CSci cr; fall, spring, every year) Issues in internet programming. Internet history, architecture/protocols, network programming, Web architecture. Client-server architectures and protocols. Client-side programming, server-side programming, dynamic HTML, Java programming, object-oriented architecture/design, distributed object computing, Web applications.

CSCI 4203. Computer Architecture. (4.0 cr.; = [EE 5361, EE 4363]; prereq 2021 or #; fall, spring, every year) Introduction to computer architecture. Aspects of computer systems, such as pipelining, memory hierarchy, and input/output systems. Performance metrics. Examines each component of a complicated computer system.

CSCI 4211. Introduction to Computer Networks. (3.0 cr.; = [CSCI 5211]; prereq 4061 or #; basic knowledge of [computer architecture, operating systems] recommended, cannot be taken for grad CSci cr; fall, spring, every year) Concepts, principles, protocols, and applications of computer networks. Layered network architectures, data link protocols, local area networks, routing, transport, network programming interfaces, networked applications. Examples from Ethernet, Token Ring, TCP/IP, HTTP, WWW.


CSCI 4707. Practice of Database Systems. (3.0 cr.; = [CSCI 5707, INET 4707]; prereq 4041 or #; fall, spring, every year) Concepts, conceptual data models, case studies, common data manipulation languages, logical data models, database design, facilities for database security/integrity, applications.

CSCI 4921. History of Computing. (3.0 cr.; = [HSCI 4321]; fall, even years) Developments in last 150 years; evolution of hardware and software; growth of computer and semiconductor industries and their relation to other businesses; changing relationships resulting from new data-gathering and analysis techniques; automation; social and ethical issues.

CSCI 4950. Senior Software Project. (3.0 cr. [max 6.0 cr.]; A-F only; prereq Upper div CSci, #; fall, spring, every year) Student teams develop a software system, distribute system to users, and extend, maintain it in response to their needs. Software engineering techniques. Software development team participation, leadership.

CSCI 4970W. Advanced Project Laboratory. (3.0 cr. [max 9.0 cr.]; prereq Upper div CSci, 4061, #; cannot be taken for grad cr; fall, spring, every year) Formulate and solve open-ended project: design, implement, interface, document, test. Team work strongly encouraged. Arranged with CSci faculty.

CSCI 4980. Special Topics in Computer Science for Undergraduates. (1.0-3.0 cr. [max 9.0 cr.]; A-F or Audit; prereq Undergrad, #; no cr for grads in [CSci or CompE]; fall, spring, offered periodically) Lectures and informal discussions on current topics in computer science.

CSCI 4994H. Honors Thesis. (1.0-3.0 cr. [max 6.0 cr.]; A-F; spring only; #; spring, summer, every year) Research work for an honors thesis arranged with a CS faculty member who is the adviser or coadviser.

CSCI 5103. Operating Systems. (3.0 cr.; prereq 4061 or #; fall, every year) Conceptual foundation of operating system designs and implementations. Relationships between operating system structures and machine architectures. UNIX implementation mechanisms as examples.

CSCI 5105. Introduction to Distributed Systems. (3.0 cr.; prereq 5103 or equiv or #; spring, offered periodically) Distributed system design and implementation. Distributed communication and synchronization, data replication and consistency, distributed file systems, fault tolerance, and distributed scheduling.

CSCI 5106. Programming Languages. (3.0 cr.; prereq 4011 or #; fall, every year) Design and implementation of high-level languages. Course has two parts: (1) language design principles, concepts, constructs; (2) language paradigms, applications. Note: course does not teach how to program in specific languages.

CSCI 5115. User Interface Design, Implementation and Evaluation. (3.0 cr.; prereq 4041 or #; fall, every year) Theory, design, programming, and evaluation of interactive application interfaces. Human capabilities and limitations, interface design and engineering, prototyping and interface construction, interface evaluation, and topics such as data visualization and World Wide Web. Course is built around a group project.

CSCI 5117. Developing the Interactive Web. (3.0 cr.; prereq 4131 or 5131 or #; upper div or grad in CSci recommended; spring, odd years) Hands-on design experience using modern web development tools. Students work in teams to develop software programs using each of four toolkits. Analyze developments in forum posts and classroom discussions.

CSCI 5125. Collaborative and Social Computing. (3.0 cr.; prereq 5115 or #; spring, odd years) Introduction to computer-supported cooperative work, social computing. Technology, research methods, theory, case studies of group computing systems. Readings, hands-on experience.

CSCI 5143. Real-Time and Embedded Systems. (3.0 cr.; #; offered periodically) Real-time systems that require timely response by computer to external stimulus. Embedded systems in which computer is part of machine. Increasing importance of these systems in commercial products. How to control robots and video game consoles. Lecture, informal lab.

CSCI 5161. Introduction to Compilers. (3.0 cr.; A-F only; prereq 4061 or #; experience with C language; spring, offered periodically) Techniques for translating modern programming languages to intermediate forms or machine-executable instructions/their organization into compiler. Lexical analysis, syntax analysis, semantic analysis, data flow analysis, code generation. Compiler project for prototypical language.

CSCI 5204. Advanced Computer Architecture. (3.0 cr.; = [EE 5364]; prereq 4203 or EE 4363; fall, every year) Instruction set architecture, processor microarchitecture, memory, I/O systems. Interactions between computer software and hardware. Methodologies of computer design.

CSCI 5211. Data Communications and Computer Networks. (3.0 cr.; = [CSCI 4211]; prereq 4061 or #; basic knowledge of [computer architecture, operating systems, probability], grad student; fall, every year) Concepts, principles, protocols, and applications of computer networks. Layered network architectures, data link protocols, local area networks, network layer/routing protocols, transport, congestion/flow control, emerging high-speed networks, network programming interfaces, networked applications. Case studies using Ethernet, Token Ring, FDDI, TCP/IP, ATM, Email, HTTP, and WWW.

CSCI 5221. Foundations of Advanced Networking. (3.0 cr.; prereq 4211 or 5211 or #; offered periodically) Intro course in computer networks recommended; spring, odd years) Design principles, protocol mechanisms. Network algorithms, implementation techniques. Advanced network architectures, state-of-art/emerging networking technologies/applications, network modeling. Simulation, experiments.
CSCI 5231. Wireless and Sensor Networks. (3.0 cr.; prereq 4211 or 5211 or #; spring, even years) Enabling technologies, including hardware, embedded operating systems, programming environment, communication, networking, and middleware services. Hands-on experience in programming tiny communication devices.

CSCI 5271. Introduction to Computer Security. (3.0 cr.; prereq 4061 or equiv or #; fall, every year) Concepts of computer, network, and information security. Risk analysis, authentication, access control, security evaluation, audit trails, cryptography, network/database/application security, viruses, firewalls.

CSCI 5302. Analysis of Numerical Algorithms. (3.0 cr.; prereq 2031 or 2033 or #; spring, every year) Additional topics in numerical analysis. Interpolation, approximation, extrapolation, numerical integration/differentiation, numerical solutions of ordinary differential equations. Introduction to optimization techniques.


CSCI 5461. Functional Genomics, Systems Biology, and Bioinformatics. (3.0 cr.; prereq 3003 or 4041 or #; spring, every year) Computational methods for analyzing, integrating, and deriving predictions from genomic/proteomic data. Analyzing gene expression, proteomic data, and protein-protein interaction networks. Protein/gene function prediction, integrating diverse data, visualizing genomic datasets.

CSCI 5471. Modern Cryptography. (3.0 cr.; prereq [2011, 4041, [familiarity with number theory or finite fields]] or #; fall, spring, offered periodically) Introduction to cryptography. Theoretical foundations, practical applications. Threats, attacks, and countermeasures, including cryptosystems and cryptographic protocols. Secure systems/networks. History of cryptography, encryption (conventional, public key), digital signatures, hash functions, message authentication codes, identification, authentication, applications.


CSCI 5512. Artificial Intelligence II. (3.0 cr.; =CSCI 5512W; prereq [STAT 3021, 4041] or #; spring, every year) Uncertainty in artificial intelligence. Probability as a model of uncertainty, methods for reasoning/learning under uncertainty, utility theory, decision-theoretic methods.


CSCI 5523. Introduction to Data Mining. (3.0 cr.; prereq 4041 or equiv or #; fall, spring, offered periodically) Data pre-processing techniques, data types, similarity measures, data visualization/exploration. Predictive models (e.g., decision trees, SVM, Bayes, K-nearest neighbors, bagging, boosting). Model evaluation techniques, Clustering (hierarchical, partitional, density-based), association analysis, anomaly detection. Case studies from areas such as earth science, the Web, network intrusion, and genomics. Hands-on projects.

CSCI 5525. Machine Learning. (3.0 cr.; prereq Grad student or #; fall, even years) Models of learning. Supervised algorithms such as perceptrons, logistic regression, and large margin methods (SVMs, boosting). Hypothesis evaluation. Learning theory. Online algorithms such as winnow and weighted majority. Unsupervised algorithms, dimensionality reduction, spectral methods. Graphical models.

CSCI 5551. Introduction to Intelligent Robotic Systems. (3.0 cr.; prereq 2031 or 2033 or #; fall, offered periodically) Transformations, kinematics/inverse kinematics, dynamics, control. Sensing (robot vision, force control, tactile sensing), applications of sensor-based robot control, robot programming, mobile robotics, microrobotics.


CSCI 5561. Computer Vision. (3.0 cr.; prereq 5511 or #; spring, every year) Issues in perspective transformations, edge detection, image filtering, image segmentation, and feature tracking. Complex problems in shape recovery, stereo, active vision, autonomous navigation, shadows, and physics-based vision. Applications.


CSCI 5609. Visualization. (3.0 cr.; prereq [1913, 4041] or equiv or #; fall, even years) Fundamental theory/practice in data visualization. Programming applications. Perceptual issues in effective data representation, multivariate visualization, information visualization, vector field/volume visualization.

CSCI 5611. Animation & Planning in Games. (3.0 cr.; prereq 4041 or 4611 or #; fall, odd years) Theory behind algorithms used to bring virtual worlds to life. Computer animation topics. Real-time, interactive techniques used in modern games. Physically-based animation, motion
planning, character animation, simulation in virtual worlds.

CSCI 5619. Virtual Reality and 3D Interaction. (3.0 cr.; prereq 4611 or 5607 or 5115 or equiv or #; spring, even years) Introduction to software, technology/applications in virtual/augmented reality, 3D user interaction. Overview of current research. Hands-on projects.

CSCI 5707. Principles of Database Systems. (3.0 cr.; [INET 4707, CSCI 4707]; prereq [4041 or #], grad student; fall, every year) Concepts, database architecture, alternative conceptual data models, foundations of data manipulation/analysis, logical data models, database designs, models of database security/integrity, current trends.


CSCI 5715. From GPS and Virtual Globes to Spatial Computing. (3.0 cr.; prereq Familiarity with Java, C++, or Python; spring, odd years) Mathematical concepts, geo-information, representations, algorithms, data-structures/access methods, analysis, architectures, interfaces, reasoning, time.

CSCI 5801. Software Engineering I. (3.0 cr.; prereq [1902, 2011] or #, fall, every year) Advanced introduction to software engineering. Software life cycle, development models, software requirements analysis, software design, coding, maintenance.

CSCI 5802. Software Engineering II. (3.0 cr.; prereq 5801 or #; spring, offered periodically) Introduction to software testing, software maturity models, cost specification models, bug estimation, software reliability models, software complexity, quality control, and experience report. Student groups specify, design, implement, and test partial software systems. Application of general software development methods and principles from 5801.

CSCI 5990. Special Topics in Computer Science. (1.0-3.0 cr. [max 9.0 cr.]; prereq #, may be repeated for cr; fall, spring, offered periodically) Lectures and informal discussions on current topics in computer science.

CSCI 5991. Independent Study. (1.0-3.0 cr. [max 9.0 cr.]; prereq #; may be repeated for cr; fall, spring, summer, every year) Independent study arranged with CS faculty member.

CSCI 5994. Directed Research. (1.0-3.0 cr. [max 9.0 cr.]; prereq #; may be repeated for cr; fall, spring, summer, every year) Directed research arranged with faculty member.

CSCI 5996. Curricular Practical Training. (1.0 cr. [max 3.0 cr.]; S-N or Audit; prereq [CSci or CompE] major, #, fall, spring, summer, every year) Industrial work assignment involving advanced computer technology. Reviewed by faculty member. Grade based on final report covering work assignment.

Construction Management (CMGT) College of Continuing Education

CMGT 2019. AutoCAD for Construction Managers. (2.0 cr.; prereq 30 sem cr; fall, spring, every year) Most current version of AutoCAD software skills and construction concepts. 2-D techniques and business applications of computer-aided drafting (CAD) at job entry level.

CMGT 2021. Facility Programming and Design. (2.0 cr.; A-F or Audit; fall, spring, every year) Role of planning/design in development of built environment. Case study, evaluating user's program. Sequential design iterations for refined solution presented to client as proposal, from perspective of facility manager. Stakeholder roles. Classroom, online, studio.


CMGT 3011. Construction Plan Reading. (2.0 cr.; fall, spring, summer, every year) Intro to construction plan reading and construction documents (using architectural, civil, mechanical, electrical drawings and project manual). Read, understand, and interpret commercial construction plans and project manuals, including notes, symbols, and plan layout.

CMGT 4011. Construction Documents and Contracts. (3.0 cr.; prereq 3001, 45 sem cr; fall, spring, every year) Definition, interpretation, and utilization of drawings. Specifications, agreements, bidding forms, general conditions. Bonds, contracts, subcontracts, and related documents. Appropriate provisions for minority business participation, such as tax exempst status and wage rates.


CMGT 4041W. Specifications and Technical Writing for Construction Professionals. (3.0 cr.; prereq 4011 or #; spring, every year) Develop/enhance appropriate oral/written communication necessary for use in the construction process from planning phase through contract closeout. Develop construction-specific practical applications to facilitate the process and avoid common pitfalls.

CMGT 4051. Construction Materials for Managers. (3.0 cr.; prereq 3001, [AEM 2011 or #]; spring, every year) Concepts of physical properties. Behavior mechanisms for construction materials such as concrete, aggregate, steel, and wood. Standard specifications for material properties. Lab techniques for evaluation of each material.


CMGT 4081. Managing Erosion and Sediment Control on Construction Sites. (1.0 cr.; A-F or Audit; prereq 3011 or related experience, summer, every year) Best management practices relating to supervision or direction of construction site operations. Grading, culvert replacement, bridge construction, incorporating permit requirements, sample specifications, Storm Water Pollution Prevention Plan (SWPPP). Management practices to reduce or control erosion/sedimentation.

CMGT 4193. Directed Study. (1.0-4.0 cr. [max 12.0 cr.]; prereq Admitted to CMgt major or minor or certificate; fall, spring, summer, every year) Independent project. Topic arranged with supervision by construction management faculty.

CMGT 4196. Construction Management Internship. (1.0-4.0 cr. [max 12.0 cr.]; S-
CMGT 4201. Construction Accounting. (2.0 cr.; A-F or Audit; prereq 3001, Acct 2050, ABUs 4101; fall, every year) Unique characteristics and dissimilarities crucial for all parties involved to understand/manage the construction process. Unique aspects of construction financial accounting, managerial accounting, tax planning, and auditing.

CMGT 4211. Facility Cost Accounting and Finance. (2.0 cr.; A-F or Audit; prereq ABUS 4101 or basic accounting/finance experience; fall, every year) Lease types. Determination of total annual facility costs. Students apply accounting concepts within real property/facilities context. How to interpret financial statements and create capital/operating budgets. Asset depreciation, capital planning, expense management. Financial terminology for presenting to Corporate Suite.

CMGT 4213. Facility Operations and Maintenance Intensive. (3.0 cr.; A-F or Audit; prereq 2021 or &2021, [3001 or &3001], [4011 or &4011], [4562 or &4562] recommended; fall, every year) Managing operation/maintenance of building systems and facility management department. Operation of mechanical, electrical, and plumbing systems. Critical spaces, fire/life safety systems, utilities. Maintenance for specific building systems. Technology/resources used to support building operations/maintenance.

CMGT 4215. Facility Quality Assessment and Commissioning. (2.0 cr.; A-F or Audit; prereq 3001, [4213 or &4213], 4542, 4562; spring, every year) How to assess condition/quality of building site, exterior/interior of facility, and building equipment. Evaluating effectiveness/efficiency of facility operations/maintenance program. What to look for during building audits. How to write professional assessment reports. How to make useful recommendations for improvements. Value/purpose of building commissioning/re-commissioning.

CMGT 4422. Advanced Construction Cost Estimating. (2.0 cr.; prereq CMGT 4022 or #; spring, every year) Advanced estimating concepts, including procurement, productivity, and value engineering. Working in teams, students develop and deliver a competitive bid for a real project and examine strategies to meet the owner's budget and expectations through value engineering approaches.

CMGT 4471. Sustainability for Construction Managers. (2.0 cr.; A-F or Audit; spring, every year) Hands-on work experiences in a construction company, applying coursework in the workplace, contributing knowledge of best practices, and participating in career development exercises.

CMGT 4472. Structural Frames and Building Design/Construction. (3.0 cr.; A-F or Audit; prereq 3001, [AEM 2011 or BP 3001 or BP 3101]; fall, every year) Basic contemporary structural systems in masonry, steel, and wood framing systems. Forms/performance of systems.


CSCL 1001. Introduction to Cultural Studies: Rhetoric, Power, Desire. (4.0 cr.; fall, spring, every year) Fundamental of film analysis and an introduction to the major theories of the cinema, presented through detailed interpretations of representative films from the international history of the cinema.

CSCL 1101. Literature. (4.0 cr.; fall, spring, every year) Introduction to literature across time, national boundaries. Basic genres, including poetry, novel, drama, historical/philosophical writing. Key questions: What is literature? What forms does it take? Why does literature matter?


CSCL 1301W. Reading Culture: Theory and Practice. (4.0 cr.; fall, spring, every year) Culture and cultural conflict. Reading cultural theory/texts such as film, literature, music, fashion, commercial art, and built environment.

CSCL 1401W. Reading Literature: Theory and Practice. (4.0 cr.; fall, spring, every year) Analyzing literary form. Introduction to literary criticism. Interpretation of works. Literature is meaningful? Emphasizes practice in reading a broad spectrum of world literature, literary theory.

CSCL 1501W. Reading History: Theory and Practice. (4.0 cr.; fall, spring, every year) What is history? How can we understand its meanings/uses? Emphasizes practice in reading cultural texts from various historical perspectives.

CSCL 1901. Introductory Seminars. (1.0-2.0 cr. [max 12.0 cr.]; A-F or Audit; Seminar. Timely issues/themes in construction management.

CSCL 1910W. Freshman Seminar. (3.0 cr. [max 6.0 cr.]; A-F or Audit; fall, every year) Topics specified in Class Schedule.

CSCL 1913W. Freshman Seminar. (3.0 cr. [max 6.0 cr.]; A-F or Audit; fall, every year) Topics specified in Class Schedule.

CSCL 1921W. Introduction to Film Study. (4.0 cr.; fall, spring, every year) Ways of reading texts, artistic forms, everyday practices that define ongoing conflicts over meaning, value, truth. Examples from visual arts, music, film, literature, myth, ritual, built environment.
CSCL 3115. Cinema and Ideology. (4.0 cr.; fall, spring, summer, every year)
The cinema as a social institution with emphasis on the complex relations it maintains with the ideological practices that define both the form and the content of its products. Specific films used to study how mass culture contributes to the process of shaping beliefs and identities of citizens.

CSCL 3172. Music as Discourse. (3.0 cr.; fall, spring, every year)
Close examination of widely varying musical forms and styles, "classical" and "popular," in relation to human subjectivity and configurations of culture, ideology, and power.

CSCL 3173W. The Rhetoric of Everyday Life. (3.0 cr.; fall, spring, every year)
How discourse reproduces consciousness and persuade us to accept that consciousness and the power supporting it. Literary language, advertising, electronic media; film, visual and musical arts, built environment and performance. Techniques for analyzing language, material culture, and performance.

CSCL 3174. Poetry as Cultural Critique. (3.0 cr.; =ENGL 3012; spring, offered periodically)
Examines the status of "poetry" in several cultures of the Americas bringing together techniques of close reading and broad cultural inquiry.

CSCL 3175. Comedy: Text and Theory. (3.0 cr.; fall, spring, every year)
Comedy as a discursive/political practice. Jokes, stand-up routines, plays, films, satire, and social ritual. Philosophical, literary, psychological, anthropological, feminist, and postmodern theory.

CSCL 3176. Oppositional Cinemas. (4.0 cr.; fall, spring, summer, every year)
The ways diverse national cinemas engage the international hegemony of Hollywood cinema. The cinematic struggle against cultural imperialism and the role of race, class, and gender in the domain of international cultural politics.

CSCL 3177. On Television. (4.0 cr.; fall, spring, every year)
Key debates in the history, theory, and criticism of television. Focuses on critical/creative "readings" of television's past/present forms. TV's influence on film, music, and digital media.

CSCL 3178W. Documentary Cinema: History and Politics. (4.0 cr.; fall, spring, offered periodically)
Documentary cinema from its emergence in 1920s to present. Complex power relations between filmmakers and their subjects. Political appropriations of the genre.

CSCL 3179. Reading Literary Movements. (3.0 cr.; fall, spring, every year)
Literary movements that emerge when group of writers puts forth new definition of literature. Literary movements created by scholars after the fact. Focuses on one or two related movements (e.g., surrealism, dadaism).

CSCL 3281. European Intellectual History: The Early Modern Period, Antiquity to 1750. (3.0 cr.; =CSCL 5281, HIST 3281, HIST 5281; fall, every year)
First of a two-semester course. European thought in its historical/cultural context. Emphasizes development of philosophical/scientific thought, its relation to thinking about the individual and the community. Readings from original sources.

CSCL 3282. European Intellectual History: The Modern Period, 1750-Present. (3.0 cr.; =HIST 5282, CSCL 5282, HIST 3282; spring, odd years)
Second of a two-semester course. European thought in its historical/cultural context. Emphasizes development of philosophical/scientific thought, its relation to thinking about the individual and the community. Readings from original sources.

CSCL 3212W. Theories of Culture. (3.0 cr.; fall, spring, every year)
Examination of three prevalent theoretical perspectives on culture -- philosophical, anthropological, and aesthetic -- as they converge in the work of writers who have contributed to our contemporary conception of cultural diversity.

CSCL 3331. Science and Culture. (3.0 cr.; spring, every year)
Science and technology engaged through historical and cultural manifestations from film, literature, and YouTube to scientific and philosophical essays. Relations among humanities, science, economics, politics, philosophy and history. Psychiatry and drugs, food and agriculture, sexuality, religion and science, climate change.

CSCL 3361. Visions of Nature: The Natural World and Political Thought. (3.0 cr.; =EEB 3361; spring, every year)
Scientific and cultural theory concerning the organization of nature, human nature, and their significance for development of ethics, religion, political/economic philosophy, civics, and environmentalism in Western/other civilizations.

CSCL 3413W. Psychoanalysis and Literature Part II: Post Freudian Criticism. (3.0 cr.; spring, every year)

CSCL 3456W. Sexuality and Culture. (3.0 cr.; fall, spring, summer, every year)

CSCL 3458W. The Body and the Politics of Representation. (3.0 cr.; fall, spring, every year)
Western representation of the human body, 1500 to present. Body's appearance as a site and sight for production of social and cultural difference (race, ethnicity, class, gender). Visual arts, literature, music, medical treatises, courtesy literature, erotica.

CSCL 3461. Monsters, Robots, Cyborgs. (3.0 cr.; fall, every year)
Historical/critical reading of figures (e.g., uncanny double, monstrous aberration, technological hybrid) in mythology, literature, and film, from classical epic to sci-fi, cyberpunk, and Web.

CSCL 3465. Aliens. (3.0 cr.; fall, spring, every year)
Do interactions with people from other countries affect fears, anxieties, and desires about beings from other worlds? In whose interests are "aliens" used? Novels, radio broadcasts, and films considered from perspectives of sociology, philosophy, psychology, literary criticism, and history.

CSCL 3472. Gay Men and Homophobia in American Culture. (3.0 cr.; fall, spring, every year)
The historical experience of gay men, the social construction of same-sex desire in American society since 1700, studied in a broad context of cultural history and discourse, including literature and the arts, journalism, science and medicine, religion, and law.

CSCL 3557W. Close Reading. (3.0 cr.; fall, spring, every year)
History/theory of "close reading" (i.e., the most intense encounter between reader and text) exemplified through critical texts. Students perform close readings of various texts.

CSCL 3621W. Colonial and Postcolonial Literatures and Theory: 1700 to the Present. (3.0 cr.; fall, spring, odd years)
Readings in colonial/postcolonial literatures/ theory from at least two world regions; Africa, the Americas, the Arab world, Asia, Europe, and the Pacific. Cultural/psychological dynamics and political economy of world under empire, decolonization, pre- vs. post-coloniality, globalization.

CSCL 3631. Jewish Writers and Rebels in German, Austrian, and American Culture. (3.0 cr.; =JWST 3631, GER 3631; prereq No knowledge of German required; cr toward major or minor requires reading in German; fall, offered periodically)
Literary/cultural modes of writing used by Jewish writers in Germany, Austria, and America to deal with problems of identity, anti-Semitism, and assimilation. Focus on 20th century. All readings (novels, poetry, stories) in English.

CSCL 3771. Basic Concepts of Literary Study. (3.0 cr.; fall, spring, every year)
Concepts used when carrying out work of reading/interpretation. How analysis works: aspects of distinction between text/context, other concepts. How to understand/justify literary interpretation. Course does not engage in the reading of literature.

CSCL 3910. Topics in Cultural Studies and Comparative Literature. (3.0 cr. [max 24.0 cr.]; fall, spring, summer, every year)
Topics specified in Class Schedule.

CSCL 3910H. Topics in Cultural Studies and Comparative Literature: Honors. (3.0 cr.; max 12.0 cr.); fall, spring, summer, every year) Topics specified in Class Schedule.

CSCL 3979. Issues in Cultural Pluralism. (3.0 cr.; fall, spring, summer, every year) Critical/religious basis for study of racial, ethnic, and cultural communities, primarily in the U.S. Perspectives on identity, citizenship, democracy, and power.

CSCL 3993. Directed Study. (1.0-3.0 cr.; fall, spring, every year) Guided individual reading or study. Prereq-instr consent, dept consent, college consent.

CSCL 4944H. Honors Thesis. (3.0 cr.; A-F only; prereq Candidate for honors in CSCL, consent of CSCL honors adviser; fall, spring, every year) Honors thesis.

CSCL 4993. Directed Study. (1.0-3.0 cr.; max 6.0 cr.; A-F or Audit; fall, spring, summer, every year) Guided individual study.

CSCL 5154W. Theoretical Constructions of Space. (3.0 cr.; spring, odd years) Inquiry into theories of space drawn from various disciplines including anthropology, architecture, geography, history, landscape design, philosophy, planning, and sociology. Focus on sociopolitical interests that are served and sustained; emphasis on opportunities and implications for personal identity.

CSCL 5256W. Suburbia. (3.0 cr.; fall, offered periodically) Suburbia from origins in 18th-century England to the present. Historical changes and present challenges, especially in America. Ideology, mythology, planning, development, geography, transportation, the family. Specific sites and designs, representations in film, television, popular literature, and music.

CSCL 5281. European Intellectual History: The Early Modern Period, Antiquity to 1750. (3.0 cr.; A-F or Audit; [HIST 3261, HIST 5281, CSCL 3281]; fall, offered periodically) First of a two-semester course. European thought in its historical/cultural context. Emphasizes development of philosophical/scientific thought, its relation to thinking about the individual and the community. Readings from original sources.

CSCL 5282. European Intellectual History: The Modern Period, 1750-Present. (3.0 cr.; A-F or Audit; [CSCL 3282, HIST 5282, HIST 3282]; spring, offered periodically) Second of a two-semester course. European thought in its historical/cultural context. Emphasizes development of philosophical/scientific thought, its relation to thinking about the individual and the community. Readings from original sources.

CSCL 5305. Vision and Visuality: An Intellectual History. (3.0 cr.; A-F only; fall, spring, offered periodically) Central role of vision/visuality in modernity. Modern age as scopic regime. Ways that ideas/ideologies of perception have shaped aesthetic experience within social existence.

CSCL 5331. Discourse of the Novel. (3.0 cr.; [CL 5331]; fall, offered periodically) Comparative study of the novel, 18th century to present. Its relations to ordinary language practices, emergent reading publics, technologies of cultural dissemination, problems of subjectivity, and its role in articulating international cultural relations.

CSCL 5411. Avant-Garde Cinema. (4.0 cr.; A-F or Audit; prereq 1921 or ARTH 1921W or equiv; fall, every year) History/theory of avant-garde cinema, from classical period (1920s) to post-WWII.

CSCL 5501. Origins of Cultural Studies. (3.0 cr.; fall, spring, offered periodically) Intellectual map of the creation of cultural studies as a unique approach to studying social meanings. Key figures and concepts, including nineteenth- and early twentieth century precursors.

CSCL 5555. Introduction to Semiotics. (3.0 cr.; [CL 5555, CSDS 5555]; spring, offered periodically) Problems of the nature of the sign; sign function; sign production; signifying systems as articulated in philosophy, linguistics, anthropology, psychoanalysis, and art theory. Application of semiotics to various signifying practices (literature, cinema, daily life).

CSCL 5666. Film Music: Theory, History, Practice. (4.0 cr.; A-F only; fall, spring, offered periodically) Role of music in American/European film from early 20th century silent cinema to near present. Narrative features, shorts, documentary, horror, thriller, science fiction, comedy, cartoon. Film music as social/cultural practice and as part of political economy within culture industry.

CSCL 5800. Translation Studies. (1.0 cr.; S-N only; prereq CSCL grad student; fall, spring, offered periodically) Techniques of reading/translating prose texts in fields of cultural studies/comparative literature. Attention to grammar, syntax, lexicon.

CSCL 5810H. Topics in Cultural Studies. (2.0-4.0 cr.; max 8.0 cr.; A-F only; prereq Honor student; fall, spring, every year) Topics on special subjects.

CSCL 5833. Marx, Freud, Nietzsche: Intellectual Foundations. (3.0 cr.; fall, spring, offered periodically) Three thinkers who defined modernity: Marx, Freud, and Nietzsche. Central tenets of their thought/terms associated with their theories. Their careers portrayed against the background of their times; their place in intellectual history.

CSCL 5910. Topics in Cultural Studies and Comparative Literature. (3.0-4.0 cr.; max 32.0 cr.); fall, spring, summer, every year) Topics specified in Class Schedule.

CSCL 5993. Directed Study. (1.0-3.0 cr.; max 9.0 cr.; fall, spring, summer, every year) Guided individual reading or study. Prereq-instr consent, dept consent, college consent.
CI 3001. Survey of Art Activities. (2.0 cr.; A-F or Audit; fall, spring, offered periodically) Introduction to pictorial expression, design, and the function of art in the social environment.

CI 3002. Introduction to Secondary Schools. (3.0 cr.; A-F only; fall, spring, every year) Culture of teaching, student learning, community contexts for learning, and societal influences on teaching/schools. Students visit different types of schools and volunteer in area schools or educational organizations.

CI 3211. Introduction to Elementary Teaching. (3.0 cr.; A-F only; prereq [Elementary education or early childhood education foundations major], concurrent practicum experience; fall, spring, every year) Classroom management, instructional planning, working with families in elementary classroom. Assigned readings, lectures, classroom activities, assignments.

CI 3212. Practicum: Elementary Teaching. (2.0 cr.; S-N only; prereq &EDPSY 5613, &EDPSY 5616, elementary education foundations major; fall, spring, every year) Field-based practicum. Students apply learning from their University courses to elementary school setting, connecting theory, research, and practice.

CI 3283. Practicum: Special Education K-6. (2.0 cr.; S-N only; prereq &EDPSY 5613, &EDPSY 5616, elementary education foundations major; fall, spring, every year) Field-based practicum. Students apply learning from their University course in elementary school setting, linking theory, research, and practice.

CI 3401W. Diversity in Children's Literature. (3.0 cr.; A-F or Audit; prereq Jr or sr or #; fall, spring, every year) Classic/contemporary books for children in all genres, created by authors/illustrators. Research in transactional theory. Cultural authenticity. Reading, discussion, group activities, interactive lectures, projects.

CI 3610. Linguistics for Teachers. (3.0 cr.; A-F only; fall, spring, every year) For pre-K-6 pre-service teachers. Introduction to linguistics. Linguistic terminology and how to apply methods of linguistic analysis to English, focusing on educational settings and classroom instruction.

CI 3611W. Basics in Teaching English as a Second Language. (4.0 cr.; Student Option No Audit; [SLS 3001]; prereq Have studied another language; fall, spring, every year) Writing intensive course that combines service learning internship with classroom lectures, discussions, group work, experiential activities. Prepares students for teaching ESL to adults in community programs.

CI 3612. Introduction to Pronunciation and Grammar for ESL Teachers. (4.0 cr.; Student Option No Audit; [SLS 3401]; prereq An Introduction to Linguistics course, e.g., CI 3610 or LING 3001; fall, spring, every year) Introduces English language analysis with key concepts/theories in English pronunciation system/grammar. Issues within each/explore way ESL textbooks/instructors can advance ESL learners' language proficiency in these areas.

CI 3613. Practical Language Learning for International Communication. (3.0 cr.; Student Option No Audit; [SLS 3501]; fall, spring, every year) Foundations of international/cross-cultural communication. Increased understanding of personal preferences/experiences in learning languages/using them in international communication. How these skills vary across individuals/contexts.

CI 3660. Special Topics in Second Languages and Cultures. (3.0 cr. [max 6.0 cr.]; fall, spring, summer, offered periodically) Topic specified in Class Schedule.

CI 4121. Culture Power and Education. (2.0 cr.; A-F only; fall, spring, every year) Manifestations of culture/power in education. How culture is mediating factor in educational achievement of students of color. Relationship between home/community, school cultures. Theories/research that show importance of integrating students' interests, knowledge, experience for increasing student engagement/achievement.

CI 4122. Social Class Education and Pedagogy. (2.0-3.0 cr.; A-F only; fall, spring, every year) Social, psychological, economic, political aspects of social class/poverty. Implications for education as social institution/classroom culture. How culture is mediating factor in educational achievement of students of color. Relationship between home/community, school cultures. Theories/research that show importance of integrating students' interests, knowledge, experience for increasing student engagement/achievement.

CI 4312. Sex, Drugs, and the Internet: Educational Perspectives. (3.0 cr.; A-F only; [CI 2311W]; fall, spring, summer, every year) Critical of values and ethical issues related to technology use in education, the workplace, and family and community life.

CI 4311W. Technology and Ethics in Society. (3.0 cr.; [CI 2311W]; fall, spring, summer, every year) Critical of values and ethical issues related to technology use in education, the workplace, and family and community life.

CI 5008. Theory and Practice of Teaching Art in Elementary Schools. (1.0-2.0 cr. [max 3.0 cr.]; A-F or Audit; fall, spring, every year) Art concepts, skills, processes appropriate for elementary school. Methods of art instruction. Children's production of/responses to art.

CI 5045. Advanced Contemporary Crafts. (2.0 cr.; A-F or Audit; fall, spring, summer, offered periodically) In-depth experiences in craft techniques, including ceramics, fibers, jewelry, and metal design, with emphasis on design analysis, understanding of materials, and mastery of processes.

CI 5049. Art Media Techniques. (1.0-4.0 cr.; A-F or Audit; summer, every year) Lectures, demonstrations, studio labs and critique session on creative processes; handling specific media. Topic varies.

CI 5050. Issues in Art Education. (1.0-4.0 cr. [max 12.0 cr.]; fall, summer, every year) Issues/trends, current practices, recent research.

CI 5055. Improving Art Programs in the Schools. (3.0 cr.; A-F or Audit; prereq Initial lic students majoring in art ed; fall, every year) Issues of art instruction, including teaching methods and evaluation, philosophical frameworks of pedagogy, and institutional issues concerning art programs in primary and secondary schools; social and cultural structures of schooling, practical issues of teaching art.
For teachers, administrators, and support staff working in elementary school programs. Focus on management of student behavior, instruction as it relates to student behavior, and teacher organizational tasks in the classroom.

CI 5136. History of the American Curriculum. (3.0 cr.; )
Survey of formation of public school subjects and curriculum theory in United States Social, political, and economic implications of curriculum theory.

CI 5137. Multicultural Gender-Fair Curriculum. (3.0 cr.; A-F or Audit; fall, spring, offered periodically)

CI 5138. Multicultural and Moral Perspectives on Classroom Instruction. (3.0 cr.; prereq MEd or PhD student; )
Factors leading to effective communication in ethnically diverse classroom, preschool to adult. Communication techniques and classroom structures that have cultural and moral implications.

CI 5141. Reflective Teaching and Professional Ethics. (3.0-4.0 cr.; )
Teaching license and one yr teaching exper; )
Students develop their professional identities as educators by considering their world views and values in relation to their professional role and responsibilities in the context of a diverse society. Encourages reflective practice and critical review of research.

CI 5145. Critical Pedagogy. (3.0 cr.; A-F or Audit; spring, every year)
Examination of critical pedagogy: critique of power relations regarding race, culture, class, gender, and age in various educational settings; consideration of improved practice in education for children, youth, and adults.

CI 5150. Curriculum Topics. (1.0-6.0 cr. [max 12.0 cr.]; fall, spring, summer, every year)
Special topics, current trends in curriculum. Subject integration, curriculum contexts, development, implementation, evaluation.

CI 5155. Contemporary Approaches to Curriculum: Instruction and Assessment. (3.0 cr.; A-F or Audit; prereq Grad students only; fall, spring, summer, every year)
Current research issues that cross disciplinary boundaries in curriculum development, instructional practices, and assessment methods. Interrelations among curriculum, instruction, and assessment within framework of constructivist learning theory. Individual classroom practices/theories.

CI 5156. Popular Culture, Teaching, and Learning. (3.0 cr.; A-F only; prereq Grad student or in a program that values teaching as a component of the discipline; fall, every year)
Approaches to the study of popular culture and education. Intersection between everyday life and broader historical contexts. Sporting events, toys, clothing, shopping malls, vampire mania, music festivals, video, and comics are the kinds of popular forms of culture we will engage as we develop teaching/learning strategies.

CI 5162. Peer Coaching for Teachers. (1.0-2.0 cr.; A-F or Audit; prereq Teaching experience or #; )
Teachers in classroom coaching teachers; acquiring concepts, skills, and dispositions necessary for observing classroom instruction and providing constructive feedback.

CI 5177. Practical Research. (3.0 cr.; A-F or Audit; prereq CI MEd student, or CI or EdPA Teacher Leadership MEd student; fall, spring, summer, every year)
Preparation for identifying a research and development topic, reviewing the existing knowledge on the topic, planning and carrying out a project, further investigating the topic, and writing a report on the project.

CI 5181. Clinical Experience in Elementary School Teaching. (2.0-10.0 cr. [max 30.0 cr.]; S-N or Audit; prereq Foundations of education and elem ed initial licensure only; fall, spring, summer, every year)
Students spend full days in the elementary classroom gradually assuming responsibility for teaching the class. Students prepare a portfolio based on criteria given. One seminar per week.

CI 5186. School-Related Projects. (1.0-4.0 cr.; A-F or Audit; prereq MEd student; fall, spring, summer, every year)
Research or evaluation project related to teaching, curriculum, or other aspect of schooling. Approved and supervised by faculty advisor.

CI 5187. Practicum: Improvement of Teaching in Elementary or PreKindergarten Schools. (2.0-3.0 cr.; S-N or Audit; prereq Students in [early childhood educ M Ed or elem educ M Ed or teaching M Ed]; fall, spring, summer, every year)
Elementary school classroom teaching project designed to improve specific teaching skills. Approved and directed by adviser.

CI 5190. Directed Individual Study in Curriculum and Instruction. (1.0-6.0 cr. [max 12.0 cr.]; prereq Grad student, #; fall, spring, summer, every year)

CI 5254. Kindergarten Methods. (2.0 cr.; A-F or Audit; prereq Foundations of Education/Elementary Education or M.Ed./JLP Elementary Education; fall, spring, summer, every year)
Purpose of kindergarten, its place in elementary program. Curriculum appropriate for needs of age group, including children with special needs. Assessment procedures, role of classroom teacher.

CI 5283. Practicum: Applying Instructional Methods in the Elementary Classroom. (3.0 cr. [max 6.0 cr.]; S-N only; prereq M.Ed./Elementary education initial licensure student, enrolled in elementary education methods course; fall, spring, every year)
Field-based practicum in elementary school setting. In-class discussions about application of classroom learning to school setting.

CI 5285. Clinical Experience in Elementary School Teaching. (12.0 cr. [max 24.0 cr.]; S-N only; prereq M.Ed./Elementary education initial licensure students; fall, spring, summer, every year)
Students spend full days in elementary classroom, gradually assuming responsibility for teaching, and prepare portfolio based on criteria given. One seminar per week.

CI 5286. Student Teaching Seminar: Elementary Education. (3.0 cr. [max 6.0 cr.]; A-F only; prereq M.Ed./Elementary education initial licensure only; fall, spring, every year)
Weekly seminar supplementing student teaching experience. Class discussions, sharing of artifacts from the classroom, reflections, and readings.

CI 5287. Capstone Project: Improvement of Teaching in Elementary and Pre-Kindergarten Schools. (3.0 cr.; A-F only; prereq M.Ed./elementary education initial licensure student; fall, spring, summer, every year)
Elementary school classroom teaching project to improve specific teaching skills. Approved/ directed by adviser.

CI 5300. Teaching Introductory Computer Concepts and Skills. (1.0-3.0 cr.; A-F or Audit; spring, every year)
Pedagogical strategies for teaching keyboarding and word processing.

CI 5301. Foundations of Computer Applications for Business and Education. (3.0 cr.; A-F only; fall, spring, summer, every year)
Instructional uses of computers/representative business, education, marketing applications. Word processing, databases, spreadsheets, graphic design. Expectations are for demonstrations of skills on apps/understanding of concepts that go beyond basic.

CI 5304. Data Management for Online Integration. (3.0 cr.; spring, every year)
Using database software to organize, manage, and display online data, to create content management systems, and to integrate into existing Web sites.

CI 5305. Integrated Computer Applications in Business and Marketing Education. (3.0 cr.; fall, spring, every year)
Case-based authentic business computing problems requiring integration of two or more application packages. Pedagogical issues of learning/teaching advanced computer applications.

CI 5321. Foundations of Distance Education. (3.0 cr.; A-F or Audit; summer, every year)

CI 5323. Online Learning Communities. (3.0 cr.; A-F or Audit; spring, every year)
Students design/research an online learning environment that promotes community. What community is, how it fosters learning in educational learning environments. Theories of distance learning instruction. Community models. Technological tools to develop online communities.

CI 5325. Designing and Developing Online Distance Learning. (3.0 cr.; A-F or Audit; prereq 5351 or 5362 recommended; fall, every year) Students research, use, and evaluate technologies for distance learning and design their own learning environments.

CI 5327. Designing Online Adventure Learning. (3.0 cr.; A-F or Audit; spring, every year) Designing, developing, and integrating adventure learning environments in K-16. Examples of effective adventure learning environments.

CI 5330. Special Topics in Learning Technologies. (1.0-3.0 cr. [max 12.0 cr.]; fall, summer, every year) Topics related to needs of in-service teachers. Topics, location, credits. Duration flexible.

CI 5331. Introduction to Learning Technologies. (3.0 cr.; fall, every year) Orientation to examination of various issues affecting use of technology. Students identify research topics for investigation in future courses and identify key literature in preparation for masters/masterual examinations.


CI 5347. Teaching Digital Writing: Blogs, Wikis, Online Talk, Podcasting, and E-Portfolios to Teach Writing. (3.0 cr.; A-F or Audit; =CI 5475); fall, every year) Uses of blogs, wikis, online discussion. Database search strategies. Multimodal integration of images, audio, video, text. Digital note-taking, mapping, storytelling. Audio production. Formatting/design techniques. Online evaluation. -portfolios.

CI 5351. Technology Tools for Educators. (3.0 cr.; A-F or Audit; fall, every year) Develop skills in using technology applications to support teaching and learning. Internet applications, presentation software, Web 2.0 technologies, and Web site development.

CI 5351. Technology Tools for Educators. (3.0 cr.; spring, every year) Implications/challenges in using Internet-based technologies in classroom. Pedagogical models.

CI 5352. Foundations of Interactive Design for Web-based Learning. (3.0 cr.; fall, every year) Processes of designing/developing interactive learning media and online applications from ground up. Focuses on usability/aesthetics in online learning.


CI 5365. Contemporary Software Development Issues and Tools. (3.0 cr.; prereq Familiar with standard computer/Internet operations; summer, every year) Software used in multimedia design/ development. Uses of the software, intricacies of interface, relevant programming principles. Introduction to developing multimedia applications.

CI 5367. Interactive Multimedia Instruction. (3.0 cr.; A-F or Audit; prereq Knowledge of principles and procedures of CBI design and one multimedia authoring system; spring, every year) Principles of effective computer-based design; tools in multimedia development; contemporary issues and skills used in the design, development, and implementation of interactive multimedia instruction. Use multimedia development tools, create a multimedia portfolio, and investigate the issues surrounding their effective use.

CI 5390. Learning Technologies Field Experiences. (2.0 cr.; S-N only; prereq Students in teachers of computers/keyboarding/related technology applications additional licensure program; fall, spring, every year) Field-based experience for students enrolled in computers, keyboards, and related technology applications classes. Apply learning from University courses to the K-12 school setting. In-class discussions about the application of classroom learning to the school setting.


CI 5402. Introduction to Special Collections. (3.0 cr.; A-F or Audit; prereq Children's lit course or #; fall, offered periodically) Uses Children's Literature Research Collection. Theory and practice in the teaching of reading. Study of manuscripts, original art, and letters.

CI 5403. Writing For and By Children. (3.0 cr.; A-F only; fall, every year) Aspects of writing/illustrating children's literature or children's own writing. May feature authors/illustrators of children's books.

CI 5404. Culturally Diverse Books for Children and Adolescents. (3.0 cr.; A-F or Audit; prereq MEd, MA, PhD student; fall, odd years) Reading of literature for children/adolescents about diverse cultures. Critique of literary quality and cultural depiction. Development of ways to use culturally diverse literature.

CI 5405. Middle School Language Arts Methods. (2.0 cr.; A-F only; prereq Elem ed licensure student; fall, odd years) Introduction to the unique needs of middle school students in the language arts classroom. Language arts content and pedagogical skills. Adolescent development/psychology. Field placement in a middle school language arts classroom.

CI 5410. Special Topics in the Teaching of Literacy. (1.0-3.0 cr. [max 12.0 cr.]; fall, summer, every year) Topics related specifically to the needs of in-service teachers. Topics, location, credits, and duration will be highly flexible.

CI 5411. Teaching Reading in the Elementary School. (3.0 cr.; A-F or Audit; fall, offered periodically) Aids the inservice elementary classroom teacher in the development of knowledge of theory and practice in the teaching of reading.

CI 5412. Reading Difficulties: Instruction and Assessment. (3.0 cr.; A-F or Audit; prereq 5411 or 5451; spring, offered periodically) Causes, diagnosis and assessment, prevention and correction; intervention practices useful to the classroom teacher and special teacher of reading.

CI 5413. Foundations of Reading. (3.0 cr.; A-F or Audit; prereq CI 3610 and concurrent registration with CI 5414; spring, offered periodically) Reading processes, development of readers. Assessment/tutoring of individual children in reading and other literacy practices.

CI 5414. Practicum: Working With Developing Readers. (2.0 cr.; S-N only; prereq CI 3610 and concurrent registration with CI 5413 required; elementary education foundations major; fall, spring, every year) Field-based practicum. Students apply learning from their University course to working with developing readers. Instructor provides specific assignment.

CI 5415. Literacy Development in the Primary Grades. (3.0 cr.; A-F or Audit; prereq Elem teaching exper or #; fall, every year) Theories/practice of integrated teaching of reading, literature, writing, and language in primary classroom settings. Uses national/state language arts standards and assessment protocols to examine primary literacy curricula.

CI 5417. Elementary Literacy Instruction for ESL Students. (3.0 cr.; A-F or Audit; prereq Bachelor's degree completed; fall, odd years) Teaching reading/writing in elementary grades to students from diverse languages. Second-language literacy development. Phonemic awareness, phonics, fluency, vocabulary, comprehension. Ways to connect students? background knowledge to literacy curriculum.
CI 5418. Whole Language Teaching and Learning in the Elementary School. (3.0 cr.; A-F or Audit; prereq MEd or grad student, minimum one yr of teaching exper.) Theory, research, and politics of whole language teaching. Applications for developing an elementary school whole language curriculum.

CI 5422. Teaching Writing in Schools. (3.0 cr.; A-F or Audit; fall, spring, offered periodically) Theory/practice of teaching writing in schools. How race, gender, and social class impact teaching/learning.


CI 5425. Reading Instruction in the Elementary Grades. (3.0 cr.; A-F only; prereq [Elementary or early childhood] licensure student; fall, spring, every year) Curricular/methodological issues in teaching of reading. Reading/orthographic processes, strategy instruction for word recognition/comprehension, authentic assessment strategies, and teaching diverse students.


CI 5431. Introduction to Instructional Leadership in K-12 Reading. (3.0 cr.; A-F or Audit; prereq Minnesota license valid for classroom teaching in pre-kindergarten, [adult basic education or grades kindergarten through 6 or 1 through 6 or 5 through 8 or 9 through 12 or kindergarten through 12]; summer, every year) K-12 curriculum in reading, major theories/ research that motivate curriculum. Major instructional principles, alignments needed, resources available.

CI 5432. Instructional Leadership in Reading in Kindergarten and the Elementary Grades. (3.0 cr.; A-F or Audit; prereq 5431; fall, every year) Research-based reading instruction for elementary grades. How to help other teachers improve practice. Characteristics of effective schools within context of improving students' reading achievement.

CI 5433. Instructional Leadership in Reading for the Middle and Secondary Grades. (3.0 cr.; A-F or Audit; prereq 5432; spring, every year) Curriculum/instruction for middle/secondary school students.

CI 5434. Professional Development and Evolving Practice in K-12 Reading. (3.0 cr.; A-F or Audit; prereq 5433; summer, every year) Developing e-portfolio to assess competence in standards for teaching K-12 reading. Evolving teaching practices. Applications of current technologies.

CI 5435. Instructional Leadership in Preventing Reading Difficulties. (3.0 cr.; A-F or Audit; prereq 5434; fall, every year) Research-based reading interventions for struggling readers. How to help other teachers improve their practice. Theory/research behind preventing reading difficulties. Principles/techniques for assessing reading difficulties and students' progress.


CI 5442. Literature for Adolescents. (3.0 cr.; A-F or Audit; fall, spring, offered periodically) Characteristics of literature written for adolescents; rationale for using adolescent literature; adolescents' reading interests and attitudes; analysis of quality and appeal; individualized reading programs; methods of promoting reading; multicultural literature; developing teaching activities.

CI 5451. Teaching Reading in Middle and Secondary Grades. (3.0 cr.; A-F or Audit; fall, every year) Methods of accommodating to students' abilities and facilitating reading in regular content classes.


CI 5463. Minnesota Writing Project Annual Invitational Summer Institute. (3.0 cr.; A-F only; prereq Licensed teacher or administrator or [space available, faculty letter of recommendation]; summer, every year) Workshop. Participants reflect on their own literacy processes, participate in a writing group, discuss current reading texts, and demonstrate best practices in classroom.

CI 5469. Minnesota Writing Project Directed Studies. (1.0-3.0 cr.; A-F only; prereq Teaching license, [CI 5463 or enrolled in the Certificate for Teaching Writing and Critical Literacy]; summer, every year) Directed study for teachers involved in MWP. Capstone course for those enrolled in the Certificate in Teaching Writing and Critical Literacy. Teachers investigate current theory and practice of literacy instruction. Ongoing cohort for those enrolled in the Certificate.

CI 5472. Teaching Film, Television, and Media Studies. (3.0 cr.; A-F or Audit; fall, spring, every year) Methods of teaching film, video, and media studies at the secondary and college level; methods for eliciting critical responses; analysis of film/video techniques; analysis of cultural representations and genre characteristics; connecting and comparing film/video and literature; studying documentary and television news; developing media studies units.

CI 5474. New Literacies Frameworks and Instruction: Digital Texts and Digital Reading. (3.0 cr.; A-F only; fall, every year) Read digital texts against backdrop of traditional print-based notions of reading, literacy, school curriculum/instruction. Assists education professionals in making school/district-wide decisions based on sound research on digital reading/new literacies.

CI 5475. Teaching Digital Writing: Blogs, Wikis, Online Talk, Podcasting, and E-Portfolios to Teach Writing. (3.0 cr.; A-F or Audit; [CI 5447]; fall, every year) Blogs, wikis, online discussion. Database searches. Integration of images, audio, video, text. Digital note-taking, mapping, storytelling. Online discussions, collaborative writing. Audio production. Formatting/design techniques. Online evaluation. E-portfolios.


CI 5482. Reading, Language Arts, and Literature: Intermediate. (3.0 cr.; A-F or Audit; prereq Elem ed initial licensure only; fall, spring, every year) Curricular and methodological issues of reading, language arts, and children's literature. Evaluating children's literature, response to literature, reading/writing processes, strategy instruction for word recognition/comprehension, authentic assessment strategies, teaching diverse students in upper elementary grades.

CI 5496. Directed Experiences in Teaching English. (8.0 cr.; S-N or Audit; prereq MEd/
initial licensure students in English ed only; fall, spring, every year)
Student teaching/clinical experience for English post-baccalaureate students only.

**CI 5502. Science Instruction in the Elementary Grades.** (3.0 cr.; A-F or Audit; prereq Early Childhood or Elementary Education ILP; fall, spring, every year)
Methods/materials for teaching science/health at elementary school level.

**CI 5504. Elementary School Science: Materials and Resources.** (3.0 cr.; prereq Elem tcgh expor or #; fall, every year)
Examination of the teacher's role in inquiry teaching; the current science curriculum; and resources for teaching science in the elementary school.

**CI 5505. Middle School Science Methods.** (2.0 cr.; A-F only; prereq Elem ed licensure student; fall, every year)

**CI 5530. Secondary Science Teaching: Laboratory-based Instruction.** (3.0 cr.; A-F only; prereq Science ed MEd ILP student; summer, every year)
Lab-based science teaching in secondary school setting. Research-based teaching strategies are modeled that address national-/state-level standards. How to use various inquiry-based instructional techniques/methods.

**CI 5531. Teaching Middle School Science.** (3.0 cr.; A-F or Audit; prereq Initial licensure student in Science ed; fall, every year)
Methods of planning/teaching science to middle school students.

**CI 5532. Teaching Secondary School Science.** (3.0 cr.; A-F or Audit; prereq Admission to initial licensure program in science; spring, every year)
Methods of planning/teaching science for secondary school students.

**CI 5533. Current Developments in Science Teaching.** (3.0 cr.; A-F or Audit; prereq [MEd, initial licensure, grad student] or #; summer, every year)
Using curriculum standards to design science courses.

**CI 5534. Studies in Science Education.** (3.0 cr.; A-F or Audit; prereq M.Ed., init lic, or #; fall, every year)
Improvement of science teaching through the application of research findings.

**CI 5535. Foundations of Science Education.** (3.0 cr.; A-F or Audit; prereq M.Ed., grad student, or #; spring, every year)
Analysis of present science teaching practices in light of historical and philosophical foundations of science education.

**CI 5536. Equity, Policy, and Assessment in Science Education.** (3.0 cr.; A-F only; prereq MEd or grad student or #; fall, every year)
Nature of equity, diversity, and policy matters that influence schools/teachers involved in science teaching and scientific literacy. Classroom presentations, discussions, readings in current research.

**CI 5537. Principles of Environmental Education.** (3.0 cr.; A-F or Audit; prereq Undergrad in NRES or M.Ed. or grad student in education or #; fall, every year)

**CI 5539. Improving Secondary Science Instruction: Surviving the First Two Years.** (3.0 cr.; A-F only; prereq MEd science education student, in first three years of teaching; fall, every year)
Students reflect on their instruction and student learning during first years of teaching. Monthly meetings, observations, online discussion. Classroom management, planning, inquiry-based teaching, assessment, equity in the classroom.

**CI 5540. Special Topics: Science Education.** (1.0-8.0 cr.; [max 12.0 cr.;] fall, spring, summer, every year)
Detailed examination and practice of the teaching of one area of science (e.g. geology, health, physical science) or one method of instruction (e.g. laboratories, demonstrations, Internet, simulations).

**CI 5541. Teaching History and Nature of Science.** (3.0 cr.; A-F or Audit; prereq MEd ILP or professional studies student in science education or #; fall, every year)
Understanding nature of science (NOS). Integrates reflect on NOS in secondary science classroom. Historical cases/integrating NOS with science content/scientific inquiry.

**CI 5596. Clinical Experience in Middle School Science.** (4.0 cr.; A-F or Audit; prereq initial licensure in science ed; fall, every year)
Supervised clinical experience in middle school science teaching.

**CI 5597. Clinical Experience in Secondary School Science Teaching.** (4.0-8.0 cr.; S-N or Audit; prereq initial licensure or #; spring, every year)
Supervised clinical experience in secondary school science teaching.

**CI 5619. Teaching World Languages and Cultures in Elementary Settings.** (3.0 cr.; summer, every year)
Methods/materials for elementary world language instruction; development of oral communication/literacy in world languages; world language program design; global awareness/cross-cultural experience; children's language; children's literature, games, and songs; planning/development of units and lessons.

**CI 5620. Introduction to Second Language Acquisition for Language Teachers.** (3.0 cr. [max 6.0 cr.]; summer, every year)
Current research and theory in the area of second language acquisition (SLA). Topics include the similarities and differences across first and second language acquisition; the role of individual differences in language learning (including age, first language, aptitude among others). Implications for sociolinguistic diversity in the United States.

**CI 5621. Culture as the Core in the Second Language Classroom.** (2.0 cr.; Student Option No Audit; summer, every year)
How language teachers foster development of intercultural communicative competence through a pedagogical approach that addresses the nature of culture and culture learning, and the interrelatedness of language and culture learning.

**CI 5622. Second Language Acquisition Basics for Teachers.** (2.0 cr.; Student Option No Audit; summer, every year)
Participants expand their repertoire of tasks/activities, gather samples of learner language, and practice analyzing those samples to identify language features that learners do/do not know.

**CI 5623. Improving Language Learning: A Practical Course in Styles- and Strategies-based Instruction.** (2.0 cr.; Student Option No Audit; summer, every year)
Learner-focused approach to teaching that helps students understand and make the most of their own learning styles/strategies. Participants create materials/lessons and explore ways to incorporate strategies into their own language curricula.

**CI 5624. Content-based Language Instruction and Curriculum Development.** (2.0 cr.; Student Option No Audit; summer, every year)
Intensive professional development to help foreign language teachers learn to implement the CBI curricular approach in the language classroom. Introduces all phases of CBI curricular development and provides resources necessary to ensure successful implementation.

**CI 5625. Developing Assessments for the Second Language Classroom.** (2.0 cr.; Student Option No Audit; summer, every year)
Assessment fundamentals and various topics, including assessment frameworks, performance assessment models, national standards, effective evaluation, and authentic materials. Participants use backward design to develop rating criteria and rubrics, and a standards-based performance assessment unit.

**CI 5626. Developing Learners’ Sociocultural Competence.** (2.0 cr.; Student Option No Audit; summer, every year)
Overview of how to incorporate a pragmatics component into second/foreign language curriculum to enhance learners’ sociocultural competence. Includes approaches to teaching/evaluating pragmatics.

**CI 5628. Analyzing Learner Language in Second Language Acquisition.** (3.0 cr.; Student Option No Audit; prereq 5646, 5649 [or other course on the grammar of a language]; fall, spring, every year)
Review broad findings in second language acquisition (SLA) research. Cognitive/social
process of becoming multilingual. How to carry out classroom-based research projects focused on learner language development.

CI 5645. Teaching English Learners in the Elementary Classroom. (3.0 cr.; A-F only; prereq Early Childhood or Elementary Education ILP; fall, spring, summer, every year) Benefits/challenges of working with English learners (ELs). Linguistically/culturally diverse students. Instructional practices/strategies for teaching ELs in elementary classrooms. Language learning/bilingualism. Cultural differences.

CI 5646. English Grammar for ESL Teachers. (3.0 cr.; prereq LING 5001 or #; fall, every year) English syntax from pedagogical perspective. Grammatical structures that challenge ESL learners. Analyzing learner errors. Issues/activities related to teaching grammar in ESL contexts.


CI 5648. Advanced Practices in Teaching Academic Language. (3.0 cr.; A-F only; prereq Grad student, #; spring, every year) Preparations K-12 teachers for student development of academic language proficiency. Read/discuss current research. Implement innovative teaching practices.

CI 5649. Language Analysis for ESL Teaching in Higher Ed. (4.0 cr.; Student Option No Audit; prereq 5646; spring, every year) Overview of complex aspects of English grammar not covered in 5646. Academic uses of passives, indirect objects, conditionals, relative clauses, complementation, reported speech, deixis/reference, articles, prepositions, phrasal verbs, pragmatics.

CI 5651. Foundations of Second Languages and Cultures Education. (3.0 cr.; A-F or Audit; fall, every year) Historical overview of second language teaching/learning in U.S. introduction to second language acquisition. Second language instructional concepts across elementary, secondary/university options for foreign language, bilingual education, immersion language programs, and English as a second language programs. Theoretical frameworks for language instruction are tied to practice.

CI 5653. Methods in Teaching English as a Second Language (ESL) in Higher Education. (3.0 cr.; Student Option No Audit; prereq An intro to linguistics course; fall, spring, every year) Theory/practice teaching academic English as second or foreign language in contexts of higher education. History of field/varied methods in language teaching. Current best practices in teaching academic English pronunciation, listening, speaking, reading, writing skills.

CI 5654. Practicum in Teaching English as a Second Language (ESL) in Higher Education. (6.0 cr.; S-N only; prereq 5653; spring, every year) Practical, hands-on training in teaching of English as Second Language. Applying theoretical/descriptive material studied in 5653. Discuss readings/research articles on ESL in higher ed, applying theoretical/practical principles to specific critical classroom incidents.

CI 5655. Teaching Literacy in Second Language Classrooms. (3.0 cr.; A-F or Audit; fall, every year) Reading comprehension/composing processes in a second language; relationship between first and second literacy development; relationship between reading and writing; relationship of culture to reading comprehension and writing; politics of literacy; assessment of second language literacy; using technology to enhance literacy instruction.

CI 5657. Teaching Speaking and Listening in Second Language Classrooms. (3.0 cr.; A-F or Audit; spring, odd years) Theories/methods in teaching language as communication in oral/aural modes; planning student interaction; classroom organization for oral language learning/acquisition; using technology to enhance interaction; assessment of listening comprehension and oral communication.

CI 5658. Foreign Language Testing and Assessment. (3.0 cr.; A-F or Audit; spring, even years) For world language/EFL teachers. Aligning foreign language classroom instruction/assessment; language testing/assessment; classroom-based and large-scale proficiency testing/assessment; assessing proficiency in speaking, listening, reading, writing and communicative modes (interpretive, presentational, interpersonal); creation of formative/summative assessments; critique of contemporary assessment instruments.

CI 5660. Special Topics in the Teaching of Second Languages and Cultures. (1.0-4.0 cr. [max 12.0 cr.]; spring, summer, every year) Topics related specifically to the needs of the in-service teacher. Topics, location, credits, and duration are flexible.

CI 5662. Second Language Curriculum Design. (3.0 cr.; A-F or Audit; spring, every year) Historical overview of curriculum development in second language education; contexts that influence curriculum development; models for curriculum development in second language settings; politics of curricular reform; national/state standards and implications for curriculum development; effects of technology on second language curriculum.

CI 5670. Foundations of Dual Language and Immersion Education. (3.0 cr.; prereq Enrollment in certificate program in dual language/immersion educ or #; fall, every year) Research foundations and program principles for dual language/immersion. Second language acquisition; critical features of program design/implementation; benefits/challenges of dual language/immersion; program assessment;
advocacy. Theory/research for dual language/immersion tied to practical application.

CI 5671. Curriculum Development and Assessment in Dual Language/Immerion Classrooms. (3.0 cr.; prereq #; fall, odd years) Content-based language instruction and curriculum development for dual language, bilingual, and immersion classrooms. Materials development; proactive/reactive instructional techniques; noticing and awareness-raising strategies; structuring student language production; differentiating for content, ability, and language.

CI 5672. Language-Focused Instructional Practices and Strategies for Dual Language/Immerion Classrooms. (3.0 cr.; prereq #; spring, every year) Counterbalancing content with integrated focus on language and literacy development for dual language, bilingual, and immersion classrooms. Materials development; proactive/reactive instructional techniques; noticing and awareness-raising strategies; structuring student language production; differentiating for content, ability, and language.

CI 5673. Immersion 101: An Introduction to Immersion Teaching. (2.0 cr.; Student Option No Audit; [CI 5674]; summer, every year) Research-based introduction to issues for teachers, administrators, and district personnel in K-12 immersion education. One-way (foreign language), two-way (bilingual), and indigenous programs. Principles/practices that inform language-attentive curriculum development/instruction.

CI 5674. Immersion 101: An Introduction to Immersion Teaching in Character-based Languages. (2.0 cr.; Student Option No Audit; [CI 5673]; summer, every year) Research-based introduction to issues for teachers, administrators, and district personnel in K-12 immersion education. One-way (foreign language) and two-way (bilingual) programs. Principles/practices that inform language-attentive curriculum development/instruction.

CI 5699. Clinical Experiences in Second Languages. (3.0-12.0 cr. [max 16.0 cr.]; A-F or Audit; prereq SLC initial licensure program only; fall, spring, every year) Teaching and learning experiences in elementary and secondary second language instructional settings. Includes a seminar held concurrently to support the student teaching experience.

CI 5702. Social Studies Instruction in the Elementary Grades. (3.0 cr.; A-F only; prereq Early Childhood or Elementary Education ILP; fall, spring, every year) Content/orrganization of elementary social studies programs. Programs of understanding. Improving learning situation.

CI 5741. Introduction to Social Studies Education. (3.0 cr.; A-F only; prereq social studies initial licensure student; summer, every year) Broad issues and themes related to social studies education, including societal context, rationale, and scope and sequence. Analysis and evaluation of selected teaching strategies, methods, and resources.

CI 5742. Advanced Methods of Teaching the Social Studies. (3.0 cr.; A-F only; prereq Secondary social studies initial licensure student; fall, every year) Focus on developing a repertoire of instructional methods that support authentic pedagogy and assessment. Enhancing reading comprehension and writing skills in the social studies.

CI 5743. The Social Sciences and the Social Studies. (3.0 cr.; A-F only; prereq Secondary social studies initial licensure student; fall, every year) Development of instructional strategies and contexts for exploring the social sciences as disciplines at the secondary level; central concepts and generalizations; tools of inquiry; competing structures and theories; and the relative impact of multicultural and gender-fair perspectives on the nature of history and the social sciences.

CI 5744. Seminar: Reflecting on Professional Development in Social Studies Education. (3.0 cr.; A-F only; prereq Secondary social studies initial licensure student; spring, every year) Reflecting on teaching experience, examining social/cultural context of teaching/learning, developing a professional identity. Refining teaching and teacher research skills.

CI 5745. Engaging Youth With Social Studies Texts. (3.0 cr.; A-F only; spring, every year) Ways to engage students (grades 5-12) in social studies (textbooks, literature, speeches, editorials, political cartoons, tables, graphs, maps, film). Developing middle/high school students’ disciplinary literacy.
Cl 5927. Family and Consumer Sciences
Student Teaching IV. (1.0 cr.; prereq 5926; spring, every year)
Full-time supervised student teaching experience in family/consumer sciences programs.

Cl 5993. Directed Study in Family, Youth, and Community. (1.0-3.0 cr.; max 9.0 cr.): A-F only; prereq #; fall, spring, summer, every year)
Self-directed study in areas not covered by regular courses. Specific program of study is jointly determined by student and advising faculty member.

Cl 5996. Internship in Family, Youth, and Community. (1.0-6.0 cr.;: fall, offereed periodically)
Involvement in work experience focused on educational competencies in family, youth, and community settings. Nature/extent of responsibilities are defined by position the student assumes.

Dakota (DAKO)
College of Liberal Arts

DAKO 1121. Beginning Dakota I. (5.0 cr.; =DAKO 4121); fall, every year)
Listening, speaking, reading, writing. Oral drills, in-class participation focused on questions/answers.

DAKO 1122. Beginning Dakota II. (5.0 cr.; =DAKO 4122); prereq 1121; spring, every year)
Further development of language acquisition skills. Oral drills, in-class participation focused on questions/answers.

DAKO 3123. Intermediate Dakota I. (5.0 cr.; =DAKO 4123); prereq 1122; fall, every year)
Language acquisition skills, oral drills. In-class participation focuses on questions/answers.

DAKO 4122. Beginning Dakota II. (3.0 cr.; =DAKO 1122); prereq [1121, 1004 in another language] or passing score on LPE or grad student; spring, every year)
Language acquisition skills. Oral drills. In-class participation focuses on questions/answers.

DAKO 4123. Intermediate Dakota I. (3.0 cr.; =DAKO 3123); prereq 1121, 3123, 5126; fall, every year)
Listening, speaking, reading, writing. Oral drills. In-class participation focuses on questions/answers.

DAKO 4124. Intermediate Dakota II. (3.0 cr.; =DAKO 3124); prereq 1121, 1122, 3123; spring, every year)
Listening, speaking, reading, writing. Oral drills. In-class participation focuses on questions/answers.

DAKO 4126. Advanced Dakota Language I. (3.0 cr.; A-F or Audit; fall, every year)
Focuses on immersion method.

DAKO 4129. Advanced Dakota Language II. (3.0 cr.; A-F or Audit; spring, every year)
Focuses on immersion method.

DAKO 5126. Advanced Dakota Language I. (3.0 cr.; max 12.0 cr.); A-F or Audit; fall, every year)
Focuses on immersion method.

DAKO 5129. Advanced Dakota Language II. (3.0 cr.; max 12.0 cr.); A-F or Audit; spring, every year)
Focuses on immersion method.

Dance (DNCE)
College of Liberal Arts

DNCE 1001. Modern Dance Technique 1. (1.0 cr.; fall, spring, summer, every year)
First course in ten-section sequence of modern dance technique. Introductory modern dance technique training. Dance form varies according to instructor.

DNCE 1002. Modern Dance Technique 2. (1.0 cr.; prereq 1001 or audition or #; spring, every year)
Second course in ten-section sequence of modern dance technique. Introductory modern dance technique training. Dance form varies according to assigned instructor.

DNCE 1010. Modern Dance Technique 3. (1.0-2.0 cr.; max 4.0 cr.); prereq %, audition; fall, every year)
Third course in ten-section sequence of modern dance technique. Beginning modern dance technique training. Dance form varies by instructor.

DNCE 1020. Modern Dance Technique 4. (1.0-2.0 cr.; max 4.0 cr.); prereq 1010, %; audition; spring, every year)
Fourth course in ten-section sequence of modern dance technique. Beginning modern dance technique training. Dance form varies by instructor.

DNCE 3103. Men's Modern Dance Technique. (1.0 cr.; max 3.0 cr.; fall, every year)
Identity of male dancer. Gender-specific movement through technical training. Human movements attributable to specific genders: feminine, masculine, transgender? If so, how does this impact teaching of dance technique, performance, and how observer views dance?

DNCE 4104. Modern Dance Partnering Technique. (1.0 cr.; max 2.0 cr.; A-F only; prereq Dance major or #; spring, every year)
Technical demands, approaches, and skills needed for partnering in modern dance.

DNCE 1101. Ballet Technique 1. (1.0 cr.; fall, summer, every year)
Principles, basic technique, and vocabulary of ballet; barre, center, and allegro.

DNCE 1102. Ballet Technique 2. (1.0 cr.; prereq 1101, or audition, or #; spring, every year)

DNCE 1110. Ballet Technique 3. (2.0 cr.
(max 4.0 cr.); prereq %, audition; fall, every year)
First of two-semester sequence of beginning ballet technique. Level 3 in eight-level sequence of ballet technique. Practical application of ballet principles. Barre work needed for center work. Center work will consist of adagio, basic turns, petit, grand allegro.

DNCE 1110. Ballet Technique 4. (2.0 cr.
(max 4.0 cr.); prereq 1110, %, audition; spring, every year)
Second of two-semester sequence in beginning ballet. Practical application of ballet principles. Barre/center work. Ever-changing combinations/steps learned in previous level.

DNCE 1201. Jazz Technique 1. (1.0 cr.; fall, summer, every year)
First of six-semester sequence of jazz dance. Fundamental jazz vocabulary/movement. Basic understanding of proper body placement, clear articulation, basic mechanics of jazz movement, rhythmic footwork. Improvisation will be introduced. Overview of history of jazz music/dance styles.

DNCE 1202. Jazz Technique 2. (1.0 cr.; prereq 1201 or audition or #; spring, every year)

DNCE 1210. Jazz Technique 3. (1.0 cr.; max 2.0 cr.; prereq %, audition; fall, every year)
Third of six-semester sequence of jazz dance. Vocabulary. Technical skills using variety of jazz dance styles while increasing...
DNCE 1220. Jazz Technique 4. (1.0 cr.; max 2.0 cr.; prereq 1210, %; audition; spring, every year)
Fourth of six-semester sequence of jazz dance.
Expand vocabulary/develop skills, technique, style. Increase flexibility, strength. Use of space, clear articulation of movement, rhythmic footwork, grounding movement, dynamics, musicality.

DNCE 1301. Tap Technique 1. (1.0 cr.; fall, summer, every year)
Learning fundamental terms, basic rhythm structures, stock steps, and standard time steps.

DNCE 1302. Tap Technique 2. (1.0 cr.; prereq 1301 or #; spring, every year)
Fundamental terms, basic rhythms and syncopation, stock steps, and standard time steps; clarity of sound and rhythm.

DNCE 1313. African Based Movement. (1.0 cr.; fall, spring, every year)
Varied movement of African diaspora, primarily but not limited to West African region and continent of Africa. Traditional movement. Movement inspired by Africa, the Caribbean, and African diaspora at large. In-class movement participation, one movement midterm, one two-page paper.

DNCE 1315. Flamenco. (1.0 cr.; fall, spring, summer, every year)
Basic Spanish Flamenco dance technique with focus on rhythm, footwork, body style. Choreography incorporating techniques learned. Live flamenco guitar accompanies classes.

DNCE 1323. Swing Dance. (1.0 cr.; fall, spring, every year)
Traditional swing dances popular in the United States from 1930s through early 1960s. Each week new movements/figures are taught and previous dances reviewed. Students are expected to change partners.

DNCE 1327. Argentine Tango. (1.0 cr.; Student Option No Audit; fall, offered periodically)
Basic rhythms emphasizing posture, axis, walking, lead/follow techniques, footwork patterns. Students listen to music to identify rhythm, communicate.

DNCE 1331. Yoga. (1.0 cr.; fall, spring, summer, every year)

DNCE 1335. Tai Chi Ch'uan. (1.0 cr.; spring, summer, every year)

DNCE 1343. Hip Hop Movement. (1.0 cr.; Student Option No Audit; fall, offered periodically)
Hip hop's forms: old school, popping, locking, breaking, contemporary choreography, social dances. History, culture, technique. Warm-up, strengthening,urance applications, choreography, cool down. Lecture, demonstration, practice.

DNCE 1345. Alexander Technique for Movement Artists. (1.0 cr.; Student Option No Audit; spring, every year)
Increased kinesthetic awareness of habitual movement patterns in order to improve dance/movement technique and prevent related injuries.

DNCE 1347. Pilates Conditioning. (1.0 cr.; fall, summer, every year)

DNCE 1349. Contact Improvisation. (1.0 cr.; fall, spring, summer, every year)
Safe, clear introduction to principles of contact improvisation. Rolling point of contact, supporting/being supported, falling/recovering, connecting with center as source/support for movement. Classes include warm-up.

DNCE 1351. African Diasporic Movement 1. (1.0 cr.; Student Option No Audit; fall, every year)
First of six-course sequence. Introduction to traditional West African dance technique as a foundational base to begin learning technique, body placement, movement, space, time, energy, isolations, patterns, technique, community building, group work and presentation.

DNCE 1352. African Diasporic Movement 2. (1.0 cr.; Student Option No Audit; prereq 1351 recommended; spring, every year)
Second of six-course sequence. Builds on level 1 by further developing in complexity technique movement, poly-rhythm, levels, undulation, combinations, dynamics. Relationship between dance/drum, energy expressing.

DNCE 1353. African Diasporic Movement 3. (1.0 cr.; Student Option No Audit; prereq 1352 or audition or #; fall, every year)
Third of six-course sequence. Afro-Brazilian dance, including jumps, turns, floor work, and rhythmicity to develop flexibility, strength, and vocabulary in polycentric movement, moving toward body-sound harmony, illuminating dynamics of coordination, relaxation, breathing, undulation.

DNCE 1354. African Diasporic Movement 4. (1.0 cr.; Student Option No Audit; prereq 1353 or audition or #; spring, every year)
Fourth of six-course sequence. Builds on level 3 by exploring movement from mythology of Afro-Brazilian belief systems orixá's and Candomblé's. How corporal knowledge and technique fluency through the course sequence support different dance techniques.

DNCE 1401. Introduction to Dance. (3.0 cr.; Student Option No Audit; =CHIC 1401; fall, spring, every year)
What is dance? How does movement create meaning? Dance as action and framework for analysis of moving bodies. Movement politics of race, class, gender, sexuality, and nation through reading, writing, moving, and watching dance performances. Discussion. Dance experience not required.

DNCE 1601. Dance Improvisation. (1.0 cr.; A-F or Audit; prereq Concurrent registration in a modern dance technique course; %; fall, every year)
Individual ways of moving linked to fundamental elements of dance: time, space, and energy. Metered time, musical phrasing. Movement speed, shape, and quality. Creative process, individual movement vocabulary, structural devices in dance.

DNCE 1626. Music for Dance. (3.0 cr.; prereq %; fall, every year)
Cultural gravity of the Western perspective. Ways global regions express natural laws of acoustics through music while considering historical, political, and ethical issues around the relationship between music and dance. Workshops, practice, and exercises.

DNCE 1905. Freshman Seminar. (3.0 cr.; A-F or Audit; prereq Fr; fall, spring, offered periodically)
Topics specified in Class Schedule.

DNCE 3010. Modern Dance Technique 5. (2.0 cr. [max 4.0 cr.]; prereq %, audition; fall, every year)
Application of principles of space, time, energy. Alignment, power from pelvic center, rotation/tturnout, muscular tonality, joint articulation, clarity of intent, stretch, strength, stamina.

DNCE 3200. Modern Dance Technique 6. (2.0 cr. [max 4.0 cr.]; prereq 3010, %, audition; spring, every year)
Continuation of 3010. Application of principles of space, time, energy. Alignment, power from pelvic center, rotation/tturnout, muscular tonality, joint articulation, clarity of intent, stretch, strength, stamina.

DNCE 3110. Ballet Technique 5. (2.0 cr. [max 4.0 cr.]; prereq %, audition; fall, every year)

DNCE 3120. Ballet Technique 6. (2.0 cr. [max 4.0 cr.]; prereq 3110, %, audition; spring, every year)

DNCE 3210. Jazz Technique 5. (1.0 cr. [max 2.0 cr.]; prereq %, audition; fall, every year)
Continuation of jazz technique. Rhythm structures, longer phrases, greater physical speed, attack/control.

DNCE 3220. Jazz Technique 6. (1.0 cr. [max 2.0 cr.; prereq 3210, %, audition; spring, every year]) Continuation of 3210. Jazz technique. Rhythm structures, longer phrases, greater physical speed, attack/control.

DNCE 3301. Tap Technique 3. (1.0 cr.; prereq 1302 or #; fall, summer, every year) Tap techniques and creative development through improvisational studies.

DNCE 3302. Tap Technique 4. (1.0 cr.; prereq 3301 or #; spring, every year) Tap techniques and rhythm structures.

DNCE 3311. Contemporary Indian Dance 1. (1.0 cr.; Student Option No Audit; prereq #; fall, offered periodically) First in two-course sequence. Odissi classical Indian dance, martial movement Chhau, Iyengar yoga. Students deconstruct, extend and interweave these to create contemporary South Asian form. Footwork, hip flexion, torso movement, breath, rhythmic complexity.

DNCE 3312. Contemporary Indian Dance 2. (1.0 cr.; Student Option No Audit; prereq 3311 or #; spring, offered periodically) Second in two-course sequence. Odissi classical Indian dance, martial movement Chhau, Iyengar yoga. Students deconstruct, extend and interweave these to create contemporary South Asian form. Footwork, hip flexion, torso movement, breath, rhythmic complexity.

DNCE 3334. Introduction to Dance/Movement Therapy. (2.0 cr.; prereq %, fall, spring, every year) Historical/theoretical perspectives on use of movement/dance in relationship to psychology/healing. D/MT pioneers/techniques. Applications of D/MT with various populations/settings. Experiential course.

DNCE 3337. Body Mind Centering. (2.0 cr.; fall, spring, summer, every year) Improvisational movement explorations, hands-on re-patterning work. Direct experience of the way mind (desire, attention, intention) is expressed through various body systems. Students use imagery, touch, and anatomical information to access a range of inner sensations and movement experiences. Emphasizes each individual’s unique experience of the body.

DNCE 3351. African Diasporic Movement 5. (1.0 cr. [max 2.0 cr.; Student Option No Audit; prereq 1354 or audition or #; fall, every year]) Rigorous practice. West African techniques. Cardiovascular endurance of students will improve as a result. Live drummers, students can expect to learn drum parts to enhance the understanding of the rhythms.

DNCE 3352. African Diasporic Movement 6. (1.0 cr. [max 2.0 cr.; Student Option No Audit; prereq DNCE 3351 African Diasporic Movement 5 or audition or instructor consent; spring, every year]) Dances performed by dance companies of Guinea through the use of more complex and deep rhythms such as Yamama, Doundouba, Baho and Tiriabah. Rigorous practice. West African techniques. Live drummers.

DNCE 3401W. Dance History 1. (3.0 cr.; fall, every year) Historiography of dance, 20th century through present. Reconstruction/incorporation of dance practice in context of globalization. Artistic choices as influenced by complex history of performing arts and terrain of body/politics.

DNCE 3402W. Dance History 2. (3.0 cr.; prereq 3401W; spring, every year) History/theory of dance in varied forms/aspects. From development of ballet through 20th century modern dance. Second half of year-long survey.

DNCE 3411. Dance and Popular Culture: Choreographing Race, Class, and Gender. (3.0 cr.; prereq Jr or sr; spring, every year) How race, class, and gender become aestheticized and are put into motion as popular culture. Choreographic analysis of moving bodies. How “popular” affects understanding of culture. Exoticism, binary structures of stereotypes, identity, hegemony.

DNCE 3433. Articulate Body. (3.0 cr.; prereq Dnce major; %; spring, every year) Lectures and movement sessions in biodynamic considerations for optimal dance performance and metabolic demands of dance.

DNCE 3434. Nutrition and Body Maintenance for Movement Artists. (2.0 cr.; Student Option No Audit; spring, every year) Students learn and research ways to improve nutrition and remain injury-free throughout career and beyond. Discuss nutrition principles and apply to unique challenges, needs, interests of movement artists. Examine anatomy of movement to develop constructive injury prevention and management strategies. Stress reduction.

DNCE 3478W. Dance and Citizenship: Land, Migration, and Diaspora. (3.0 cr.; fall, every year) Dance/performance as practiced/transformed by minority groups in the United States. Migration as a global phenomenon, particularly pertaining to land disputes, labor distribution, political asylum, refugee, and dislocation.

DNCE 3495. Dance and Global Tourism. (3.0 cr.; Student Option No Audit; prereq Jr or sr; fall, every year) Political economy of the dancing body and its role in the representation of nations through global tourism. Dance and its relationship to belonging, nationalism, and the politics of art and tradition.

DNCE 3500. Topics in Dance. (1.0-3.0 cr. [max 10.0 cr.]; A-F or Audit; fall, spring, summer, every year) Topics specified in Class Schedule.

DNCE 3601. Dance Composition 1. (3.0 cr.; prereq 1020, 1601, concurrent regis in a modern dance technique course; %; spring, offered periodically) Continuation of movement vocabulary through improvisation, analysis of form and structure, experimentation with tone and performance

DNCE 3602. Dance Composition 2. (3.0 cr.; prereq 3601, %, concurrent regis in a modern dance technique course; fall, every year) Movement, vocabulary in relation to theme, space, time, energy, and body parts; solo, duet, and trio forms.

DNCE 3621. Dance Production I. (2.0 cr.; A-F or Audit; prereq Dance major; %; spring, every year) Technical/administrative aspects of dance production. Lighting, costumes, sound, marketing, stage management, fundraising, publicity. Emphasizes practical project management and personal management skills.

DNCE 3622. Dance Production II. (2.0 cr.; A-F or Audit; prereq 3621, dance major; %; spring, every year) Continuation of 3621. Students produce the spring Student Dance Concert.

DNCE 3700. Performance. (1.0 cr. [max 4.0 cr.]; prereq Concurrent enrollment in a technique course, audition; %; fall, spring, every year) Creation or reconstruction of a dance theatre work under the direction of a guest artist or faculty member. Work is performed at the end of the rehearsal period.

DNCE 3701. Summer Dance Intensive. (1.0-3.0 cr. [max 6.0 cr.; Student Option No Audit; summer, every year) Real-world experience with a professional dance company. Students participate in daily technique and repertory classes culminating in an informal performance. Artists are arranged year-by-year.

DNCE 3901. Survival Strategies in Dance. (3.0 cr.; A-F or Audit; prereq Dance major; %; spring, offered periodically) Strategies fundamental to a dancer’s survival. Injury prevention/care. Development of healthy dietary and muscular/skeletal habits. Career tracks.

DNCE 4443. Theorizing Dancing Bodies. (3.0 cr.; ==[DNCE 5443]; prereq 3402W or #; fall, every year) Major developments in Western philosophic thought on dance and dance theory, from its beginnings to present.

DNCE 4454W. (Re)Writing the Dancing Body. (3.0 cr.; ==[DNCE 5454]; prereq Jr or sr; spring, every year) Modes of writing found in dance studies. Oral histories, historical documentation, performance reviews, performance ethnographies, scholarly essays. Discussion/critique of existent modes of writing. Writing/rewriting practice.

DNCE 4601. Dance Composition 3. (3.0 cr.; prereq 3602, concurrent regis in a modern dance technique course; %; spring, offered periodically) Continuation of movement vocabulary through improvisation, analysis of form and structure, experimentation with tone and performance.
personas. Effects of lights/costumes/text/props/music; development of larger ensemble works.

DNCE 4602. Dance Composition 4. (3.0 cr.; prereq 4601, & modern dance technique course; %; fall, every year)

DNCE 4901. Senior Seminar. (2.0 cr.; S-N or Audit; [TH 4901]; prereq Sr, [Dnce or Th major]; fall, every year)
Development of senior project, alone or in groups, under guidance of faculty members.

DNCE 5010. Modern Dance Technique 7. (2.0 cr. [max 4.0 cr.]; prereq %, audition; fall, every year)
Continuation of technical development. Performance range/style. Students study with various guest artists.

DNCE 5020. Modern Dance Technique 8. (2.0 cr. [max 4.0 cr.]; prereq 5010, %; audition; spring, every year)
Continuation 5010. Performance range/style. Students study with various guest artists.

DNCE 5110. Ballet Technique 7. (1.0 cr. [max 2.0 cr.]; prereq %; audition; fall, every year)
Continuation of ballet technique. Musicality, performance, stylistic differences. Practical work conducted within context of choreographic/aesthetic development of ballet.

DNCE 5120. Ballet Technique 8. (1.0 cr. [max 2.0 cr.]; prereq 5110, %; audition; spring, every year)
Continuation of 5110. Musicality, performance, stylistic differences. Practical work conducted within context of choreographic/aesthetic development of ballet.

DNCE 5334. Introduction to Dance/Movement Therapy. (2.0 cr.; prereq %; spring, every year)

DNCE 5443. Theorizing Dancing Bodies. (3.0 cr.; = [DNCE 4443]; prereq #; fall, every year)
Major developments in Western philosophic thought on dance and dance theory, from its beginnings to present.

DNCE 5454. (Re)Writing the Dancing Body. (3.0 cr.; = [DNCE 4454W]; prereq Grad student; spring, every year)

DNCE 5493. Corporealities, Movement, and Social Justice: Staging "Equitable" Choreographies. (3.0 cr.; A-F only; prereq Jr or Sr; 4443 recommended; spring, every year)

DNCE 5495. Dance and Global Tourism. (3.0 cr.; Student Option No Audit; prereq Grad student; fall, every year)

DNCE 5500. Topics in Dance. (1.0-3.0 cr. [max 10.0 cr.]; fall, spring, summer, offered periodically)
Topics specified in Class Schedule.

DNCE 5601. Dance Composition 5. (1.0 cr.; prereq 4601, 4602, %; spring, every year)

DNCE 5700. Performance. (1.0 cr. [max 4.0 cr.]; prereq & technique course; %; fall, spring, every year)
Technique, improvisation, choreography, music, design, and technical production as they relate to dance performance.

DNCE 5858. Teaching Dance. (4.0 cr.; prereq 1020, %, #; fall, every year)
Methods, principles, and techniques of teaching dance.

DNCE 5993. Directed Studies. (1.0-4.0 cr. [max 10.0 cr.]; fall, spring, every year)
Guided individual study. Prereq-instr consent, dept consent, college consent.

Dental Hygiene (DH) School of Dentistry

DH 2111. Dental Anatomy. (2.0 cr.; A-F only; prereq DH student; fall, every year)
All deciduous/permanent teeth, including tooth form, function, and relationship to oral health. Biochemistry, eruption, exfoliation patterns. Ideal tooth occlusion, dental terminology, tooth annihilation systems. Lab includes identification/annotation of teeth.

DH 2121. The Dental Hygiene Care Process Clinical Application I. (5.0 cr.; A-F or Audit; prereq DH student; fall, every year)
Dental hygiene care process, assessment principles related to medical and oral health status, dental hygiene clinical procedures, and development of instrumentation skills.

DH 2132. Head and Neck Anatomy. (1.0 cr.; A-F or Audit; prereq DH student; fall, every year)
Anatomical structures of head/neck as they relate to practice of dental hygiene.

DH 2212. Communication for Oral Health Providers. (2.0 cr.; A-F only; prereq DH student; spring, every year)
Effective communication strategies within health care settings with emphasis on oral health provider-patient relationship. Application of health literacy concepts, behavior change theory as components of evidence-based decision making in clinical setting.

DH 2215. Oral Histology and Embryology. (2.0 cr.; A-F or Audit; prereq DH student; spring, every year)

DH 2221. Periodontology. (3.0 cr.; A-F only; prereq DH student; spring, every year)

DH 2222. Dental Hygiene Care Process Clinical Application II. (3.0 cr.; A-F or Audit; prereq DH student; spring, every year)

DH 2231. Cariology and Applied Nutrition in Dental Hygiene Care. (3.0 cr.; A-F or Audit; prereq DH student; spring, every year)
Study of dental caries etiology, pathology, prevention, applied principles of dietary/nutrition to dental hygiene patient care with skills in dental dietary counseling.

DH 3120. General and Oral Pathology. (2.0 cr.; A-F or Audit; prereq DH student; fall, spring, summer, every year)

DH 3121. Local Anesthesia and Pain Management. (2.0 cr.; A-F only; summer, every year)

DH 3123. The Dental Hygiene Care Process Clinical Application III. (4.0 cr.; A-F only; prereq DH student; summer, every year)
Dental hygiene treatment planning, alternative instruments, and advanced skills related to implementation of dental hygiene care. Clinical experience.

DH 3126. Oral and Maxillofacial Radiology Clinic I. (0.0 cr.; A-F or Audit; prereq DH student; fall, summer, every year)
Radiographic Technique. Exposure of radiographs on skulls, interpretation, panoramic/extraoral technique, quality assurance procedures.

DH 3133. Pharmacology. (2.0 cr.; A-F or Audit; prereq DH student; summer, every year)
Principles of pharmacology, physical/chemical properties of drugs, modes of administration,
DH 314. Pediatric Dentistry. (1.0 cr.; A-F or Audit; prereq DH student; summer, every year) Knowledge, skills, and attitudes required for providing dental hygiene care for pediatric patients.

DH 315. Oral and Maxillofacial Radiology. (2.0 cr.; A-F or Audit; prereq DH student; spring, every year) General principles of radiology, radiation physics, dosimetry, biology, radiation protection, regulations, recent concepts of imaging.

DH 319. Independent Study. (0.0 cr.; prereq DH student; spring, summer, every year) Clinical experience in dental hygiene care.

DH 321. Biomaterials and Principles of Restorative Techniques I. (4.0 cr. [max 8.0 cr.]; A-F only; prereq DH student; summer, every year) Principles of biomaterials, restorative techniques. Lecture, preclinical experiences.

DH 322. Dental Hygiene Care Process: Clinical Application IV. (6.0 cr.; A-F only; prereq Dental hygiene student; fall, every year) Knowledge, skills, and attitudes required for providing dental hygiene care for the medically compromised patient, gerodontic patient, and patient with a disability.

DH 327. Oral and Maxillofacial Radiology Clinic II. (0.0 cr.; A-F or Audit; prereq DH student; fall, every year) Exposing patient radiographs, interpretation, panoramic/extraoral technique, and quality assurance procedures.

DH 328. Ethics and Jurisprudence for the Dental Hygienist. (1.0 cr.; A-F only; prereq Dental hygiene student; fall, every year) Ethical decision making, jurisprudence.


DH 328. Dental Public Health and Academic Service Learning I. (2.0 cr.; A-F only; prereq DH student; spring, every year) Academic service-learning in various community health care settings. Assessment, planning, implementation, and evaluation of a community oral health program.

DH 4130. Management and Supervision of a Dental Practice. (2.0 cr.; A-F only; prereq Current Dental Hygiene Program student; spring, every year) Planning, organizing, leading, and controlling clinical, business, and human aspects of dental practice.

DH 4135W. Research Methods in Dental Hygiene. (3.0 cr.; A-F only; prereq DH; spring, every year) Scientific method/critiquing scientific literature. Evidence-based decision making, types of research/research design, problem identification/hypothesis development. Analyzing individual components of journal articles, writing lit review.

DH 4211. Principles of Restorative Techniques II. (3.0 cr.; S-N only; prereq Dental hygiene student; fall, spring, every year) Restorative Techniques. Clinical experiences.

DH 422. Dental Hygiene Care Process Clinical Application V. (6.0 cr.; A-F only; prereq DH student; spring, summer, every year) Advanced dental hygiene care process. Analyze patient preventive/treatment need through case presentation. Community service, cultural diversity, family violence issues. New products, techniques, research.

DH 4229. Oral and Maxillofacial Radiology Clinic IV. (3.0 cr.; A-F or Audit; prereq DH student; summer, every year) Exposing patient radiographs, interpretation, panoramic/extraoral technique, quality assurance procedures.

DH 4234. Leadership and Professional Development. (2.0 cr.; A-F only; prereq 2nd yr student in dental hygiene; summer, every year) Explore dental hygienist in health care delivery organizations or public health organizations/programs. Current issues that influence practice of dental hygiene. Health care delivery systems, workforce needs, professional associations, state practice acts, legislative process.

DH 4318. Oral and Maxillofacial Radiology Clinic III. (0.0 cr.; A-F or Audit; prereq DH student; fall, spring, every year) Exposing patient radiographs, interpretation, panoramic/extraoral technique, quality assurance procedures.

DH 4310. Management and Supervision of a Dental Practice. (2.0 cr.; A-F only; prereq Current Dental Hygiene Program student; spring, every year) Planning, organizing, leading, and controlling clinical, business, and human aspects of dental practice.

DH 4315W. Research Methods in Dental Hygiene. (3.0 cr.; A-F only; prereq DH; spring, every year) Scientific method/critiquing scientific literature. Evidence-based decision making, types of research/research design, problem identification/hypothesis development. Analyzing individual components of journal articles, writing lit review.

DH 4315W. Research Methods in Dental Hygiene. (3.0 cr.; A-F only; prereq DH; spring, every year) Scientific method/critiquing scientific literature. Evidence-based decision making, types of research/research design, problem identification/hypothesis development. Analyzing individual components of journal articles, writing lit review.

DH 5201. Management Internship. (5.0 cr.; S-N only; prereq Dental hygiene student; fall, summer, every year) Supervised experience in oral health care industry. Experience in corporations, health care management organizations, long-term care facilities, publishing firms, or professional organizations.

DH 5203. Capstone Project. (3.0 cr.; S-N only; prereq Dental hygiene student; fall, spring, every year) Formulation of extensive business plan/project related to area of interest based on coursework taken or internship experience.

DH 5401. Research Methods in Health Sciences. (2.0 cr. [max 3.0 cr.]; A-F only; prereq Dental hygiene student; spring, every year) Developing skills in scientific method. Analyzing research findings. Types of research, problem selection, hypothesis writing, research planning/design, data collection/measuring techniques, analysis/interpretation of data. Ethics.

DH 5403. The Discipline of Dental Hygiene. (2.0 cr.; A-F only; prereq Dental hygiene program, 2nd yr; fall, every year) Dental hygiene practice grounded in science and guided by research evidence. Etiology, prevention, and treatment of dental caries, periodontal diseases, oral cancer, and other conditions. Advances in technology.

DH 5405. Curriculum and Course Development. (2.0 cr. [max 4.0 cr.]; A-F only; prereq Dental hygiene student; fall, every year) Curriculum/course development/management, competency-based education/outcomes assessment. Role of accreditation in dental hygiene education. Students develop competency-based dental hygiene curriculum/course.

DH 5407. Instructional Strategies for Effective Teaching. (2.0 cr.; A-F only; prereq Dental hygiene student; fall, every year) Application of principles of learning. Learning/teaching styles, student-centered teaching, instructional strategies. Microteaching selected strategies.

DH 5409. Dental Hygiene Clinic Administration. (2.0 cr.; A-F only; prereq
DH 5411. Administrative Leadership and Professional Development. (1.0 cr. [max 2.0 cr.]; A-F only; prereq Dental hygiene grad student; spring, every year) Application of leadership theory. Models of administrative roles in education, health care, research, and corporate health care settings. Education/organization culture, strategic planning, human resource management/budgeting. Professional development/advancement.


DH 5415. Dental Hygiene Supervised Didactic Course Student Teaching. (1.0 cr. [max 2.0 cr.]; A-F only; prereq Dental hygiene grad student; fall, spring, summer, every year) Observation/participation in supervised teaching experience in dental hygiene education under faculty mentorship.

DH 5420. Master of Dental Hygiene Independent Study. (0.0-5.0 cr. [max 10.0 cr.]; S-N or Audit; prereq Enrolled master of dental hygiene student; fall, spring, summer, every year) Directed study with dental hygiene faculty member on selected topic.

DH 5421. Grant Writing for Health Professionals. (1.0 cr.; A-F only; prereq Enrolled in Dental Hygiene grad program; spring, every year) Introduction to grant writing for health care professionals. Grant sourcing, matching goals/objectives to funding sources, developing evaluation plan, writing proposals, responding to critiques. Effect of economic environment/social responsibility of non-profits.

Dental Therapy (DT)
School of Dentistry

DT 3210. Head and Neck Anatomy. (1.0 cr.; A-F only; fall, every year) Anatomical nomenclature in head/neck anatomy as they relate to dental therapy treatment. Prereq-Accepted into undergraduate dental therapy program.

DT 3429. Introduction to Psychomotor Skill Development. (1.0 cr.; S-N only; fall, every year) Reality based training for psychomotor skills required in prosthodontic/operative courses. Eye-hand/mirror skills, ergonomics used while preparing teeth for restoration. Prereq-Dental therapy student.


DT 3433. Operative Dentistry I Pre-Clinic Laboratory. (2.0 cr.; A-F only; prereq 2d yr dental therapy student; summer, every year) How to treat dental caries. Therapeutic treatment of the underlying pathology. Surgical treatment of early caries lesion. Hands-on projects working with models simulating teeth and surrounding structures.

DT 3471. Prosthodontic Topics for Dental Therapy. (2.0 cr.; S-N only; fall, every year) Lectures, lab projects of selected prosthodontic techniques to enable the dental therapist to provide/cement quality pre-fabricated metal or resin provisional crowns and other procedures in the scope of DT practice.

DT 3521. Foundations of Interprofessional Professionalism, Communication and Collaboration. (1.0 cr.; S-N only; fall, spring, summer, every year) Professionalism, communication/collaboration across health professions. Online independent/group work followed by facilitated interprofessional small group discussions of case narratives.

DT 3641. Principles of Exodontia and Minor Oral Surgery. (1.0 cr.; S-N only; spring, every year) Develop knowledge/skill in exodontia/minor oral surgery.

DT 4140. Preventive Pediatric Dentistry Clinic. (1.0 cr.; A-F only; fall, every year) Students participate in oral health promotion of pediatric patients. Brushing techniques, fluoride application, dietary analysis/counseling. Students talk with parents of pediatric patients. At least 10 clinic sessions.

DT 4142. Clinical Pediatric Dentistry II. (1.0 cr.; A-F only; prereq Foundation competence in clinical dentistry; summer, every year) Early childhood development, care for children.

DT 4240. Oral Radiology Clinic. (1.0 cr. [max 3.0 cr.]; A-F only; fall, spring, summer, every year) Clinical instruction in oral radiography. Intraoral/extraoral radiographic procedures, quality evaluations.

DT 4242. Oral Radiology Clinic III. (1.0 cr.; A-F only; fall, every year) Clinical instruction in oral radiography. Intraoral/extraoral radiographic procedures, evaluations.

DT 4320. Comprehensive Care Clinic. (4.0 cr.; S-N only; prereq 3d yr dental therapy student; fall, every year) Assessment, treatment, and management of patients. Concepts/principles of evidence-based dentistry as applied to clinical practice.

DT 4321. Dental Auxiliary Utilization. (1.0 cr.; A-F only; prereq 2d yr dental therapy student; fall, spring, summer, every year) Clinical rotation. Advanced diagnostic/treatment technologies. Techniques of four-handed dentistry.

DT 4323. Comprehensive Care Clinic II. (1.0 cr.; A-F only; summer, every year) Mission of School of Dentistry. Application of principles to the comprehensive assessment, treatment, and management of patients. Evidence-based dentistry.

DT 4324. Comprehensive Care Clinic III. (1.0 cr.; A-F only; fall, every year) Application of principles to comprehensive assessment, treatment, and management of patients. Evidence-based Dentistry.

DT 4360. Outreach Experiences in Dental Therapy. (1.0 cr. [max 2.0 cr.]; S-N only; fall, spring, every year) Students complete six-eight weeks of outreach service at combination of following: Hibbing Community College Dental Clinic; Mobile Dental Unit; NorthPoint Health/Wellness Center; Prairie Winds Dental Clinic; Rice Regional Dental Clinic, or Walker Dental Clinic.

DT 4361. Outreach Experiences II. (2.0 cr.; S-N only; fall, every year) Experiences that reinforce principles of delivering dental health care/services to patients, including underserved patient populations, in off-site clinical settings.

DT 4440. Operative Dentistry Clinic. (2.0 cr. [max 6.0 cr.]; A-F only; fall, spring, summer, every year) Placing restorations. Student clinicians place single tooth restorations on patients, with direction/oversight of instructor.

DT 4441. Operative Dentistry II. (0.0 cr.; A-F only; summer, every year) How to place restorations. Students place single-tooth restorations on patients.

DT 4443. Operative Dentistry III. (4.0 cr.; A-F only; fall, every year) How to place restorations. Student place single-tooth restorations on patients.

DT 4460. Essentials of Clinical Care I For the Dental Therapist. (1.0-12.0 cr.; S-N only; spring, every year) Students provide comprehensive care under direction of clinical faculty. May include periodontics, operative, pediatric care, and health promotion. Limited care may be given on rotations to oral surgery clinics.

DT 4960. Essentials of Clinical Care II for Dental Therapists. (5.0-10.0 cr. [max 20.0 cr.]; S-N only; summer, every year) Comprehensive clinical care of assigned patients that may include treatment encompassing periodontics, operative, prosthodontics and endodontics, health promotion disciplines.

DT 5000. Dental Therapy Capstone Project. (0.0-1.0 cr.; S-N only; fall, spring, every year) In-depth, independent, project-based research topic from interests in oral health. Intensive, active-learning initiative requiring significant
effort in planning/implementation. Final written product/oral presentation mandatory, demands extensive systematic investigation/research.

DT 5110. Periodontology I. (1.0 cr.; A-F only; prereq 2nd yr dental therapy masters student; summer, every year)

DT 5130. Preclinical Pediatric Dentistry. (2.0 cr.; A-F only; summer, every year)

DT 5140. Preventive Pediatric Dental Clinic. (1.0 cr.; A-F only; fall, every year)
Oral health promotion of pediatric patients. Brushing techniques, fluoride application, dietary analysis/counseling. Students interact with parents of pediatric patients.

DT 5141. Clinical Pediatric Dentistry III. (2.0 cr.; A-F only; prereq Must be in the dental therapy program, passed basic foundation competencies; fall, every year)
Early childhood development, dental care for children.

DT 5162. Principles of Exodontia and Minor Oral Surgery. (1.0 cr.; A-F only; fall, spring, every year)
Develop knowledge/skill for exodontia/minor oral surgery.

DT 5210. Head and Neck Anatomy. (1.0 cr.; A-F only; prereq Accepted into master's dental therapy program; fall, every year)
Anatomical nomenclature in head/neck anatomy as they relate to dental therapy treatment.

DT 5211. Applied Pharmacology for the Dental Therapist. (2.0 cr.; A-F only; summer, every year)
Principles of pharmacological drugs used in dentistry, modes of drug administration, therapeutic/adverse effects of drugs. Preparation for pharmacology of local anesthetics. Nitrous oxide sedation, prescription writing.

DT 5212. Local Anesthesia and Pain Management. (2.0 cr.; A-F or Audit; summer, every year)

DT 5230. Oral and Maxillofacial Radiology. (2.0 cr.; A-F only; spring, every year)
Production/utilization of radiographs in accordance with good professional judgement, as well as state/federal radiation regulations. Processing radiographs in darkroom. Processing a digital image. Prereq-DT grad program.

DT 5231. Oral and Maxillofacial Radiology II. (1.0 cr.; A-F only; fall, every year)
Use of X-rays in accordance with state/federal radiation regulations. Radiographic assessment of developmental and acquired anomalies of teeth, osseous structures, and maxillary sinus.

DT 5232. Oral and Maxillofacial Radiology Preclinical Laboratory. (0.0 cr.; S-N only; summer, every year)
Preclinical demonstration-participation phases using mounted human skulls.

DT 5241. Oral Radiology Clinic I. (1.0 cr.; A-F only; prereq Must be in dental therapy masters program; fall, every year)
Clinical instruction in oral radiography. Intraoral/extraradial radiographic procedures, evaluations.

DT 5250. Oral Histology and Embryology. (2.0 cr.; A-F only; spring, every year)

DT 5251. General and Oral Pathology. (1.0 cr.; A-F only; summer, every year)
Principles of general and oral pathology with focus on etiology, progression, recognition, and treatment. Overview of diagnostic process and normal clinical findings.

DT 5252. Comprehensive Care Clinic. (4.0 cr.; S-N only; fall, every year)
Assessment, treatment, and management of patients. Concepts/principles of evidence-based dentistry as applied to clinical practice.

DT 5251. Treatment Planning for the Dental Therapist. (1.0 cr.; S-N only; fall, every year)
Formal lecture presentations regarding fundamentals of assessment/treatment planning of dental cases. Prepare student to understand University of Minnesota School of Dentistry protocol in development of optimal, alternative, emergency treatment plans.

DT 5330. Clinical Application I. (3.0 cr.; A-F only; prereq Accepted into master's dental therapy program; fall, every year)
Assessment principles related to medical/oral health status. Dental therapy clinical procedures, instrumentation skills. Health assessment, parts of periodontium, dental deposits, toothwear, dental disease/prevention, plaque control.

DT 5331. Provider Patient Relationships. (2.0 cr.; A-F only; spring, every year)

DT 5332. Cariology and Applied Nutrition in Dental Therapy Care. (3.0 cr.; A-F only; spring, every year)
Dental caries etiology, pathology/prevention. Applying principles of diet/nutrition to dental therapy patient care/counseling.

DT 5333. Dental Public Health and Academic Service Learning I. (3.0 cr.; A-F only; fall, every year)
Dental therapist as engaged with diverse communities and as professionally responsible and ethical health care provider. Public health approach to disease. Ways in which U.S. oral health care is delivered. Factors impacting supply/demand. Outreach experiences, service learning.

DT 5334W. Dental Therapy Care Process: Clinical Application II. (4.0 cr.; A-F only; fall, every year)
Providing dental care for gerodontic patients and patients with disabilities.

DT 5335. Dental Practice Management. (2.0 cr.; A-F only; prereq 2nd yr dental therapy student; spring, every year)
Interprofessional course. Organizational, managerial, and financial systems that affect successful dental practice.

DT 5336. Ethics and Jurisprudence for the Dental Therapist. (1.0 cr.; A-F only; fall, every year)

DT 5337. Dental Public Health and Service Learning II. (2.0 cr.; A-F only; spring, every year)
How to assess, plan, implement, obtain funding for, and evaluate a public health program.

DT 5338W. Research Methods in Dental Therapy. (3.0 cr.; A-F only; spring, every year)

DT 5339. Introduction to Outreach Experiences. (0.0 cr.; S-N only; spring, every year)
Provide dental care to underserved populations in various clinical settings throughout Minnesota.

DT 5361. Outreach Experiences II. (2.0 cr.; S-N only; fall, every year)
Experiences that reinforce principles of delivering dental health care/services to patients, including underserved patient populations, in contemporary off-site clinical settings.

DT 5410. Applied Dental Biomaterials. (1.0 cr.; A-F only; spring, every year)
Application of scientific principles to selection/utilization of dental materials. Prereq-2nd yr DT student.

DT 5429. Introduction to Psychomotor Skill Development. (1.0 cr.; S-N only; fall, every year)
Virtual reality based training for psychomotor skills required in prosthodontic/operative courses. Eye-hand/mirror skills, ergonomics used while preparing teeth for restoration. Prereq-In dental therapy program.

**DT 5430. Oral Anatomy.** (2.0 cr.; A-F only; prereq Accepted into dental therapy masters program; fall, every year) Morphological characteristics of human dentition, associated contiguous structures. Foundational knowledge applied to situations encountered in general dental clinical practice.

**DT 5431. Oral Anatomy Laboratory.** (3.0 cr.; A-F only; prereq Accepted into masters in dental therapy program; fall, every year) Manual dexterity skills, anatomy of human dentition.


**DT 5433. Operative Dentistry I Pre-Clinic Laboratory.** (2.0 cr.; A-F only; prereq 2nd yr masters in dental therapy student; summer, every year) How to treat dental caries. Therapeutic treatment of underlying pathology. Surgical treatment of early caries lesion. Hands-on projects working with models simulating teeth and surrounding structures.

**DT 5434. Operative Dentistry II Lecture.** (1.0 cr.; A-F only; prereq Enrolled in master's in dental therapy program; fall, every year) How to surgically manage more advanced caries lesions. Transition from pre-clinic lab to clinic setting.

**DT 5435. Operative Dentistry II for the Dental Therapist, Lab.** (1.0 cr.; A-F only; fall, every year) More advanced caries lesions: diagnosis, structural preparation, decay removal and restoration.

**DT 5436. Operative Dentistry III.** (1.0 cr.; A-F only; fall, every year) Transition of students from the pre-clinic laboratory to the clinic setting. Demonstrate competency in the surgical treatment of dental caries prior to being certified ready for patient care.

**DT 5443. Operative Clinic III.** (4.0 cr.; A-F only; fall, every year) How to place restorations. Students place single-tooth restorations on patients.

**DT 5460. Essentials of Clinical Care I For the Dental Therapist.** (1.0-12.0 cr.; S-N only; spring, every year) Students provide comprehensive care under direction of clinical faculty. May include periodontics, operative, pediatric care, and health promotion. Limited care may be given on rotations to oral surgery clinics.

**DT 5471. Prosthodontic Topics forDental Therapy.** (2.0 cr.; S-N only; summer, every year) Lectures, lab projects of selected prosthodontic techniques to enable the dental therapist to provide/cement quality pre-fabricated metal or resin provisional crowns and other prosthodontic procedures in the scope of DT practice.

**DT 5521. Foundations of Interprofessional Professionalism, Communication, and Collaboration.** (1.0 cr.; S-N only; fall, spring, summer, every year) Professionalism, communication/collaboration across health professions. Online independent/group work followed by facilitated interprofessional small group discussions of case narratives.

**DT 5960. Essentials of Clinical Care II for the Dental Therapist.** (5.0-10.0 cr.; max 20.0 cr.; S-N only; summer, every year) Students provide comprehensive care under direction of clinical faculty. May include periodontics, operative, pediatric care, and health promotion. Limited care may be given on rotations to oral surgery clinics.

**Design (DES) College of Design**

**DES 1000. D@MN: Design@Minnesota.** (3.0 cr.; A-F only; fall, every year) Applications of design thinking/design process. Understanding design as consumers, customers, possible future clients.

**DES 1101V. Honors: Introduction to Design Thinking.** (4.0 cr.; A-F only; prereq Honors student; fall, spring, every year) Theories/processes that underpin design thinking. Interactions between humans and their natural, social, and designed environments where purposeful design helps determine quality of interaction. Design professions.

**DES 1101W. Introduction to Design Thinking.** (4.0 cr.; A-F only; fall, spring, every year) Theories/processes that underpin design thinking. Interactions between humans and their natural, social, and designed environments where purposeful design helps determine quality of interaction. Design professions.

**DES 1111. Creative Problem Solving.** (3.0 cr.; S-N only; fall, every year) Development of creative capability applicable to all fields of study. Problem solving techniques. Theory of creativity/innovation.

**DES 1111H. Honors: Creative Problem Solving.** (3.0 cr.; A-F only; prereq Honors; fall, every year) Development of creative capability applicable to all fields of study. Problem solving techniques. Theory of creativity/innovation.

**DES 1160. Topics in Design.** (2.0-4.0 cr.; max 6.0 cr.; A-F only; fall, spring, summer, every year) Topics in design.

**DES 1170. Topics in Design.** (1.0-4.0 cr.; max 6.0 cr.; A-F or Audit; fall, spring, summer, every year) In-depth investigation of specific topic.

**DES 3196. Field Study: National or International.** (1.0-10.0 cr.; A-F or Audit; fall, spring, summer, every year) Faculty-directed field study in national or international setting.

Five stages in the career discovery process: self-assessment, exploration, decision making, experiencing, and implementing. Determining next steps in academic/career process.
DES 3201. Career and Internship Preparation for Design. (1.0 cr.; A-F only; prereq Pre-graphic design or graphic design or pre-interior design or interior design or pre-apparel design or apparel design or environmental design or architecture; fall, spring, every year)
Research career opportunities/organizations related to industry. Set career goals based on skills/interests. Identify job search skills to secure internships, implement transition from college to employment.


DES 3311. Travels in Typography. (3.0 cr.; A-F only; =[DESI 3010]; fall, spring, every year) Using collection in James Ford Bell Library, students study rare book/map collections and undertake hands-on exercises on history of type, including developments in typesetting, calligraphy, and letterpress printing.

DES 3321. Furniture Design: Exploration. (3.0 cr.; A-F only; =[DESI 3040]; fall, every year) Furniture design as discipline, not as method. Material. Objects that mediate our environment. History, design criteria, technology, craft. Group case study, research presentation, individual making/presenting of concept-prototype.

DES 3331. Street Life Urban Design Seminar. (3.0 cr.; A-F only; =DESI 3050); spring, every year) The street as part of network of urban systems/fragments: sidewalks, private interiors, curbs, terraces, boulevards, parking lots, bus stops, public institutions, urban architectures, utility lines, storm/sewer systems, groundwater, satellite communication systems, gardens, and lighting. Readings in urban studies, geography, design, economics and art history. Students review case studies, envision possible transformations of streets/street life.


DES 3351. Phenomenon of Everyday Design. (3.0 cr.; A-F or Audit; fall, offered periodically) Examines the growing fascination with design in everyday life. From Target to IKEA, from TIME magazine to the New York Times Sunday supplement, interest in the designer and designed object are permeating popular culture. Implications of this phenomenon in the present and historical precedents for the "design in everyday life" concept.

DES 3361. History of Modern Design. (3.0 cr.; A-F or Audit; summer, offered periodically) Interplay between the products of design and mass consumption in an innovative manner. Major focus on the late 19th and the 20th centuries. Lectures, exams, and projects integrate material from product, interior, industrial, merchandising, graphic, textile, and clothing design.

DES 4160. Topics in Design . (1.0-4.0 cr. [max 24.0 cr.]; A-F only; fall, spring, summer, every year) In-depth investigation of single specific topic announced in advance.

DES 4165. Design and Globalization. (3.0 cr.; A-F or Audit; =DESI 4165); prereq Jr or Sr; fall, every year) Movement of people, products, and ideas. Challenges brought by differences among us.

DES 4193. Directed Study in Design. (1.0-6.0 cr. [max 36.0 cr.]; A-F only; prereq %; fall, spring, summer, every year) Directed Study in Design

DES 4301. Metaphor and Design. (3.0 cr.; A-F only; fall, spring, every year) Analyze role of metaphors/related tropes when conceptualizing meanings within designed environment. How fundamental/newly emerging metaphorical conceptualizations shape designed spaces, products, images. Create summary statement of significant learning insight.

DES 5160. Topics in Design. (1.0-4.0 cr. [max 24.0 cr.]; A-F only; fall, spring, summer, every year) Topics in design

DES 5165. Design and Globalization. (3.0 cr.; A-F or Audit; =DESI 4165); prereq Grad student; fall, every year) Movement of people, products, and ideas. Challenges brought by differences among us.

DES 5168. Evidence-Based Design. (3.0 cr.; A-F or Audit; prereq CDes grad student or #; fall, every year) Origins of evidence-based design/possible benefits and detractors. Students learn various components as a process/explore methods of integrating process via application to a design project in their area of expertise. Process, impact, influences, and anticipated outcomes are documented/analyzed as compared to a typical design process approach.

DES 5170. Topics in Design. (1.0-4.0 cr. [max 8.0 cr.]; A-F or Audit; fall, spring, summer, every year) In-depth investigation of single specific topic, announced in advance.

DES 5180. Split Rock Arts Topics. (1.0-2.0 cr. [max 4.0 cr.]; A-F or Audit; summer, every year) In-depth investigation of a specific topic, announced in advance.

DES 5185. Human Factors in Design. (3.0 cr.; A-F or Audit; prereq Grad student or Sr or #; fall, offered periodically) Theories/methods that influence the assessment of physical, social, and psychological human factors. Development of user needs with application to designed products that interact with human body.

DES 5193. Directed Study in Design. (1.0-6.0 cr. [max 36.0 cr.]; A-F only; prereq %; fall, spring, summer, every year) Directed Study in Design

DES 5196. Field Study: National/International. (1.0-10.0 cr.; A-F or Audit; =GDES 5196, APST 5196, HSG 5196); fall, spring, summer, every year) Faculty-directed field study in a national or international setting.

DES 5201. Career and Job Search Preparation for Graduate Students. (1.0 cr.; S-N only; prereq Grad student; fall, spring, every year) Job search/career development tools. Goals, networking, job search, resume/CV, interviewing. Assignments include resume/CV, informational interview, career development plan.

Doctor of Dental Surgery (DDS) School of Dentistry

DDS 3111. Introduction to Oral Health and Oral Health Disparity. (2.0 cr.; A-F only; fall, every year) Role of oral health in achieving general health, common oral diseases, oral health disparities, and dentistry as a career option. Prereq: Students must be part of the SEAM program.

Dutch (DTCH) College of Liberal Arts

DTCH 1001. Beginning Dutch. (5.0 cr.; =DTCH 4001); fall, summer, every year) Emphasis on working toward novice-intermediate low proficiency in all four language modalities (listening, reading, speaking, writing). Topics include everyday subjects (shopping, directions, family, food, housing, etc.).

DTCH 1002. Beginning Dutch. (5.0 cr.; =DTCH 4002); prereq 1001; spring, summer, every year) Continues the presentation of all four language modalities (listening, reading, speaking, writing), with a proficiency emphasis. Topics include free-time activities, careers, and Dutch culture.

DTCH 1003. Intermediate Dutch. (5.0 cr.; =DTCH 4003); prereq 1002; fall, every year) Emphasis on intermediate proficiency in listening, reading, speaking, and writing. Contextualized work on grammar and vocabulary is combined with authentic readings and essay assignments.

DTCH 1004. Intermediate Dutch. (5.0 cr.; =DTCH 4004); prereq 1003; spring, every year) Emphasis on developing intermediate mid-high proficiency in listening, reading, speaking, and
writing. Contextualized work on grammar and vocabulary is supported by work with authentic readings and essay assignments.

**DTCH 3011W. Conversation and Composition.** (3.0 cr.; = [DTCH 4011]; prereq 1004 or 4004 or #; fall, every year)
Practice/refinement of spoken/written Dutch. Composition, vocabulary. Reading, viewing, and discussion of Dutch/Flemish media reports. Grammar review, critical corrective grammatical skills.

**DTCH 3012. Conversation and Composition.** (3.0 cr.; = [DTCH 4012]; prereq 3011 or 4011; spring, every year)
Practice/refinement of spoken/written Dutch. Compositional skills, vocabulary. Reading, viewing, and discussion of Dutch/Flemish media reports. Grammar review, development of critical corrective grammatical skills.

**DTCH 3310. Studies in Dutch Literature.** (3.0 cr. [max 9.0 cr.]; prereq Reading knowledge of Dutch; fall, spring, every year)
In-depth study of authors or topics from various periods in Dutch literature (e.g., 19th-century Dutch novels, colonial novels, literature of Golden Age). All primary literature is read in the original.

**DTCH 3510. Topics in Dutch Culture.** (3.0 cr. [max 9.0 cr.]; prereq No knowledge of Dutch required; fall, spring, summer, every year)
A single topic or theme of Dutch or Flemish culture explored in depth. Past topics have included Dutch national character, origin of the Batavian myth, and images of Dutchness.

**DTCH 3993. Directed Studies.** (1.0-5.0 cr. [max 12.0 cr.]; fall, spring, summer, every year)
Guided reading in or study of Dutch literature, culture, or advanced language skills. Prereq-instr consent, dept consent, college consent.

**DTCH 4001. Beginning Dutch.** (2.0 cr.; = [DTCH 1001]; prereq 1004 in another language or passing score on LPE or grad student; fall, spring, every year)
Meets concurrently with 1001. See Dttc 1001 for description.

**DTCH 4002. Beginning Dutch.** (2.0 cr.; = [DTCH 1002]; prereq 1004 in another language or passing score on LPE or grad student; spring, summer, every year)
Meets concurrently with 1002. See 1002 for description.

**DTCH 4003. Intermediate Dutch.** (2.0 cr.; = [DTCH 1003]; prereq 1004 in another language or passing score on LPE or grad student; fall, every year)
Meets concurrently with 1003. See 1003 for description.

**DTCH 4004. Intermediate Dutch.** (2.0 cr.; = [DTCH 1004]; prereq 1004 in another language or passing score on LPE or grad student; spring, every year)
Meets concurrently with 1004. See 1004 for description.

**DTCH 4011. Conversation and Composition.** (2.0 cr.; = [DTCH 3011W]; prereq Grad student; fall, every year)
Meets with 3011W. See 3011W for description.

**DTCH 4012. Conversation and Composition.** (2.0 cr.; = [DTCH 3012]; prereq Grad student; spring, offered periodically)
Meets with 3012. See 3012 for description.

**DTCH 5993. Directed Studies.** (1.0-4.0 cr. [max 12.0 cr.]; fall, spring, summer, every year)
Guided individual reading or study. Prereq-instr consent, dept consent, college consent.

**Early Modern Studies (EMS)**

**College of Liberal Arts**

**EMS 5500. Topics in Early Modern Studies.** (3.0 cr. [max 6.0 cr.]; prereq Grad student; fall, every year)
Selected topics in early modern studies from various disciplinary perspectives/world regions.

**Earth Sciences (ESCI)**

**Institute of Technology**

**ESCI 1001. Earth and Its Environments.** (4.0 cr.; = [ESCI 1101]; fall, spring, summer, every year)

**ESCI 1003. Dinosaur Evolution, Ecology, and Extinction: Introduction to the Mesozoic World.** (3.0 cr.; spring, every year)
Dinosaurs and the Mesozoic Earth are used to introduce evolution, plate tectonics, climate change, and Earth systems. Overview of the history of dinosaur interpretations illustrates the principles and social aspects of scientific investigation.

**ESCI 1005. Geology and Cinema.** (4.0 cr.; = [ESCI 1105]; spring, every year)
Physical processes shaping the Earth, materials it comprises, its nearly five billion year history as told spectacularly, but often wrongly, by Hollywood movies.

**ESCI 1006. Oceanography.** (3.0 cr.; = [ESCI 1006, GEO 5006]; fall, every year)
How various processes in the ocean interact. Marine biology, waves, tides, chemical oceanography, marine geology, human interaction with sea.

**ESCI 1901. Freshman Seminar: Environment.** (3.0 cr. [max 6.0 cr.]; A-F or Audit; prereq freshman; fall, spring, every year)
Topics vary. See Class Schedule.

**ESCI 1905. Freshman Seminar.** (1.0-3.0 cr. [max 6.0 cr.]; A-F or Audit; prereq freshman; fall, spring, every year)
Topics vary. See Class Schedule.

**ESCI 1906W. Freshman Seminar: Writing Intensive and Environmental Theme.** (1.0-3.0 cr. [max 6.0 cr.]; A-F or Audit; prereq freshman; fall, every year)
Topics vary: see freshman seminar topics.

**ESCI 2201. Solid Earth Dynamics.** (4.0 cr.; A-F or Audit; prereq &PHYS 1301 or #; fall, every year)
Dynamics of solid Earth, particularly tectonic system. Seismology, internal structure of Earth. Earth's gravity, magnetic fields. Paleomagnetism, global plate tectonics, tectonic systems. Field trip.

**ESCI 2202. Earth History.** (4.0 cr.; A-F only; prereq [2201, 2301] or #; spring, every year)
ESCI 2203. Earth Surface Dynamics. (4.0 cr.; A-F or Audit; spring, every year)
Earth's surface processes, drivers, and implications. Interactions between atmosphere, lithosphere, hydrosphere, and biosphere.

ESCI 2301. Mineralogy. (3.0 cr.; prereq [CHEM 1061, &CHEM 1065, &MATH 1271] or #; fall, every year)
Crystalllography, crystal chemistry, physics. Physical/chemical properties, crystal structures, chemical equilibria of major mineral groups. Lab includes crystallographic, polarizing microscope, X-ray powder diffraction exercises, hand-specimen mineral identification.

ESCI 2302. Petrology. (3.0 cr.; prereq 2301 or #; spring, every year)
Migmatic and metamorphic processes, with an emphasis on plate tectonic interpretation of rock sequences.

ESCI 3001. Earth Materials. (3.0 cr.; fall, offered periodically)
Common rocks/minerals and their geologic settings. Properties of these materials as basis for identification/use in industry/society.

ESCI 3002. Climate Change and Human History. (3.0 cr.; A-F or Audit; = [ESCI 5102]; spring, odd years)
Causes of long-/short-term climate change. Frequency/magnitude of past climate changes; their geologic records. Relationship of past climate changes to development of agrarian societies and to shifts in power among kingdoms/city-states. Emphasizes last 10,000 years.

ESCI 3004. Water and Society. (3.0 cr.; fall, offered periodically)
Processes that influence formation, circulation, composition, and use of water. Human influence on water quality through agricultural, industrial, and other land-use practices. International case studies examine human interaction with surface environment, influence of local land-use practices.

ESCI 3005. Earth Resources. (3.0 cr.; fall, odd years)

ESCI 3006. Planets of the Solar System. (3.0 cr.; )

ESCI 3093. Problems in Earth Sciences: Junior. (1.0-4.0 cr. [max 6.0 cr.]; prereq #; fall, spring, every year)
Problems in earth sciences studied independently under the direction of a faculty member.

ESCI 3202. Fluid Earth Dynamics. (4.0 cr.; prereq 2201; fall, every year)
Dynamics of fluid Earth, mainly surface processes and convection.

ESCI 3303W. Geochemical Principles. (4.0 cr.; prereq [CHEM 1061, &CHEM 1065] or #; fall, every year)

ESCI 3302. Science and Politics of Global Warming. (3.0 cr.; = [ESCI 5402]; spring, every year)

ESCI 3345. Atmospheric Pollution: From Smog to Climate Change. (3.0 cr.; A-F or Audit; prereq [CHEM 1061, PHYS 1101W, Math 1142] or 1271 or #; fall, every year)

ESCI 3870. Modeling Workshop. (1.0 cr. [max 2.0 cr.; prereq Geo or Geophys or GeoEng major or #; fall, spring, offered periodically)
Modeling of geologic or geophysical systems.

ESCI 3880. Laboratory Workshop. (1.0 cr. [max 2.0 cr.; prereq Geo or Geophys or GeoEng major or #; fall, spring, every year)
Geologic or geophysical lab study.

ESCI 3890. Field Workshop. (1.0 cr. [max 2.0 cr.; prereq [Geo or ESci or GeoEng] major or #; fall, spring, every year)
Earth sciences field study.

ESCI 3891. Field Methods. (2.0 cr.; A-F only; spring, every year)
Methods in geologic field mapping.

ESCI 3911. Introductory Field Geology. (4.0 cr.; A-F or Audit; prereq 2201, 3891, #; summer, every year)

ESCI 4010. Undergraduate Seminar: Current Topics in Earth Sciences. (1.0-4.0 cr. [max 12.0 cr.; prereq #; fall, spring, every year)
Topics in earth sciences investigated in a seminar format.

ESCI 4093. Problems in Earth Sciences: Senior. (1.0-4.0 cr. [max 6.0 cr.]; prereq #; fall, spring, summer, every year)
Seniors engage in independent research under faculty supervision.

ESCI 4094. Senior Thesis. (2.0 cr. [max 4.0 cr.; prereq Sr, Geo or ESci major; #; fall, spring, summer, every year)
Senior-level majors engage in independent research under faculty supervision. Select problems according to individual interests and in consultation with faculty committee. Thesis and oral defense.

ESCI 4102W. Vertebrate Paleontology: Evolutionary History and Fossil Records of Vertebrates. (3.0 cr.; A-F or Audit; prereq 1001 or 1002 or Biol 1001 or Biol 1002 or Biol 1009 or #; spring, odd years)
Vertebrate evolution (exclusive of mammals) in phylogenetic, temporal, functional, and paleoecological contexts. Vertebrate anatomy. Methods in reconstructing phylogenetic relationships and origin/history of major vertebrate groups, from Cambrian Explosion to modern diversity of vertebrate animals.

ESCI 4103W. Fossil Record of Mammals. (3.0 cr.; A-F or Audit; spring, even years)

ESCI 4203. Principles of Geophysical Exploration. (3.0 cr.; prereq Phys 1302; fall, every year)
Seismic exploration (reflection and refraction); potential techniques (gravity and magnetics) and electrical techniques of geophysical exploration.

ESCI 4204. Geomagnetism and Paleomagnetism. (3.0 cr.; prereq 2201, Phys 1302, Math 1272 or #; )
Present geomagnetic field at the Earth's surface, secular variation, geomagnetic field reversals. Physical and chemical basis of paleomagnetism: origin of natural remanent magnetization, mineralogy of magnetic minerals, magnetic polarity stratigraphy, apparent polar wander, and environmental magnetism.

ESCI 4211. Solid Earth Geophysics I. (3.0 cr.; A-F or Audit; prereq 2201, Phys 1302; fall, every year)
Basic elasticity, basic seismology, and physical structure of the Earth's crust and deep interior.

ESCI 4212. Solid Earth Geophysics II. (3.0 cr.; A-F or Audit; prereq 2201, Phys 1302; spring, every year)
Dynamics of the solid Earth, mostly mantle and core; seismic tomography, geothermal measurements, gravity, time-dependent deformation of the Earth, computer modeling.

ESCI 4401. Aqueous Environmental Geochemistry. (3.0 cr.; = [ESCI 8401]; prereq Chem 3501 or #; spring, offered periodically)

ESCI 4402. Biogeochemical Cycles in the Ocean. (3.0 cr.; = [ESCI 8402, ESCI 5412]; prereq [CHEM 1021, CHEM 1022] or #; fall, even years)
Marine biogeochemistry and chemical oceanography. Processes controlling chemical composition of oceans past/present. Cycles of major/minor constituents, including carbon, nitrogen, phosphorus, silicon, and oxygen and their isotopes. Role of these cycles in climate system.

**ESCI 4501. Structural Geology.** (3.0 cr.; prereq 2201, 2302; fall, every year) Fundamental concepts related to deformation of Earth's crust. Processes associated with deformation, faulting, folding, fabric development. Lab/lecture including solving problems, conducting physical/numerical experiments. Field trips.

**ESCI 4502. Tectonic Styles.** (3.0 cr.; prereq 4501 or #; ) Origin and nature of major types of tectonic disturbances affecting the crust and lithosphere, including analysis of the form and development of individual structural components and relationship to plate tectonics. Changes over geologic time in the nature of orogenic processes.

**ESCI 4503. Neotectonics.** (3.0 cr.; prereq 4501 or #; ) Integration of diverse elements of geology, geodesy, and geophysics to examine recent and active tectonics of the Earth's lithosphere; extensional, compressional and wrench tectonic regimes with case studies around the world; modern global plate motions, geodetic techniques, seismic anisotropy, climatically driven tectonics.

**ESCI 4602. Sedimentology and Stratigraphy.** (3.0 cr.; prereq [2203, 2301] or #; spring, every year) Interpretation of origin of sedimentary rocks through application of basic physical/chemical principles. Modern depositional environments, petrographic microscopy, basin dynamics, stratigraphy.

**ESCI 4701. Geomorphology.** (3.0-4.0 cr.; prereq 1001, Math 1031 or #; ) Origin, development, and continuing evolution of landforms in various environments. Environmental implications. Weathering, slope and shore processes, fluvial erosion and deposition, and region processes, glacial processes.


**ESCI 4703. Glacial Geology.** (4.0 cr.; prereq 1001 or #; fall, odd years) Formation and characteristics of modern glaciers; erosional and depositional features of Pleistocene glaciers; history of quaternary environmental changes in glaciated and nonglaciated areas. Field trips and labs.

**ESCI 4801. Geomicrobiology.** (3.0 cr.; prereq One semester college level biology; spring, every year) Geosphere/biosphere interactions over temporal/spatial scales. Global biogeochemical cycling, microbe-metal interactions, microbial paleobiology, environmental geomicrobiology, life detection, habitability of planets.

**ESCI 4911. Advanced Field Geology.** (4.0 cr.; A-F or Audit; prereq 3911, #; summer, every year) Geologic mapping; study of igneous, metamorphic, and sedimentary rocks; structures and surficial features; problem solving. Paper required.

**ESCI 4971W. Field Hydrogeology.** (4.0 cr.; prereq #; summer, every year) Aquifer, vadose zone, and surface water hydrology field techniques. Shallow soil boring, sampling. Well installation. Single/multiple well aquifer testing. Ground water sampling for chemical analysis. Weather data collection, hydrogeologic mapping, water balance calculation.

**ESCI 5093. Directed Studies in Earth Sciences.** (1.0-4.0 cr. [max 16.0 cr.]; fall, spring, every year) Independent, directed study in earth sciences arranged by student/faculty member.

**ESCI 5102. Climate Change and Human History.** (3.0 cr.; =[ESCI 3002]; prereq 1001 or equiv or #; spring, odd years) Causes of long-/short-term climate change. Frequency/magnitude of past climate changes, their geologic records. Relationship of past climate changes to development of agrarian societies and to shifts in power among kingdoms/city-states. Emphasizes last 10,000 years.

**ESCI 5201. Time-Series Analysis of Geological Phenomena.** (3.0 cr.; A-F or Audit; prereq Math 2263 or #; ) Time-series analysis of linear and nonlinear geologic and geophysical phenomena. Examples drawn from ice age cycles, earthquakes, climatic fluctuations, volcanic eruptions, atmospheric phenomena, thermal convection and other time-dependent natural phenomena. Modern concepts of nonlinear dynamics and complexity theory applied to geological phenomena.

**ESCI 5203. Mineral and Rock Physics.** (3.0 cr.; prereq 2201, Phys 1302; spring, offered periodically) Physical properties of minerals and rocks as related to the composition and dynamics of the Earth's crust, mantle, and core.


**ESCI 5302. Isotope Geology.** (3.0 cr.; A-F or Audit; prereq 3303W or #; fall, every year) Theory and uses of radioactive, radiogenic, and stable isotopes in geology. Radioactive dating, geothermometry, and tracer techniques in geologic processes.

**ESCI 5351. Geochemical Modeling of Aquifer Systems.** (3.0 cr.; prereq 4401; spring, even years) Using mass transfer reaction path models to assess chemical evolution of natural fluids, hydrothermal alteration processes, and formation of hydrothermal ore deposits.

**ESCI 5353. Electron Microprobe Theory and Practice.** (3.0 cr.; =[MATS 5353]; prereq [One yr chem, one yr physics] or #; fall, offered periodically) Characterizing solid materials with electron beam instrumentation, including reduction of X-ray data to chemical compositions.


**ESCI 5502. Advanced Structural Geology.** (3.0 cr.; prereq 4501 or #; ) Analysis of structures and fabric of deformed rocks, determination of states of stress and strain in rocks and of evolution of these with time. Deformation mechanisms. Extensive reading in journal literature. Field trips.

**ESCI 5503. Advanced Petrology.** (3.0 cr.; prereq 2302, CHEM 1061, CHEM 1065, [MATH 1372 or MATH 1572]; fall, odd years) Quantitative approach to modern igneous/m metamorphic petrology. Emphasizes thermodynamics of minerals/melts and with applications to phase diagrams, thermobarometry, melting relationships, and energetics of petrologic mass transfer.

**ESCI 5504W. Neotectonics.** (3.0 cr.; prereq [2201, 4501] or #; fall, even years) Integration of multidisciplinary elements of geology, geodesy, geodynamics, seismotectonics, tectonophysics to examine recent/active tectonics of Earth's lithosphere. Extensional, compressional, wrench-tectonic regimes with global case studies incorporating mantle to surface processes.

**ESCI 5601W. Advanced Sedimentology.** (4.0 cr.; prereq 4602 or #; fall, odd years) Principles/processes of sedimentary geology. Interactions among lithosphere, biosphere,
atmosphere, hydrosphere. Detrital/carbonate facies of modern/ancient systems, coastal processes, geobiology, tectonics, paleoclimate, structural diagenesis, paleoecos, volcanic sedimentation.

**ESCI 5705. Limnogeology and Paleoenvironment.** (3.0 cr.; prereq #; ) Within-lake, hydrogeologic, and landscape (geological/biological) processes that lead to formation of various proxy records of paleoenvironment. Systems approach to physical, geochemical, biogeochemical, and biotic proxies. Basic principles, case studies. Emphasizes how proxy records relate to paleoclimate.

**ESCI 5713. Tracers and Karst Hydrogeology.** (3.0 cr.; prereq 5701, #; ) Karst hydrogeology and application of tracers to determine source, age, and mixing parameters of water in various natural reservoirs. Physical and chemical principles and processes operating in karst hydrogeology; use of natural and synthetic chemical and isotopic labels or tracers to follow movement and mixing of water through hydrologic cycle.

**ESCI 5971. Field Hydrogeology.** (2.0 cr.; prereq #; summer, every year) Aquifer, vadose zone, and surface water hydrology field techniques. Shallow soil boring and sampling. Well installation. Single/multiple well aquifer testing. Ground water sampling for chemical analysis. Weather data collection, hydrogeologic mapping, water balance calculation.

**ESCI 5980. Seminar: Current Topics in Earth Sciences.** (1.0-4.0 cr. [max 8.0 cr.]; S-N or Audit; fall, spring, offered periodically) Topics in earth sciences investigated in a seminar format.

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**East Asian Studies (EAS) College of Liberal Arts**

**EAS 3461. Introduction to East Asia I: The Imperial Age.** (3.0-4.0 cr. ; = [HIST 3461]; fall, spring, every year) Comparative survey of early history of China, Japan, Korea, and Vietnam; early Chinese thought; diffusion of Confucianism, Buddhism, and other values throughout East Asia; political and social history of region to 1600.

**EAS 3462. From Subjects to Citizens: The History of East Asia From 1500 to the Present.** (3.0-4.0 cr. ; = [HIST 3462H, HIST 3462, EAS 3462]; spring, every year) How Asian states, societies, economies, and cultures linked with one another and with European powers. How period's historical effects still resonate. Covers India, China, Japan, Korea, and Indochina.

**EAS 3462H. Honors: From Subjects to Citizens: The History of East Asia from 1500 to the Present.** (3.0-4.0 cr. ; A-F or Audit; = [HIST 3462H, HIST 3462, EAS 3462]; spring, every year) How Asian states, societies, economies, cultures linked with one another/European powers. Historical effects. Covers India, China, Japan, Korea, Indochina.

**EAS 3468. Social Change in Modern China.** (3.0 cr. ; = [HIST 5468, HIST 3468]; fall, offered periodically) Opium War and opening of Treaty Ports in 19th century; missionary activity and cultural influence; changes in education system; women's movement; early industrialization; socialism and collectivization after 1949; industrialization of Taiwan; PRC's entry into the world trading system.

**EAS 3471. Modern Japan, Meiji to the Present (1868-2000).** (3.0 cr. ; = [HIST 3471, ALL 3478]; fall, spring, every year) Japan's early development as industrial/imperial power after Meiji Restoration of 1868. Political developments in Taisho years; social, cultural, economic trends that supported them. Militarization/mobilization for war in 1930s. Japan's war with China, Pacific War with the United States. American occupation. Postwar economic recovery, high growth. Changing political/popular culture of 1980s, '90s.

**EAS 3473. Family, School, and Work in Modern Japanese History.** (3.0 cr.; ) Impact of economic, social, and cultural change on males and females in the family, the education system, the employment system from the 17th through 20th centuries.

**EAS 3479. History of Chinese Cities and Urban Life.** (3.0-4.0 cr.; A-F or Audit; = [HIST 3479, ALL 3371, HIST 4759]; fall, spring, offered periodically) Introduction to traditional Chinese cities, modern transformation. Ideal city plan in Confucian classics compared with physical layout of major cities. Models about Chinese cities, influence of models on our understanding of Chinese history/society.


**Ecology, Evolution, and Behavior (EEB) College of Biological Sciences**

**EEB 3001. Ecology and Society.** (3.0 cr.; A-F or Audit; = [BIOL 3008W, BIOL 1407, BIOL 3007, BIOL 4007, EEB 3008W]; prereq [One semester college biology or #]; [MATH 1142 or MATH 1271 or MATH 1281 or equiv]; spring, every year) Principles of population growth/interactions, communities and ecosystem function applied to ecological issues. Regulation of populations, dynamics/impacts of disease, invasions by exotic organisms, biodiversity, global change. Lab. Scientific writing.

**EEB 3408W. Ecology.** (3.0 cr.; = [BIOL 3408W, BIOL 5407, BIOL 3807, EEB 3001, BIOL 3407]; prereq [One semester college biology or #]; [MATH 1142 or MATH 1271 or MATH 1281 or equiv]; spring, every year) Principles of population growth/interactions, communities and ecosystem function applied to ecological issues. Regulation of populations, dynamics/impacts of disease, invasions by exotic organisms, biodiversity, global change. Lab. Scientific writing.

**EEB 3409. Evolution.** (0.0-3.0 cr.; = [BIOL 3409, BIOL 4009, BIOL 5409, BIOL 2822, BIOL 3409]; prereq One semester college biology; fall, spring, every year) Diversity of forms in fossil record and in presently existing biology. Genetic mechanisms of evolution, including natural selection, sexual selection, genetic drift. Examples of ongoing evolution in wild/domesticated populations and in disease-causing organisms. Lab.

**EEB 3412W. Introduction to Animal Behavior.** (4.0 cr.; A-F only; = [BIOL 3411W, BIOL 3811, BIOL 3411]; prereq Undergrad biology course; spring, every year) Writing intensive course. Introduction to animal behavior. Feeding behavior, reproductive behavior, perception, learning, animal conflict, social behavior, parental care, communication. Scientific process. Formulate research questions.

**EEB 3603. Science, Protection, and Management of Aquatic Environments.** (3.0 cr.; prereq One semester college biology; spring, every year) Fundamentals of aquatic ecology. Case study approach to water problems faced by society (e.g., eutrophication, climate change invasive species, acid rain, wetland protection, biodiversity preservation). Science used to diagnose/mediate or remove problems.

**EEB 3963. Modeling Nature and the Nature of Modeling.** (3.0 cr.; = [EEB 5963]; prereq [Math 1281, Math 1282] or equiv or #; ) Hands-on modeling experiences in context of biological applications. Reviews calculus concepts. Students carry out modeling steps, from developing the model, to analytical analysis, to developing computer code, to running the models.

**EEB 4068. Plant Physiological Ecology.** (3.0 cr.; Student Option No Audit; = [EEB 5068]; prereq BIOL 2022 or BIOL 3002 or BIOL 3407 or BIOL 3408W or #; spring, odd years) Plant function, its plasticity/diversity in an ecological context. Impact of environmental stresses on major physiological processes of plants, including photosynthesis, respiration, water uptake/transport, and nutrient uptake/assimilation. Lab, field trip to Cedar Creek.

**EEB 4129. Mammalogy.** (4.0 cr.; A-F or Audit; = [FW 4129]; prereq BIOL 1001 or BIOL 2012; fall, every year) Evolutionary and biogeographic history of mammals. Recognize, identify, and study
natural history of mammals at the ordinal level, North American mammals at familial level, and mammals north of Mexico at generic level. Minnesota mammals at specific level. Includes lab.

EEB 4134. Introduction to Ornithology. (4.0 cr.; prereq Biol 1001 or Biol 2012; spring, every year) Structure, evolution, classification, distribution, migration, ecology, habitats, identification of birds. Lecture, lab, weekly field walks. One weekend field trip.

EEB 4329. Primate Ecology and Social Behavior. (3.0 cr.; A-F or Audit; prereq BIOL 1009 or BIOL 2022 or BIOL 3411 or ANTH 1001 or #; fall, offered periodically) Primates as model system to explore animal/human behavior. Factors influencing sociality/group composition. Mating systems. Prevalence of altruistic, cooperative, and aggressive behavior. Strength of social bonds in different species. Evolution of intelligence/culture.


EEB 4609W. Ecosystem Ecology. (3.0 cr.; prereq Biol 3407 or #; fall, every year) Regulation of energy and elements cycling through ecosystems. Dependence of cycles on kinds/numbers of species within ecosystems. Effects of human-induced global changes on functioning of ecosystems.

EEB 4611. Biogeochemical Processes. (3.0 cr.; prereq [CHEM 2301, PHYS 1201] # or #; spring, offered periodically) Application of biochemistry, ecology, chemistry, and physics to environmental issues. Issues in biogeochemistry. Impact of humans on biogeochemical processes in soils, lakes, oceans, estuaries, forests, urban/managed ecosystems, and extreme environments (e.g., early Earth, deep sea vents, thermal springs).

EEB 4793W. Directed Studies: Writing Intensive. (1.0-7.0 cr.; S-N or Audit; prereq #, %; fall, spring, summer, every year) Individual study on selected topics or problems. Emphasizes readings, use of scientific literature. Written report.

EEB 4794W. Directed Research: Writing Intensive. (1.0-6.0 cr.; [max 42.0 cr.]; S-N or Audit; prereq #, %; fall, spring, summer, every year) Laboratory or field investigation of selected areas of research, including written report.

EEB 4811. Biogeochemical Processes. (4.0 cr.; A-F or Audit; prereq CHEM 2301, [PHYS 1201 or #]; summer, offered periodically) Application of biochemistry, ecology, chemistry, physics to global biogeochemical cycles. Human impacts on biogeochemical cycles. Lab. Meets at Itasca Biological Station & Laboratories. Lodging/meal costs in addition to tuition.

EEB 4839. Field Studies in Mammalogy. (4.0 cr.; A-F or Audit; prereq College-level biology course that includes study of animals or #; summer, every year) Techniques for studying small mammals. Lectures/field projects emphasize identification, distributions, community interactions, ecophysiology, population ecology.

EEB 4844. Field Ornithology. (4.0 cr.; A-F or Audit; prereq One semester college biology or #; summer, every year) Biology of breeding birds through use of field techniques at Itasca Biological Station/Laboratories. Daily fieldwork emphasizes identification, behavioral observations, netting/censusing.

EEB 4993. Directed Studies. (1.0-7.0 cr.; S-N or Audit; prereq #, %; fall, spring, summer, every year) Individual study on selected topics or problems. Emphasizes selected readings, use of scientific literature.

EEB 4994. Directed Research. (1.0-6.0 cr. [max 42.0 cr.]; S-N only; prereq #, %; fall, spring, summer, every year) Laboratory or field investigation of selected areas of research.

EEB 5042. Quantitative Genetics. (3.0 cr.; A-F only; prereq [BIOL 4003 or GCD 3022] or #; a course in statistics is recommended; fall, every year) Fundamentals of quantitative genetics. Genetic/environmental influences on expression of quantitative traits. Approaches to characterizing genetic basis of trait variation. Processes that lead to change in quantitative traits. Applied/evolutionary aspects of quantitative genetic variation.

EEB 5053. Ecology: Theory and Concepts. (4.0 cr.; prereq Biol 3407 or #; fall, odd years) Classical and modern mathematical theories of population growth, interspecific interactions, ecosystem dynamics and functioning, with emphasis on underlying assumptions and on effects of added biological reality on robustness of predictions, stability, interspecific interactions, ecosystem structure and functioning.

EEB 5068. Plant Physiological Ecology. (3.0 cr.; Student Option No Audit; =EEB 4068; prereq BIOL 2022 or BIOL 3022 or BIOL 3407 or BIOL 3408W or #; spring, odd years) Plant function, its plasticity/diversity in ecological context. Impact of environmental stresses on major physiological processes of plants, including photosynthesis, respiration, water uptake/transport, and nutrient uptake/assimilation. Lab, field trip to Cedar Creek.


EEB 5221. Molecular Evolution. (3.0 cr.; A-F or Audit; prereq [[BIOL 4003 or GCD 3022], grad student]] or #; fall, offered periodically) Molecular basis of evolutionary change. Selection, neutral evolutionary processes at molecular level. Evolution from gene to genome level: protein structure/function, multigene families, organelle genomes, genome organization. Lectures, current literature, workshops.

EEB 5322. Evolution and Animal Cognition. (3.0 cr.; prereq Biol 3411 or Psy 3061 or #) Animal cognitive abilities. Learning, perception, memory, navigation, and communication from evolutionary/comparative perspective. Cognitive abilities as adaptations that solve specific environmental problems. Empirical methods for assessing cognitive abilities. Emphasizes parsimonious interpretations of data. Controversial topics such as animal intelligence, animal language and whether non-human animals have a "theory of mind."

EEB 5327. Behavioral Ecology. (3.0 cr.; prereq Biol 3411 or #; spring, odd years) Evolutionary principles applied to aggressive competition, mate choice, cooperation, and parental investment. Optimization models used to examine foraging strategies, predator/prey interactions, and territoriality. Evolution of sex, sexual selection, dispersal. Evolutionary game theory.

EEB 5371. Principles of Systematics. (3.0 cr.; prereq Grad student or #; spring, even years) Theoretical/practical procedures of biological systematics. Phylogeny reconstruction. Computer-assisted analyses, morphological and molecular approaches, species concepts/speciation, comparative methods, classification, historical biogeography, nomenclature, use/value of museums.

EEB 5409. Evolution. (3.0 cr.; =BIOL 3809, EEB 3409, BIOL 5409, BIOL 2822, BIOL 3409); prereq One semester college biology; fall, spring, every year) Diversity of forms in fossil record and in presently existing biology. Genetic mechanisms of evolution, including natural selection, sexual selection, genetic drift. Examples of ongoing evolution in wild/domesticated populations and in disease-causing organisms. Lab.

EEB 5601. Limnology. (3.0 cr.; prereq Grad student or #; fall, every year) Advanced introduction to description/analysis of interaction of physical, chemical, and biological factors that control functioning of life in lakes and other freshwater aquatic environments.

EEB 5605. Limnology Laboratory. (2.0 cr.; A-F or Audit; prereq 3603 or #; fall, every year) Field/lab methods to obtain information on environmental conditions in aquatic environments and measure abundance of
ECON 1101. Principles of Microeconomics. 
(4.0 cr.; =ECON 1101H, ECON 1104, APEC 1102H; prerequisite [1101 or equiv]; prerequisite knowledge of plane geometry and advanced algebra; fall, spring, summer, every year) 

ECON 1102. Principles of Macroeconomics. 
(4.0 cr.; =ECON 1105, ECON 1102H, APEC 1102, APEC 1102H; prerequisite [1101 or equiv]; prerequisite knowledge of plane geometry and advanced algebra; fall, spring, summer, every year) 

ECON 1902. Freshman Seminar. 
(3.0 cr.; =ECON 1902W, ECON 1902, ECON 1902H; prerequisite [Biol 3407 or Biol 5407] or #; spring, every year) 
Regulation of energy and elements cycling through ecosystems. Dependence of cycles on kinds/numbers of species within ecosystems. Effects of human-induced global changes on functioning of ecosystems.

(3.0 cr.; =EEB 3963; prerequisite [Math 1281, Math 1282] or equiv or #) 
Hands-on modeling experiences in context of biological applications. Reviews calculus concepts. Students carry out modeling steps, from developing the model, to analytical analysis, to developing computer code, to running the models.

ECON 3101. Intermediate Microeconomics. 
(4.0 cr.; =ECON 3001, ECON 3101H; prerequisite [1101, 1102] or equiv; prerequisite [APEC 1102H, APEC 3006]; prerequisite 3011 or equiv; fall, spring, summer, every year) 

ECON 3102. Intermediate Macroeconomics. 
(4.0 cr.; =ECON 3102H, APEC 3006; prerequisite 3101 or equiv; fall, spring, summer, every year) 
Determinants of national income, employment, and price level; effects of monetary and fiscal policies; emphasis on a general equilibrium approach. Applications of the theory, especially to current macroeconomic policy issues.

ECON 3701. Money and Banking. 
(3.0 cr.; =ECON 4721H, ECON 4728, ECON 4721; prerequisite 1101, 1102 or equiv; not open to Econ majors; fall, spring, summer, every year) 
Historical development, present characteristics, and economic role of financial institutions. Commercial banking, the Federal Reserve System, and monetary policy.

ECON 3801. Elements of Public Economics. 
(3.0 cr.; =ECON 4821; prerequisite [1102 or equiv]; not open to Econ majors; fall, every year) 

ECON 3951. Major Project Seminar. 
(2.0 cr.; =ECON 3951H; prerequisite 3101, 3102, STAT 3011, STAT 3022 or equiv; two [3xxx or 4xxx] ECON courses, at least one 4xxx ECON writing intensive course, freshman writing requirement satisfied; fall, spring, summer, every year) 
Students produce a significant written work in economics. Project demonstrate critical thinking, collection/analysis of data, problem solving, interpretation of findings. Modes of inquiry in economics.

ECON 3960. Topics in Economics. 
(3.0 cr.; max 6.0 cr.; prerequisite [1101, 1102 or equiv]; fall, every year) 
Topics specified in Class Schedule.

ECON 3968. Topics in Economics. 
(3.0 cr.; max 6.0 cr.; prerequisite [1101, 1102 or equiv]; fall, spring, every year) 
Topics specified in Class Schedule.

ECON 3991. Independent Study. 
(1.0-3.0 cr.; =ECON 3991H, ECON 3991, ECON 3991H; prerequisite 3101, 3102, %; fall, spring, summer, every year) 
Students confirm topic of study with faculty supervisor or with director of undergraduate studies before beginning (otherwise no credit).

ECON 3993. Directed Studies. 
(1.0-3.0 cr.; prerequisite 3900, 3901; prerequisite 3101, 3102, 4261, two semesters of statistics; fall, spring, summer, every year) 
Guided individual reading or study in areas not available in regular course offerings.

ECON 4100W. Undergraduate Writing in Economics. 
(1.0 cr.; max 2.0 cr.; =ECON 3993; prerequisite 3101, [&4831 or & economics honors course], freshman writing practice completed, #; fall, spring, every year) 
Research essay.

ECON 4108. Advanced Game Theory and Applications. 
(4.0 cr.; prerequisite [3101, 3102] or equiv; prerequisite [MATH 1271, MATH 1272] or equiv; fall, every year) 

ECON 4109H. Honors Course: Game Theory and Applications. 
(4.0 cr.; =ECON 4110H; prerequisite [3101, 3102] or equiv; prerequisite [MATH 1271, MATH 1272] or equiv; fall, spring, every year) 
Development of selected models of economic behavior in mathematical terms. Topics selected to illustrate advantages of mathematical formulation.

ECON 4113H. Introduction to Mathematical Economics Honors. 
(4.0 cr.; =ECON 4113H; prerequisite [3101, 3102 or equiv]; prerequisite [MATH 1271, MATH 1272, MATH 2243 or equiv]; fall, spring, every year) 
Development of selected models of economic behavior in mathematical terms. Topics selected to illustrate advantages of mathematical formulation.

ECON 4118. Advanced Mathematical Economics. 
(4.0 cr.; =ECON 4118H; prerequisite [3101, 3102 or equiv]; prerequisite [MATH 1271, MATH 1272, MATH 2243 or equiv]; fall, spring, every year) 
Development of selected models of economic behavior in mathematical terms. Topics selected to illustrate advantages of mathematical formulation.

ECON 4161. Microeconomic Analysis. 
(2.0 cr.; prerequisite [ECON 3101, 3102, MATH 2243, MATH 2263, [STAT 4101, STAT 4102] or equiv]; %; fall, every year) 
Theories of consumer demand, producer supply, and market equilibrium. General equilibrium and welfare. May include topics such as externalities, economics of information/uncertainty. Seven-week course. Meets with 8001.

ECON 4162. Microeconomic Analysis. 
(2.0 cr.; prerequisite [ECON 3101, 3102, 4161, MATH 2243, MATH 2263, [STAT 4101, STAT 4102] or equiv]; %; fall, every year) 
Theories of consumer demand, producer supply, and market equilibrium. General equilibrium and welfare. May include topics such as externalities, economics of information/uncertainty, and game theory. Seven-week course. Meets with 8002.
MATH 2263. [STAT 4101, STAT 4102] or equiv.; %; spring, every year)

Theories of consumer demand, producer supply, and market equilibrium. General equilibrium and welfare. May include topics such as externalities, economics of information/uncertainty, and game theory. Seven-week course. Meets with 8003.

ECON 4164. Microeconomic Analysis. (2.0 cr.; prereq 3101, 3102, 4163, MATH 2243, MATH 2263, [STAT 4101, STAT 4102] or equiv.; %; spring, every year)

Theories of consumer demand, producer supply, and market equilibrium. General equilibrium and welfare. May include topics such as externalities, economics of information/uncertainty, and game theory. Seven-week course. Meets with 8004.

ECON 4165. Macroeconomic Theory. (2.0 cr.; prereq 3101, 3102, MATH 2243, MATH 2263, [STAT 4101, STAT 4102] or equiv.; %; fall, every year)

Dynamic general equilibrium models: solving for paths of interest rates, consumption, investment, and prices. Seven-week course. Meets with 8105.

ECON 4166. Macroeconomic Theory. (2.0 cr.; prereq 3101, 3102, 4165, MATH 2243, MATH 2263, [STAT 4101, STAT 4102] or equiv.; %; fall, every year)

Dynamic general equilibrium models: solving for paths of interest rates, consumption, investment, and prices. Seven-week course. Meets with 8106.

ECON 4167. Macroeconomic Theory. (2.0 cr.; prereq 3101, 3102, 4166, MATH 2243, MATH 2263, [STAT 4101, STAT 4102] or equiv.; %; spring, every year)


ECON 4168. Macroeconomic Theory. (2.0 cr.; prereq 3101, 3102, 4167, MATH 2243, MATH 2263, [STAT 4101, STAT 4102] or equiv.; %; spring, every year)


ECON 4171. History of Economic Thought. (3.0 cr.; prereq [3101, 3102] or equiv; spring, every year)

Primarily a critical reading course. Smith, Ricardo, Malthus, Marx, Neoclassicists, Keynes, mercantilist/physiocratic doctrines. Modern theory.

ECON 4211. Principles of Econometrics. (4.0 cr.; prereq [3101 or equiv], [Stat 3011, Stat 3022] or equiv or higher level Stat courses), familiarity with computers; fall, every year)


ECON 4261. Introduction to Econometrics. (4.0 cr.; A-F or Audit; prereq [3101 or equiv], [Math 1271, Math 1272] or equiv), Math 2243, Math 2263, [Stat 4101, Stat 4102] or [Stat 5101, Stat 5102]); Math 4242 strongly recommended; fall, every year)

Review of basic linear regression model, its variants. Time series/simultaneous equation models. Material may include panel data, censored/truncated regressions, discrete choice models.

ECON 4301. Economic Development. (3.0 cr.; =ECON 4331W; prereq [1101, 1102] or equiv, non-econ major; spring, summer, every year)


ECON 4307. Comparative Economic Systems. (3.0 cr.; =ECON 4337; prereq 1101, 1102 or equiv; fall, spring, summer, every year)

Functions of economic systems; market economy versus centrally planned economy. Comparison of different economic systems. Post socialist transitions in Eastern Europe, Russia, and China. Initial conditions and strategies for reforms; results of reforms in terms of key economic indicators.

ECON 4401. International Economics. (3.0 cr.; prereq [[1101, 1102] or equiv], not open to econ majors; fall, spring, every year)


ECON 4411. Honors Course: International Trade. (4.0 cr.; =ECON 4431W, ECON 4436W; prereq [3101, 3102] or equiv, Math 1271, completion of freshman writing practice; spring, offered periodically)


ECON 4413. The Russian Economy. (3.0 cr.; prereq [1101, 1102] or equiv; fall, every year)


ECON 4415. The Japanese Economy. (3.0 cr.; prereq [1101, 1102] or equiv; spring, every year)


ECON 4431W. Economic Development. (3.0 cr.; =ECON 4301); prereq [[3101, 3102] or equiv], completion of freshman writing practice; fall, spring, summer, every year)


ECON 4437. Comparative Economic Systems. (3.0 cr.; =ECON 4307); prereq 3101, 3102 or equiv; fall, spring, summer, every year)

Functions of economic systems; market economy versus centrally planned economy. Comparison of different economic systems. Post socialist transitions in Eastern Europe, Russia, and China. Initial conditions and strategies for reforms; results of reforms in terms of key economic indicators.

ECON 4441. International Economics. (3.0 cr.; prereq [[1101, 1102] or equiv], not open to econ majors; fall, spring, every year)


ECON 4442W. Economic Integration of the Americas. (3.0 cr.; prereq 3101, 3102 or equiv or #; fall, offered periodically)

Analysis of economic relationships among countries in the Western Hemisphere. Modeling the impact of NAFTA and similar regional trade accords. Prospects for further integration. Comparison with European integration.

ECON 4443W. Advanced International Trade. (4.0 cr.; =ECON 4431W, ECON 4436W); prereq [3101, 3102] or equiv, freshman writing practice; fall, spring, summer, every year)


ECON 4443W. Advanced International Trade. (3.0 cr.; prereq 3101, 3102 or equiv or 4431 or 4439 or equiv recommended; spring, summer, every year)

Balance of payments; international financial markets; exchange rate determination; international monetary system; international investment and capital flows; financial management of the multinational firm; open economy macroeconomic policy.

ECON 4443W. Advanced International Trade. (4.0 cr.; A-F only; =ECON 4431W, ECON 4431W); prereq [3101, 3102] or equiv, Math 1271, completion of freshman writing practice; spring, every year)

ECON 4531. Labor Economics. (3.0 cr.; =ECON 3501; prereq 3101, 3102 or equiv); fall, spring, every year) Economic analysis of labor markets and their operations; population and labor force; labor market institutions; wage and employment theories; unions and collective bargaining; public policy.


ECON 4621H. Honors Course: Urban Economics. (4.0 cr.; =ECON 4621H); prereq 3101 or equiv; spring, offered periodically) Economics of urbanization. Location of economic activity and cities. Central place theory. Site rents and form of city. Urban economic base and economic policy. Urban problems and economic policies: transportation, poverty/segregation, housing, public finance.

ECON 4631. Industrial Organization and Antitrust Policy. (3.0 cr.; =ECON 4638, ECON 4631H, ECON 3601); prereq 3101 or equiv; fall, spring, summer, every year) Relations between market structure, economic efficiency, and welfare. Economic origins of monopoly and other restraints on competition. Purposes and effects of antitrust and related legislation. Industrial policy.

ECON 4631H. Honors Course: Industrial Organization and Antitrust Policy. (4.0 cr.; =ECON 4638, ECON 3601, ECON 4631; prereq 3101 or equiv; fall, spring, every year) Economic aspects of antitrust and related policies. Relations between market structure, economic efficiency, and welfare. Economic origins of monopoly and other restraints on competition. Purposes/effects of antitrust/related legislation.

ECON 4638. Advanced Industrial Organization and Anti-Trust Policy. (4.0 cr.; A-F only; =ECON 4631H, ECON 3601, ECON 4631); prereq 3101 or equivalent, 3102 recommended; fall, spring, every year) Economic aspects of antitrust/related policies. Relations between market structure, economic efficiency, welfare. Economic origins of monopoly/other restraints on competition. Purposes/effects of antitrust/related legislation.

ECON 4721. Money and Banking. (3.0 cr.; =ECON 4721H, ECON 4728, ECON 3701); prereq [3101, 3102] or equiv; fall, spring, summer, every year) Theories of money demand and money supply. Financial intermediation and banking, banking practices and regulation, role of the Federal Reserve system. Monetary policy.

ECON 4721H. Honors Course: Money and Banking. (4.0 cr.; =ECON 4728, ECON 3701, ECON 4721); prereq [3101 or equiv]; Math 1271; spring, every year) Theories of money demand and money supply. Financial intermediation, banking, nonbank financial institutions, banking practices, bank regulation, international banking, role of Federal Reserve system. Monetary policy.

ECON 4728. Advanced Money and Banking. (4.0 cr.; A-F only; =ECON 4721H, ECON 3701, ECON 4721); prereq [3101 or equiv]; [3102 or equiv], Math 1271; fall, spring, every year) Theories of money demand/money supply. Financial intermediation, banking, nonbank financial institutions, banking practices, bank regulation, international banking, role of Federal Reserve system. Monetary policy.

ECON 4728. Advanced Money and Banking. (4.0 cr.; A-F only; =ECON 4721H, ECON 3701, ECON 4721); prereq [3101 or equiv]; [3102 or equiv], Math 1271; fall, spring, every year) Theories of money demand/money supply. Financial intermediation, banking, nonbank financial institutions, banking practices, bank regulation, international banking, role of Federal Reserve system. Monetary policy.

ECON 4731. Macroeconomic Policy. (3.0 cr.; prereq 3101, 3102 or equiv; fall, spring, every year) Monetary vs. fiscal policy debate in the context of the underlying macroeconomic theory controversy. Comparison of Keynesian, Monetarist, and Classical theories; rational expectations; policy ineffectiveness; time inconsistency; rules vs. discretion; budget deficits; unemployment and inflation.

ECON 4731H. Honors Course: Macroeconomic Policy. (4.0 cr.; prereq [[3101, 3102] or equiv], Math 1271, honors; fall, spring, offered periodically) Monetary vs. fiscal policy debate in context of underlying macroeconomic theory controversy. Comparison of Keynesian, Monetarist, and Classical theories. Rational expectations, policy ineffectiveness, time inconsistency, rules versus discretion, budget deficits. Unemployment and inflation.

ECON 4738. Advanced Macroeconomic Policy. (4.0 cr.; A-F only; prereq [[3101, 3102] or equiv], Math 1271; fall, spring, every year) Monetary vs. fiscal policy debate in context of underlying macroeconomic theory controversy. Comparison of Keynesian, Monetarist, Classical theories. Rational expectations, policy ineffectiveness, time inconsistency, rules versus discretion, budget deficits. Unemployment and inflation.


ECON 4751. Financial Economics. (3.0 cr.; =ECON 4751H, ECON 4758); prereq [3101 or equiv], [Math 1271 or equiv], one sem statistics; fall, spring, summer, every year) Financial decisions of firms/investors. Determination of interest rates and asset prices. Role of risk/uncertainty. Emphasizes economic models.

ECON 4751H. Honors Course: Financial Economics. (4.0 cr.; =ECON 4751H, ECON 4758); prereq 3101, 3102 or equiv; [Math 1271 or equiv], [Stat 3011 or equiv]; fall, spring, every year) Efficiency of financial markets. Theoretical concepts, empirical evidence.

ECON 4758. Advanced Financial Economics. (4.0 cr.; A-F only; =ECON 4751H, ECON 4751); prereq 3101, 3102 or equiv; Math 1271 or equiv], [Stat 3011 or equiv]; fall, spring, every year) Efficiency/role of financial markets. Theoretical concepts, empirical evidence. Price of financial assets, value of investment projects, risk management/trading strategies.

ECON 4821. Public Economics. (3.0 cr.; =ECON 3801); prereq [3101, 3102] or equiv; fall, summer, every year) Competing views on proper role of government in economy. Effects of tax/spending policies, taking into account private agents' response to government actions/ways government officials may use powers. Optimal policies. Applications primarily to U.S. government.

ECON 4831. Cost-Benefit Analysis. (3.0 cr.; =ECON 4611H); prereq 3101 or equiv; fall, spring, every year) Evaluation of benefits/costs of public projects/programs. Issues connected with definition/measurement of benefits/costs. Rate of return/discount. Market imperfections, risk, uncertainty. Case studies.

ECON 4960. Topics in Economics. (3.0 cr. [max 6.0 cr.]; A-F only; prereq [3101 or 3102 or equiv], MATH 1271; fall, spring, offered periodically) Topics specified in Class Schedule.

ECON 4960H. Advanced Topics in Economics Honors. (4.0 cr. [max 8.0 cr.]; A-F only; prereq [[3101, 3102] or equiv], MATH 1271; may change based on topic; fall, spring, offered periodically) Topics specified in Class Schedule.
EDHD 4968. Advanced Topics in Economics. (4.0 cr.; A-F only; prereq [[3101, 3102] or equiv]; MATH 1271, [Stat 3011 or equiv], successful completion at least two 4xxx level UMNTC economics courses; fall, spring, every year)

Topics specified in Class Schedule.

EDHD 4993. Directed Study. (1.0-4.0 cr.; prereq %; fall, spring, summer, every year) Guided individual reading or study in areas not available in regular course offerings.

EDHD 5109. Game Theory for Engineers. (3.0 cr.; A-F only; = [ECON 5109H]; prereq [Math 2283, 2373, 2374, 3283] or Math 4606, M.S./Ph.D. student in engineering or comp sci or info tech or operations mgmt] or #; spring, every year)


EDHD 5109H. Game Theory for Engineers. (4.0 cr.; A-F or Audit; = [ECON 5109]; prereq [[Math 2283, Math 2373, Math 2374, Math 3283] or Math 4606], M.S./Ph.D. student in [engineer or comp sci or info tech or operations mgmt] or #; not for econ [undergrads or PhD students]; fall, offered periodically)


EDHD 55890. Economics of the Health-Care System. (3.0 cr.; A-F or Audit; = [PUBH 6832]; prereq 3101 or #; fall, every year)


Education and Human Development (EDHD)

College of Education and Human Development

EDHD 1620. Current Topics: Strategies for Student Success. (1.0 cr. [max 6.0 cr.]; fall, spring, every year)

For topics see Class Schedule.

EDHD 1701. Introduction to TRiO: Identity, Culture, and College Success. (1.0 cr.; A-F only; prereq TRIO student; fall, every year)

How culture/identity play role in educational experience. Self-authorship skills to create educational/personal path that aligns with values/beliefs. Lecture, discussion, readings, activities.

EDHD 1920. CEHD Special Topics. (1.0-3.0 cr. [max 6.0 cr.]; fall, spring, summer, every year)

For topics, see Class Schedule.

EDHD 3001. Exploring the Teaching Profession I. (2.0 cr.; A-F only; prereq DirecTrack to Teaching program or @; fall, every year)

Introduction to K-12 teaching as a profession. Culture of teaching, roles of teachers, student learning, multicultural/diverse students/contexts, societal influences. Volunteer experiences in Twin Cities.

EDHD 3002. Exploring the Teaching Profession II. (2.0 cr.; A-F only; prereq 3001, admission to DirecTrack to Teaching; spring, every year)

Diversity in schools, strategies for increasing cultural competence. Parents, communities, professional development. Students reflect on themselves as future teachers and complete 50 hours in educational settings.

EDHD 3100. International Topics for Undergraduates. (1.0-12.0 cr. [max 36.0 cr.]; prereq #, fall, spring, summer, every year)

Off-campus course. Topics from research exploration to academic/engagement activities. Delivered in international setting. Course requirements are determined by instructor(s) and reflect advanced undergraduate rigor.

EDHD 3300. Special Topics in Education and Human Development. (1.0-6.0 cr. [max 12.0 cr.]; fall, spring, summer, offered periodically)

Special topics in education/human development.

EDHD 4001. Teaching Students with Special Needs in Inclusive Settings. (1.0 cr.; A-F only; prereq Must be enrolled in either the initial teaching licensure program for music education or agricultural education students. All other initial teaching licensure candidates should enroll in 5015 and 5016.; spring, every year)

Historical perspectives, definitions/professional language, characteristics, needs, service delivery systems for each area of exceptionality.

EDHD 5000. Cultures, Schools, and Communities (Human Relations). (1.0 cr.; A-F only; = [EDHD 5020]; prereq Enrolled in teacher initial licensure program; fall, every year)

Addressing social/cultural dimensions of education. Challenges/dilemmas facing contemporary educators. Speakers, simulations, presentations, professional learning communities, field assignments.

EDHD 5001. Learning, Cognition, and Assessment. (3.0 cr.; = [EPSY 3119]; prereq MEd/initial licensure student or CLA music ed or preteaching major or #; psych course recommended; fall, spring, summer, every year)


EDHD 5004. Teaching Students With Special Needs in Inclusive Settings. (2.0 cr.; A-F or Audit; prereq Teacher preparation program in [CEHD or music education or agriculture education or DirecTrack] or #; licensure students must take this course for a grade; fall, spring, summer, every year)

Exceptionalities in educational settings as defined in federal/state rules/regulations. Historical perspectives, definitions, etiology, needs, characteristics. Service delivery systems for each exceptionality.

EDHD 5005. School and Society. (2.0 cr.; A-F or Audit; prereq Jr or Sr or MEd/initial licensure student or CLA music ed major or preteaching major or #; fall, spring, summer, every year)

Readings in history, philosophy, social sciences, and law revealing diverse educational values in a pluralistic society. Multiple expectations of schools. Civil liberties, rights, community. Varying cultural backgrounds of students, family circumstances, exceptional needs.

EDHD 5007. Technology for Teaching and Learning. (1.5 cr.; A-F or Audit; prereq [MEd/initial licensure or CLA music ed major or preteaching major or #], basic computer skills; fall, spring, summer, every year)

Diverse educational technology in K-12 classrooms. Effective use of technology. Computer technologies used to stimulate personal productivity/communication and to enhance teaching/learning processes.

EDHD 5008. Reading in the Content Areas for Initial Licensure Candidates. (1.0-2.0 cr.; A-F only; prereq Concurrent enrollment in licensure area methods course(s), enrolled in Initial Licensure Program, Internet access, basic understanding of [computer use, Web browsers, email, word processing software]; fall, spring, offered periodically)

Web-based course. Fostering students’ reading related to learning from text.

EDHD 5009. Human Relations: Applied Skills for School and Society. (1.0 cr.; A-F or Audit; prereq MEd/initial lic or CLA music ed or preteaching or #; fall, spring, summer, every year)

Issues of prejudice/discrimination in terms of history, power, social perception. Knowledge/skills acquisition in cooperative learning, multicultural education, group dynamics, social influence, leadership, judgment/decision making, prejudice reduction, conflict resolution, teaching in diverse educational settings.

EDHD 5010. Cultures, Schools, and Communities (Human Relations). (2.0 cr.; A-F only; prereq Enrolled in initial licensure program; fall, every year)

Addressing social/cultural dimensions of education. Challenges/dilemmas facing contemporary educators. Speakers, simulation, presentations, professional learning communities, field assignments.

EDHD 5013. Child and Adolescent Development for Teaching and Learning. (1.0 cr.; A-F only; prereq Enrolled in teacher initial licensure program; fall, summer, every year)

Attending to constant transitions/development in which children and adolescents negotiate
their road to adulthood. How to foster learning/positive development.

EDHD 5014. Child and Adolescent Development for Teaching and Learning. (2.0 cr.; A-F only; prereq Enrolled in teacher initial licensure program; fall, spring, every year)
Transitions/development in which children/adolescents negotiate road to adulthood. How to foster learning/positive development.

EDHD 5015. Teaching Students with Special Needs in Inclusive Settings. (1.0 cr.; A-F only; prereq Enrolled in teacher initial licensure program; summer, every year)
Areas of exceptionality defined in federal/state regulations. Historical perspectives, definitions, etiology, characteristics, needs, and service delivery systems. Collaborating with special education personnel.

EDHD 5016. Teaching Students with Special Needs in Inclusive Settings. (1.0 cr.; A-F only; prereq Enrolled in teacher initial licensure program; fall, every year)
Attending to constant transitions/development in which children/adolescents negotiate their road to adulthood. How to foster learning/positive development.

EDHD 5017. Academic Language and English Learners. (1.0 cr.; A-F only; prereq Enrolled in teacher initial licensure program; summer, every year)
Working with English learners and other linguistically diverse students across content areas to develop academic language proficiency.

EDHD 5018. Academic Language and English Learners. (1.0 cr.; A-F only; prereq Enrolled in teacher initial licensure program; spring, every year)
Working with English learners and linguistically diverse students across all content areas to develop academic language proficiency.

EDHD 5020. Cultures, Schools, and Communities (Human Relations). (1.0 cr.; A-F only; = [EDHD 5000]; prereq Enrolled in teacher initial licensure program; spring, every year)
Addressing social/cultural dimensions of education. Challenges/dilemmas facing contemporary educators. Speakers, simulation, presentations, professional learning communities, field assignments.

EDHD 5100. International Topics for Graduate Students. (1.0-12.0 cr.; fall, spring, summer, every year)
Off-campus course. Topics from research exploration to academic/engagement activities. Delivered in international setting. Course requirements are determined by instructor(s) and reflect graduate-level rigor.

EDHD 5200. Special Topics: Professional Development for Educators. (1.0-3.0 cr.; max 12.0 cr.; summer, every year)
Special topics course that permits offering a variety of research-based and scholarly content to meet the needs of educators from P-12 settings.

EDHD 5300. Special Topics in Education and Human Development. (1.0-6.0 cr.; max 12.0 cr.; A-F only; prereq Non-degree seeking students only. Practitioners/graduates who have already completed undergraduate coursework; fall, spring, summer, every year)
Special topics in education/human development.

Educational Psychology (EPSY)

EPSY 1905. Freshman Seminar. (1.0-3.0 cr.; max 6.0 cr.; prereq Fr; fall, offered periodically)
Interdisciplinary seminar. Topics specified in Class Schedule.

EPSY 2601. Understanding Differences, Disabilities and the Career of Special Education. (4.0 cr.; A-F only; fall, every year)
Impact of disabilities on individual/family. Support systems for persons with disabilities, approaches for advocacy. Employ reflective practices when considering concept of disability.

EPSY 3101. Creativity and Intelligence: an Introduction. (3.0 cr.; Student Option No Audit; = [EPSY 5101]; fall, offered periodically)
Classic/contemporary theories of creativity/intelligence, their development, implications for behavioral/social sciences and psychological/educational practices.

EPSY 3119. Learning, Cognition, and Assessment. (3.0 cr.; A-F or Audit; = [EDHD 5001]; fall, spring, summer, every year)
Principles of learning, cognition, cognitive development, classroom management, motivation, instruction, and assessment. Topics: behavioralism, cognitive and social constructivism, human information processing theory, intelligence, knowledge acquisition, reasoning skills, scholastic achievement, standardized testing, reliability, validity, student evaluation, performance assessment, and portfolios.

EPSY 3132. Psychology of Multiculturalism in Education. (3.0 cr.; A-F or Audit; fall, every year)
Course critically examines social and cultural diversity in the United States, confronting social issues of poverty, handicappism, homophobia, racism, sexism, victim-blaming, violence, and so on, and presenting models for change. Students examine how and why prejudices develop.

EPSY 3301. Practicum: Service Learning, Psychology of Multiculturalism in Education. (3.0 cr.; A-F or Audit; = [EPSY 5133]; #, enrollment in APECS minor; fall, offered periodically)
Thirty hours of service learning in multicultural communities. Students work with children, youth, or adults in ESL tutoring or after-school youth programs. Sensibilities/competencies related to multicultural issues in U.S. society.

EPSY 3304. Basic and Applied Statistics. (3.0 cr.; = [EPSY 5231, EPSY 5261]; fall, spring, summer, every year)

EPSY 3305. Special Topics in Educational Psychology. (1.0-4.0 cr.; max 9.0 cr.; fall, offered periodically)
Current issues in educational psychology or related coursework in areas not normally available through regular curriculum offerings.

EPSY 3301. Introduction to Educational Psychology. (3.0 cr.; Student Option No Audit; = [EPSY 5114]; fall, every year)
History, current work. Future promise of educational psychology. Major topics in educational psychology. Focuses on interplay between theory, empirical research, and practical applications.

EPSY 3302. Introduction to Communication Skills for Educational and Community Settings. (3.0 cr.; Student Option No Audit; fall, every year)
Working with diverse individuals/groups in educational/community settings. Communication skills/concepts. Self-reflection on communication style.

EPSY 3303. Educational Psychology Undergraduate Research Practicum. (3.0 cr.; max 6.0 cr.; A-F or Audit; prereq 3264, minor in applied psychology for educational/community settings; fall, spring, every year)
Supervised research experience. Students are matched with University faculty members and their research projects.

EPSY 3701. Practicum: Field Experience in Special Education. (2.0 cr.; A-F only; = [EPSY 5701]; fall, spring, summer, every year)
Observations/supervised support of teaching practice in schools or agencies serving children with disabilities in integrated programs.

EPSY 3501. Intelligence and Creativity. (3.0 cr.; A-F or Audit; = [EPSY 3101]; fall, spring, summer, every year)
Contemporary theories of intelligence and intellectual development and contemporary theories of creativity and their implications for educational practices and psychological research.

EPSY 5112. Knowing, Learning, and Thinking. (4.0 cr.; A-F or Audit; spring, summer, every year)
Principles of human information processing, memory, and thought; mental operations in comprehension and problem solving; developing expertise and automaticity; emphasis on applied settings.

EPSY 5113. Psychology of Instruction and Technology. (3.0 cr.; spring, offered periodically)
Introduction to adult learning and instructional design. Application of core foundational knowledge to development of effective learning environments for adults. Topics include philosophy, learning theories, instructional models, development and experience,
individual differences, evaluation, assessment, and technology.

EPSY 5114. Psychology of Student Learning. (3.0 cr.; A-F or Audit; =EPSY 3301; fall, spring, every year)
Principles of educational psychology: how learning occurs, why it fails, and implications for instruction. Topics include models of learning, development, creativity, problem-solving, intelligence, character education, motivation, diversity, special populations.

EPSY 5115. Psychology of Adult Learning and Instruction. (3.0 cr.; fall, every year)
Survey of adult learning/instruction. Emphasizes instructional design, learning theories, experience, individual differences, evaluation, tests/measurement, technology. Implications for curricular/instructional design in higher education, continuing education, professional/business related training.

EPSY 5119. Mind, Brain, and Education. (3.0 cr.; Student Option No Audit; prereq 3301 or equiv; spring, every year)
How educationally relevant skills/concepts develop in both typical/atypical children.

EPSY 5135. Human Relations Workshop. (4.0 cr.; fall, summer, every year)
Experiential course addressing issues of prejudice and discrimination in terms of history, power, and social perception. Includes knowledge and skills acquisition in cooperative learning, multicultural education, group dynamics, social influence, effective leadership, judgment and decision-making, prejudice reduction, conflict resolution.

EPSY 5151. Cooperative Learning. (3.0 cr.; spring, every year)
Participants learn how to use cooperative learning in their setting. Topics include theory and research, teacher's role, essential components that make cooperation work, teaching social skills, assessment procedures, and collegial teaching teams.

EPSY 5157. Social Psychology of Education. (3.0 cr.; A-F or Audit; fall, every year)
Overview of social psychology and its application to education. Participants study the major theories, research, and major figures in field. Class sessions include lectures, discussions, simulations, role-plays, and experiential exercises.

EPSY 5191. Education of the Gifted and Talented. (3.0 cr.; A-F or Audit; spring, summer, every year)
Theories of giftedness, talent development, instructional strategies, diversity and technological issues, implications for educational practices and psychological inquiry, and international considerations.

EPSY 5200. Special Topics: Psychological Foundations. (1.0-4.0 cr. [max 30.0 cr.]; fall, spring, offered periodically)
Focus on special topics in psychological and methodological concepts relevant to advanced educational theory, research, and practice not covered in other courses.

EPSY 5216. Introduction to Research in Educational Psychology and Human Development. (3.0 cr.; A-F or Audit; prereq 5261 or intro statistics course; fall, every year)
Designing/conducting a research study. Reviewing literature, formulating research problems, using different approaches to gather data, managing/analyzing data, reporting results.

EPSY 5220. Special Topics: Quantitative Methods. (1.0-4.0 cr. [max 30.0 cr.]; fall, spring, summer, offered periodically)
Focus on special topics in methodological concepts involving theory, research, and practice in statistics, measurement, evaluation, and statistics education not covered in other courses.

EPSY 5221. Principles of Educational and Psychological Measurement. (3.0 cr.; fall, every year)
Concepts, principles, and methods in educational/psychological measurement. Reliability, validity, item analysis, scores, score reports (e.g., grades). Modern measurement theories, including item response theory and generalizability theory. Emphasizes construction, interpretation, use, and evaluation of assessments regarding achievement, aptitude, interests, attitudes, personality, and exceptionality.

EPSY 5243. Principles and Methods of Evaluation. (3.0 cr.; =OLPD 5501; fall, spring, summer, every year)
Introductory course in program evaluation; planning an evaluation study, collecting and analyzing information, reporting results; overview of the field of program evaluation.

EPSY 5244. Survey Design, Sampling, and Implementation. (3.0 cr.; prereq [5221 or 5231 or 5261 or equiv]; [CEHD grad student or MEd student]; fall, every year)
Survey methods, including mail, phone, and Web-based/e-mail surveys. Principles of measurement, constructing questions/forms, pilot testing, sampling, data analysis, reporting. Students develop a survey proposal and a draft survey, pilot the survey, and develop sampling/data analysis plans.

EPSY 5245. Advanced Survey Data Analysis for Categorical and Rating Scale Data. (1.0 cr.; prereq 5244, 5261; spring, every year)
Practical course. Specific nature of survey data (typically categorical or ordinal). Appropriate data analytic methods.

EPSY 5246. Evaluation Colloquium: Psychological Foundations. (1.0 cr. [max 8.0 cr.]; S-N or Audit; =OLPD 5524; prereq 5243 or EdPA 5501; fall, spring, offered periodically)
Informal seminar of faculty and advanced students interested in the issues and problems of program evaluation.

EPSY 5247. Qualitative Methods in Educational Psychology. (3.0 cr.; prereq Grad student; fall, every year)
Introduction to qualitative methods of inquiry. Contrasting different research traditions (e.g., case study, phenomenology, ethnography, social interactionism, critical theory). Practice with field notes, observations, and interviewing. Use of NVIVO to track/code data.

EPSY 5261. Introductory Statistical Methods. (3.0 cr.; =EPSY 5231, EPSY 3264; fall, spring, summer, every year)

EPSY 5262. Intermediate Statistical Methods. (3.0 cr.; prereq 3264 or 5261 or equiv; fall, spring, every year)

EPSY 5271. Becoming a Teacher of Statistics. (3.0 cr.; prereq 5261 or equiv; fall, spring, offered periodically)
Current methods of teaching first courses in statistics. Innovative teaching methods, materials, and technological tools. Types of first courses, reform recommendations, goals for student learning, recommended content, teaching methods, technology, student assessment.

EPSY 5272. Statistics Teaching Internship. (1.0-3.0 cr.; S-N only; prereq Grad student; #; fall, spring, every year)
Supervised teaching experience.

EPSY 5400. Special Topics in Counseling Psychology. (1.0-4.0 cr. [max 8.0 cr.]; fall, spring, summer, every year)
Theory, research, and practice in counseling and student personnel psychology. Topics vary.

EPSY 5401. Counseling Procedures. (3.0 cr.; prereq Upper div student; fall, spring, summer, every year)
Emphasis on the counseling relationship and principles of interviewing. Case studies, role playing, and demonstration. For individuals whose professional work includes counseling and interviewing.

EPSY 5415. Child and Adolescent Development and Counseling. (4.0 cr.; A-F or Audit; prereq Grad student or MEd student or K-12 [counseling endorsement or licensure] student; fall, summer, every year)

EPSY 5421. Leadership and Administration of Student Affairs. (3.0 cr.; =OLPD 5724; fall, spring, summer, every year)
Theoretical approaches, administrative structure, and evaluation methods used in college/university student affairs.

EPSY 5432. Foundations of Individual/Organizational Career Development. (3.0 cr.; spring, odd years)
Introduction to individual and organizational career development theory and practice. Examines critical issues in work patterns, work values, and workplaces in a changing global society, with implications for career planning, development, and transitions, emphasizing personal and organizational change. For nonmajors: serves students in adult ed, HRD, IR, college student advising, and other related fields.

**EPSY 5435. Introduction to School Counseling.** (3.0 cr.; A-F only; prereq: CSPP grad student in school counselor program or #; fall, spring, every year)

**EPSY 5436. Crisis Management and Consulting in Schools.** (3.0 cr.; A-F or Audit; prereq: CSPP grad student in school counselor program or #; fall, spring, every year)

**EPSY 5451. College Students Today.** (3.0 cr.; =[OLPD 5704]; fall, spring, summer, every year)
Issues involving diverse populations of students in colleges/universities. Student development theory, students’ expectations/interests, how college affects student outcomes. Role of curricular/extracurricular activities and of student-faculty interactions.

**EPSY 5461. Cross-Cultural Counseling.** (3.0 cr.; A-F or Audit; fall, every year)

**EPSY 5604. Transition From School to Work and Community Living for Persons With Special Needs.** (3.0 cr.; fall, every year)
Use of strategies/models for improving transition of youth from school to work and community living. Course content that specifically addresses all phases of student assessment, individualized transition planning. Parent, family, and student involvement in designing post school options. Community-based services (employment, residential living, social and recreational services, etc). Comprehensive interagency approaches.

**EPSY 5605. Collaborative Practices for the Special Educator.** (3.0 cr.; A-F only; fall, every year)
Skills/knowledge required to consult/collaborate with school personnel, families, other professionals to maintain effective educational support.

**EPSY 5609. Family-centered Services.** (2.0 cr.; A-F or Audit; fall, every year)

**EPSY 5611W. Research-based Practices in Academic and Behavior Disabilities.** (3.0 cr.; A-F only; fall, every year)
Research that provides conceptual basis to aid in understanding of students with academic difficulties. Develop critical thinking skills through examination of research-based practices.

**EPSY 5612. Understanding of Academic Disabilities.** (3.0 cr.; A-F or Audit; fall, spring, every year)
Introduction to issues related to the education of students with academic disabilities (learning disabilities, mild mental intellectual disabilities, and emotional/behavioral disabilities) including history, definition, assessment, classification, legislation, and intervention approaches.

**EPSY 5613. Foundations of Special Education I.** (3.0 cr.; A-F or Audit; fall, spring, summer, every year)
Organization of educational programs/services for people with disabilities. First course for students seeking to become licensed in special education.

**EPSY 5614. Assessment and Due Process in Special Education.** (4.0 cr.; A-F or Audit; prereq: EPSY 5613 or equiv or #; fall, spring, summer, every year)
Assessment, planning, implementing educational programs for people with disabilities.

**EPSY 5615. Advanced Academic Interventions.** (3.0 cr.; A-F or Audit; prereq: EPSY 5612; spring, every year)
Designing, implementing, and evaluating individual educational plans (IEPs) for special education service in learning disabilities, emotional/behavioral disorders, and mild mental/intellectual disabilities.

**EPSY 5616. Classroom Management and Behavior Analytic Problem Solving.** (3.0 cr.; fall, spring, summer, every year)
Assumptions, principles, procedures of problem solving approach to analyzing behavior/programs for classroom management. Conducting observations, intervening, evaluating behavioral change.

**EPSY 5617. Academic and Social Interventions for Students With Mild to Moderate Disabilities.** (3.0 cr.; A-F only; prereq EPsy 5611 and 5613 or #; fall, every year)
Use problem solving model to make data-based decisions regarding implementation/evaluation of instruction for students with academic/behavioral difficulties.

**EPSY 5618. Specialized Interventions for Students With Mild/Moderate Disabilities in Reading & Written Language.** (3.0 cr.; A-F or Audit; spring, every year)
Historical/contemporary perspectives, empirical evidence relating to reading/written language instruction/assessment designed to improve outcomes of students with disabilities. Field work in tutoring.

**EPSY 5619. Specialized Interventions in Mathematics for Students with Mild to Moderate Disabilities.** (3.0 cr.; A-F only; spring, every year)

**EPSY 5621. Assessment and Instructional Design for Students with Developmental Disabilities.** (3.0 cr.; A-F or Audit; prereq 5613, 5614; spring, every year)
Methods/materials course. Functional/standards-based approaches to promoting academic learning in students with developmental disabilities.

**EPSY 5622. Programs and Curricula for Students With Developmental Disabilities.** (3.0 cr.; prereq 5621 or [5661 and 5662]; summer, every year)
Developing programs/curricula for students with moderate, severe, profound developmental delays, as well as severe multihandicapping conditions. Special consideration given to preparing children/youth for integrated community environments.

**EPSY 5624. Biomedical and Physical Impairments of Students With Developmental Disabilities.** (2.0 cr.; A-F or Audit; fall, summer, every year)

**EPSY 5625. Education of Infants, Toddlers, and Preschool Children with Disabilities: Introduction.** (2.0 cr.; A-F or Audit; fall, every year)
Overview of the issues, problems, and practical applications in designing early intervention services for young children with disabilities and their families.

**EPSY 5626. Seminar: Developmental Disabilities and Instructional Management.** (3.0 cr.; prereq [5621, 5622] or #; fall, summer, every year)
Data-based strategies for school and nonschool instruction of learners with developmental disabilities including assessment, design, implementation, and evaluation of curriculum and instruction: curriculum content, concept and task analysis, classroom arrangements, natural and instructional cues, corrections, and consequences.

**EPSY 5627. Seminar: Advanced issues in Learning Disabilities.** (3.0 cr.; A-F only; prereq: Special Education graduate or licensure student or #; fall, summer, every year)
Read, reflect, lead discussions related to issues in field of LD. Topics examined through relevant research in field of LD.

**EPSY 5628. Characteristics of Moderate to Severe Learning Disabilities.** (3.0 cr.; A-F only; prereq: Special Education graduate or licensure student or #; fall, summer, every year)
Characteristics of moderate/severe Learning Disabilities including (but not limited to)
EPSY 5629. Strategic Instructional Methods for Students Academically At-Risk. (3.0 cr.; A-F only; prereq Special Education graduate or licensure student or #; fall, summer, every year)
Knowledge/skills needed to teach KU-CRL research-based learning strategies for students considered academically at-risk. Content relevant to basic skills/content instruction for students in K-12 settings will be included.

EPSY 5631. Module 1: Introduction to Augmentative and Alternative Communication. (1.0 cr.; A-F only; fall, spring, summer, every year)
Terms/concepts related to augmentative/alternative communication. Myths/facts regarding AAC.

EPSY 5632. Module 2: Evidence-based Methods for AAC Assessment and Intervention. (2.0 cr.; A-F only; prereq 5631 or #; fall, spring, summer, every year)
Evidence-based tools to conduct augmentative/alternative communication (AAC) assessments. AAC intervention plans. Data-driven strategies to evaluate progress.

EPSY 5633. Module 3: Speech-generating Devices and High-Tech AAC. (1.0 cr.; A-F only; prereq 5631 or #; fall, spring, summer, every year)
Identifying, funding, customizing high-tech augmentative/alternative communication (AAC) interventions. Manufacturer/community resources. Data-driven strategies to evaluate progress.

EPSY 5634. Module 4: Assistive technology with Deaf/Hard of Hearing Students. (2.0 cr.; A-F only; prereq Special Education licensure student or #; spring, summer, every year)
Theoretical/applied study communication modalities for children/adults who are Deaf or Hard of Hearing. Assessment/development of models including gestures, speech reading, Cued Speech, sign language, Picture Exchange Communication Systems, high/low tech devices.

EPSY 5636. Sensory Impairments of Students With Developmental Disabilities. (2.0 cr.; prereq 5613, 5614; fall, every year)
Characteristics of learners with visual/auditory impairments. Design of instructional programs to remediate or circumvent disabilities, including use of prosthetic devices.

EPSY 5641. Foundations of Education for Individuals Who Are Deaf/Hard of Hearing. (2.0 cr. [max 3.0 cr.]; A-F only; fall, summer, every year)

EPSY 5642. Early Childhood Intervention for Infants, Toddlers, and Preschoolers Who Are Deaf/Hard of Hearing. (3.0 cr.; prereq Preservice teacher in deaf education licensure program or #; summer, every year)

EPSY 5644. Language Development and Programming for Deaf/Hard of Hearing Children. (3.0 cr.; fall, summer, every year)

EPSY 5646. Reading and Writing Practices with Deaf/Hard of Hearing Students. (2.0 cr.; A-F only; prereq 5644; spring, summer, every year)
Language reading connection/best practices for instruction with deaf/hard of hearing/students with co-occurring disabilities. Final project includes balanced literacy unit of instruction implemented with DHH student. Ions. Effective instructional approaches.

EPSY 5647. Aural and Speech Programming for Persons Who Are Deaf/Hard of Hearing. (3.0 cr.; fall, summer, every year)
Study of the speech and hearing mechanisms, causes of hearing loss, and rehabilitation. Emphasis on instructional practices, aural rehabilitation in the educational setting, adaptive technology, and adaptations to optimize functional skills with individuals who are deaf or hard of hearing.

EPSY 5648. Communication Systems for Children with Disabilities. (2.0 cr.; spring, summer, every year)

EPSY 5649. Models of Instructional Programming With Deaf and Hard of Hearing Students. (3.0 cr.; prereq [5641, 5644] or #; spring, summer, every year)
Design/development of portfolios for various models of educational service delivery systems for individuals with hearing loss. Emphasizes consultation skills, curriculum management/modifications, material/technology applications, and support service adaptations.

EPSY 5651. Evident-Based Practices in Deaf Education. (2.0 cr.; A-F only; prereq Special Education licensure student or #; fall, spring, every year)
Problem solving related to individual needs of students including educational policies/educational procedures in variety of educational settings.

EPSY 5655. Advanced Issues in Emotional Behavior Disorders. (3.0 cr.; A-F or Audit; fall, summer, every year)

EPSY 5657. Interventions for Behavioral Problems in School Settings. (3.0 cr.; A-F or Audit; prereq 5616, 5611; spring, summer, every year)
Comprehensive behavioral programs for students with social/emotional disabilities. Instructing students with social/emotional disabilities.

EPSY 5658. Characteristics of Moderate to Severe Emotional/Behavioral Disorders. (3.0 cr.; A-F only; prereq Special Education graduate or licensure student; fall, summer, every year)
Applying principles of assessment/individualized intervention for students with severe emotional behavior disorders (EBD).

EPSY 5661. Introduction to Autism Spectrum Disorder. (3.0 cr.; A-F only; fall, every year)

EPSY 5662. Assessment and Identification of Autism Spectrum Disorders. (2.0 cr.; A-F only; prereq 5661, Spec Ed grad or licensure student or #; summer, every year)
Selection/use of assessment procedures that may be used to screen/identify children with autism spectrum disorders.

EPSY 5663. Assessment and Intervention for Individuals with Autism Spectrum Disorders. (3.0 cr.; A-F only; prereq 5661, Special Ed grad or licensure student or #; spring, every year)
Selection/use of range of procedures, including non-biased, specific assessments to screen/identify children with autism spectrum disorders. Specific intervention strategies designed to teach beginning communication/social skills to children with Autism Spectrum Disorders (ASD).

EPSY 5664. Transitions for Individuals with Autism Spectrum Disorders. (2.0 cr.; A-F only; prereq 5661, Spec Ed grad or licensure student or #; summer, every year)
Legal/practical aspects of transition planning, specifically for students with ASD.

EPSY 5661. Education of Preschool Children With Disabilities: Methods and Materials. (3.0 cr.; A-F only; prereq [5616, 5625] or #; spring, every year)
Methods and materials available to maximize developmental and educational outcomes for young children with disabilities, age 3 to 5, and their families in home, community, and school-based settings. Develop, implement, and evaluate individualized education and family service plans.

EPSY 5682. Education of Infants and Toddlers With Disabilities: Methods and
EPSY 5690. Experimental Teaching Seminar: MEd Culminating Project. (2.0 cr.; A-F only; =EPSY 5991); prereq #; fall, spring, every year) Experimental teaching utilizing data based instruction for affecting student growth. Conduct experimental teaching project during student teaching year. Guided through formal writing process for submitting short literature review or research report for M.Ed.

EPSY 5701. Practicum: Field Experience in Special Education. (2.0 cr.; =EPSY 3701); prereq #; fall, spring, every year) Theories/research regarding human development across lifespan focusing on different contexts that shape development. Observations and supervised support of teaching practice in schools or agencies serving children with disabilities in integrated programs.

EPSY 5702. Practicum in Autism Spectrum Disorder. (3.0 cr.; =EPSY 5661, 5609, one of [5622 or 5644 or SLHS 5606], enrolled in Autism Spectrum Disorder certificate program; #; fall, spring, every year) Theories/research regarding human development across lifespan focusing on different contexts that shape development. Observation and supervised support of teaching practice in schools or agencies serving children with Autism Spectrum Disorder are served. On-site supervision is provided by qualified professionals. A University supervisor conducts on-site observations. Bi-weekly seminars.

EPSY 5703. Practicum in Applied Behavior Analysis. (3.0 cr.; A-F only; =EPSY 5657, Psy 4011, Applied Behavior Analysis Certificate student; #; spring, every year) Theories/research regarding human development across lifespan focusing on different contexts that shape development. Four hundred hours of supervised experience in applied behavior analytic intervention with individuals with significant challenging behavior and learning difficulties. On-site supervision is provided by qualified professionals. A University supervisor conducts on-site observations. Bi-weekly seminars.

EPSY 5704. Practicum in Middle/Secondary Settings. (1.0 cr.; S-N only; fall, every year) Theories/research regarding human development across lifespan focusing on different contexts that shape development. Preparation for practicing principles required for successful inclusion. Address model for best practices/requirements specified by Minnesota Board of Teaching.

EPSY 5705. Practicum in ECSE/Elementary Settings. (1.0 cr.; S-N only; fall, spring, every year) Theories/research regarding human development across lifespan focusing on different contexts that shape development. Principles for successful inclusion of students with moderate disabilities. Address model for best practices.

EPSY 5706. Practicum in Moderate to Severe Developmental Disabilities. (2.0 cr.; S-N only; prereq Special Education licensure program or #; fall, spring, every year) Theories/research regarding human development across lifespan focusing on different contexts that shape development. Practicing principles required for successful inclusion. Address model for best practices/requirements specified by Minnesota Board of Teaching.

EPSY 5707. Practicum in Moderate to Severe Learning Disabilities. (3.0 cr.; S-N only; prereq [Special Education graduate or licensure student]; #; fall, spring, every year) Theories/research regarding human development across lifespan focusing on different contexts that shape development. Practicing principles required for successful inclusion. Address model for best practices/requirements specified by Minnesota Board of Teaching.

EPSY 5708. Practicum in Moderate to Severe Emotional/Behavioral Disorders. (3.0 cr.; S-N only; prereq [Special Education graduate or licensure student]; #; fall, spring, every year) Theories/research regarding human development across lifespan focusing on different contexts that shape development. Practicing principles required for successful inclusion. Address model for best practices/requirements specified by Minnesota Board of Teaching.

EPSY 5709. Practicum: Field Experience in Early Childhood/Elementary Settings. (3.0 cr.; S-N only; fall, spring, every year) Theories/research regarding human development across lifespan focusing on different contexts that shape development. Preparation for practicing principles required for successful inclusion. Address model for best practices/requirements specified by Minnesota Board of Teaching.

EPSY 5710. Practicum: Social and Emotional Development. (3.0 cr.; S-N only; fall, spring, every year) Theories/research regarding human development across lifespan focusing on different contexts that shape development. Training for practicing principles required for successful inclusion. Address model for best practices/requirements specified by Minnesota Board of Teaching.

EPSY 5720. Social and Emotional Development. (3.0 cr.; S-N only; fall, spring, every year) Theories/research regarding human development across lifespan focusing on different contexts that shape development. Transfer of theoretical knowledge to practical application. Role of EBD teacher in variety of settings.

EPSY 5721. Practicum: Field Experience in Early Childhood/Early Childhood Settings. (6.0 cr.; S-N only; fall, spring, every year) Theories/research regarding human development across lifespan focusing on different contexts that shape development. Transfer of theoretical knowledge to practical application. Responsibilities of special education teacher in variety of settings.

EPSY 5722. Practicum: Autism Spectrum Disorders. (6.0 cr.; S-N only; fall, spring, every year) Theories/research regarding human development across lifespan focusing on different contexts that shape development. Transfer of theoretical knowledge to practical application. Role/responsibilities of special education teacher in settings of elementary/secondary age.

EPSY 5751. Student Teaching: Deaf and Hard of Hearing. (1.0-6.0 cr.; S-N only; fall, spring, every year) Theories/research regarding human development across lifespan focusing on different contexts that shape development. Students participate in educational programming for children, and youth who are deaf or hard of hearing. On-site, directed experiences under supervision of master teachers of deaf/hard of hearing students.

EPSY 5752. Student Teaching: Learning Disabilities. (1.0-6.0 cr.; S-N only; fall, spring, every year) Theories/research regarding human development across lifespan focusing on different contexts that shape development. Supervised experience in teaching or related work in schools or other agencies serving children and adolescents with learning disabilities.

EPSY 5754. Student Teaching: Social and Emotional Disabilities. (1.0-6.0 cr.; S-N only; fall, spring, every year) Theories/research regarding human development across lifespan focusing on different contexts that shape development. Supervised experience in teaching or related work in schools or other agencies serving children and adolescents with learning disabilities.

EPSY 5757. Student Teaching: Developmental Disabilities, Mild/Moderate. (1.0-6.0 cr.; =EPSY 3701); prereq Completion of all licensure coursework; #; fall, spring, every year) Theories/research regarding human development across lifespan focusing on different contexts that shape development. Supervised student teaching, or special practicum project, in schools or other agencies serving students at elementary/secondary levels who have mild to moderate developmental disabilities.

EPSY 5849. Observation and Assessment of the Preschool Child. (3.0 cr.; spring, summer, every year) Introduction to assessment principles and practices, including observational assessment methods, for children (birth to 5). Intended primarily for teachers in training and others interested in basic information regarding assessment and its relationship to intervention services for young children.

EPSY 5851. Engaging Diverse Students and Families. (3.0 cr.; prereq Honors senior or grad student; fall, spring, every year) Theoretical, practical, scientific issues involved in school psychological practice/training/research. Theoretical/empirical bases for developing appropriate dispositions, practices, strategies. Illustrative lectures, discussions, group activities, case studies, presentations.

EPSY 5853. Biological Bases of Behavior. (3.0 cr.; A-F only; fall, every year) Biological basis of behavior with emphasis on relationship between functions/structures of brain.

EPSY 5991. Independent Study in Educational Psychology. (1.0-8.0 cr. [max 20.0 cr.]; A-F or Audit; #EPSY 5690); prereq #; fall, spring, summer, every year) Self-directed study in areas not covered by regular courses. Specific program of study is jointly determined by student and advising faculty member.

Electrical and Computer Engineering (EE) Institute of Technology

EE 1. Refresher Course for Electrical Engineers. (0.0 cr.; A-F or Audit; prereq [BSEE or BEE], pass EIT exam, four yrs elec eng experience; fall, spring, every year) Review of electrical engineering fundamentals required to pass the Minnesota Professional Engineering Examination in electrical engineering. Organized review of material ordinarily contained in electrical engineering college curriculum. Emphasizes problem solving with orientation as close possible to type of questions in exam.

EE 1001. Introduction to Electrical and Computer Engineering. (1.0 cr.; S-N or Audit; spring, every year) Introduction to engineering/computer engineering. Techniques and technologies developed by electrical and computer engineers.


EE 1701W. Energy, Environment, and Society. (3.0 cr.; fall, every year) Energy supply and demand; generation of electricity; environmental impact of energy usage; energy conservation methods; utility deregulation; role of communication and computers. Demos, computer simulation, teamwork, and projects.


EE 2002. Introductory Circuits and Electronics Laboratory. (1.0 cr.; prereq 2001 or 1 &MATH 2243 or MATH 2373 or MATH 2573); fall, spring, summer, every year) Introductory lab in electronics to accompany 2001. Experiments with simple circuits. Familiarization with basic measurement tools and equipment.

EE 2006. Introductory Circuits Laboratory. (0.5 cr.; fall, spring, every year) Meets concurrently with an arranged 2002 section.


EE 2101. Introduction to Electronics I. (1.5 cr.; prereq Linear circuits; fall, every year) Diodes, field effect transistors and bipolar junction transistors, small signal transistor models. Amplifier circuits. Covers electronics content of 2001 in half a semester.

EE 2103. Introduction to Electronics II. (1.0 cr.; prereq 2001 or 2101; fall, every year) Active and passive analog filters, high frequency diode and transistor models, amplifier frequency response, multistage amplifiers. Covers electronics content of 2011 in half a semester.

EE 2301. Introduction to Digital System Design. (4.0 cr.; prereq MATH 1272 or MATH 1372 or MATH 1572; fall, spring, every year) Boolean algebra, logic gates, combinational logic, logic simplification, sequential logic, design of synchronous sequential logic. VHDL modeling, design of logic circuits. Integral lab.

EE 2361. Introduction to Microcontrollers. (4.0 cr.; prereq 2301, [1301 or CSCI 1113 or CSCI 1901]; fall, spring, summer, every year) Computer organization, assembly language programming, arithmetic/logical operations, parallel/serial input/output. Exception handling, interrupts, using special-purpose features such as A/D converters, fuzzy logic, DSP operations. Integral lab.

EE 3005. Fundamentals of Electrical Engineering. (4.0 cr.; prereq Math 2243, Phys 1302; not for EE majors; fall, spring, summer, every year) Fundamentals of analog electronics, digital electronics, and power systems. Circuit analysis, electronic devices and applications, digital circuits, microprocessor systems, operational amplifiers, transistor amplifiers, frequency response, magnetically coupled circuits, transformers, steady state power analysis.

EE 3006. Fundamentals of Electrical Engineering Laboratory. (1.0 cr.; prereq Concurrent enrollment in 3005 is allowed but not required; fall, spring, summer, every year) Lab to accompany 3005.


EE 3041. Industrial Assignment I. (2.0 cr.; A-F only; prereq [EE or CompE upper div], enrolled in ECE co-op program; fall, spring, summer, every year) Industrial work assignment in engineering co-op program. Evaluation based on student's formal written report covering semester's work assignment.

EE 3101. Circuits and Electronics Laboratory I. (2.0 cr.; prereq [3002, 3115 or &3115], CSE or %; fall, spring, summer, every year) Experiments in circuits/electronics.

EE 3102. Circuits and Electronics Laboratory II. (2.0 cr.; prereq [3101 or CSE or %]; attendance first day of class; fall, spring, summer, every year) Experiments in circuits/electronics. Team design project.

EE 3115. Analog Electronics. (3.0 cr.; prereq [3015 or 83015, CSE] or %; fall, spring, summer, every year) Basic differential amplifiers using FETs and BJTs. Current sources for differential amplifiers. Op-amp-based differential

EE 3161. Semiconductor Devices. (3.0 cr.; prereq Upper div CSE, 2011, Phys 1302, Phys 2303 or Chem 1022; fall, spring, every year) Elementary semiconductor physics; physical description of pn junction diodes, bipolar junction transistors, field-effect transistors.

EE 3601. Transmission Lines, Fields, and Waves. (3.0 cr.; prereq [2011, [Math 2243 or Math 2373 or Math 2573], [Phys 1302 or Phys 1402], CSE or %; fall, spring, summer, every year) Properties of transmission lines, electrostatics, magnetostatics, and electromagnetic waves in unbounded space. Guides, cavities, radiation theory, antennas.

EE 3940. Special Topics in Electrical and Computer Engineering. (1.0-4.0 cr. [max 8.0 cr.]; prereq #; summer, every year) Topics that are not available in regular courses. Topics vary.

EE 3990. Curricular Practical Training. (1.0-2.0 cr. [max 12.0 cr.]; S-N only; prereq #, undergrad EE or CompE major; fall, spring, summer, every year) Industrial work assignment involving advanced electrical engineering technology. Reviewed by faculty member. Final report covering work assignment.

EE 4043W. Industrial Assignment II. (4.0 cr.; A-F only; prereq 3041; fall, spring, summer, every year) Solution of system design problems that require developing criteria, evaluating alternatives, and generating a preliminary design. Final report emphasizes design communication and describes design decision process, analysis, and final recommendations.

EE 4044. Industrial Assignment III. (2.0 cr.; A-F only; prereq 4043W; fall, spring, summer, every year) Industrial work assignment in engineering co-op program. Evaluation based on student's formal written report covering semester work assignment.


EE 4161W. Energy Conversion and Storage. (3.0 cr.; prereq 3161 or #; spring, every year) Fundamental physics/chemistry of selected energy conversion and energy storage devices. Connections with their electric power applications. Role of grid, application to electric vehicles. Lectures, lab, student presentations.

EE 4163. Energy Conversion and Storage Laboratory. (1.0 cr.; prereq 4161W; spring, every year) Provides laboratory experiences with the topics of 4161W, including the fundamental physics and chemistry of selected energy conversion and energy storage devices, their application, and their connection strategies in electric power applications.

EE 4231. Linear Control Systems: Designed by Input/Output Methods. (3.0 cr.; [AEM 4321]; prereq [3015, [upper div CSE or grad student in CSE major]] or #; fall, every year) Modeling, characteristics, performance of feedback control systems. Stability, root locus, frequency response methods. Digital implementation, hardware considerations.


EE 4235. Linear Control Systems Laboratory. (1.0 cr.; prereq 4231 or 84231; fall, every year) Lab to accompany 4231.

EE 4237. State Space Control Laboratory. (1.0 cr.; prereq 4233 or & 4233; no cr for [EE or CompE] grad students; spring, every year) Lab to accompany 4233.

EE 4301. Digital Design With Programmable Logic. (4.0 cr.; prereq 2301, [1301 or CSCI 1113 or CSCI 1901]; fall, summer, every year) Introduction to system design/simulation. Design using Verilog code/synthesis. Emulation using Verilog code.

EE 4303. Introduction to Programmable Devices Laboratory. (1.0 cr.; prereq 2301, 2361; cannot receive cr for 4303 if cr granted for EE 4301; spring, offered periodically) Verilog Language. Combinatorial and sequential logic synthesis with Verilog. Implementation in Field Programmable Gate Arrays (FPGAs).


EE 4363. Computer Architecture and Machine Organization. (4.0 cr.; [EE 5361, CSCI 4203]; prereq 2361; fall, spring, every year) Introduction to computer architecture. Aspects of computer systems, such as pipelining, memory hierarchy, and input/output systems. Performance metrics. Examines each component of a complicated computer system.

EE 4398W. Introduction to Predictive Learning. (3.0 cr.; prereq [3025, ECE student] or STAT 3022; computer programming or MATLAB or similar environment is recommended for ECE students; fall, odd years) Empirical inference and statistical learning. Classical statistical framework, model complexity control, Vapnik-Chervonenkis (VC) theoretical framework, philosophical perspective. Nonlinear methods. New types of inference. Application studies.


EE 4505. Communications Systems Laboratory. (1.0 cr.; prereq 4501 or 44501; fall, every year) Experiments in analysis/design of wire/wireless communication systems. Lab to accompany 4501.


EE 4607. Wireless Hardware System Design. (3.0 cr.; prereq [3015, 3115, 3601, CSE student] or %; spring, every year) Random processes, noise, modulation, error probabilities. Antenna operation, power transfer between antennas, rf propagation phenomena, transmitters/receivers, transmission lines, effect of antenna performance on system performance, rf/microwave device technologies, small-signal amplifiers, mixers, power amplifiers, rf oscillators.

EE 4609. Digital Signal Integrity. (3.0 cr.; [EE 5609]; prereq 2011, Phys 1301, 1302, [or EE or CompE major]; spring, offered periodically) Introduction to high speed interconnect design. Transmission line theory, coupled line theory, elements of microwave circuit theory, parasitic calculations/measurement, techniques for good interconnect design.

EE 4701. Electric Drives. (3.0 cr.; prereq 3015; spring, every year) AC/DC electric-machine drives for speed/position control. Integrated discussion of electric machines, power electronics, and control systems. Computer simulations. Applications in electric transportation, robotics, process control, and energy conservation.

EE 4703. Electric Drives Laboratory. (1.0 cr.; prereq 4701 or & 4701; spring, every year) Laboratory to accompany 4701. Simulink-based simulations of electric machines/drives in applications such as energy conservation and motion control in robotics.

EE 4721. Introduction to Power System Analysis. (3.0 cr.; prereq 2011; fall, every year) AC power systems. Large power system networks. Mathematics/techniques of power
flow analysis. Short-circuit analysis, transient stability analysis. Use of power system simulation program for design.

EE 4722. Power System Analysis Laboratory. (1.0 cr.; prereq 4721 or &4721; fall, every year) Lab analysis of AC power systems, power system networks, power flow, short circuit, transient stability.

EE 4741. Power Electronics. (3.0 cr. [max 4.0 cr.]; prereq 3015, 3115; fall, every year) Switch-mode power electronics. Switch-mode DC power supplies. Switch-mode converters for DC and AC motor drives, wind/photovoltaic inverters, interfacing power electronics equipment with utility system. Power semiconductor devices, magnetic design, electro-magnetic interference (EMI).

EE 4743. Switch-Mode Power Electronics Laboratory. (1.0 cr.; prereq 4741 or & 4741; fall, every year) Laboratory to accompany 4741. PSPice/Simulink-based simulations of converters, topologies, and control in switch-mode dc power supplies, motor drives for motion control, and inverters for interfacing renewable energy sources to utility grid.

EE 4930. Special Topics in Electrical and Computer Engineering Laboratory. (1.0-2.0 cr. [max 6.0 cr.]; A-F only; prereq CSE sr or grad student or #; fall, spring, summer, offered periodically) Lab work not available in regular courses. Topics vary.

EE 4940. Special Topics in Electrical and Computer Engineering. (1.0-4.0 cr. [max 8.0 cr.]; prereq CSE or #; fall, spring, summer, every year) Topics that are not available in regular courses. Topics vary.

EE 4951W. Senior Design Project. (4.0 cr.; prereq 3015, 3115, 3102, attendance first day of class; fall, spring, every year) Team participation in formulating/solving open-ended design problems. Oral/written presentations.

EE 4970. Directed Study. (1.0-3.0 cr. [max 12.0 cr.]; prereq Cr or # [may be repeated for cr]; #; fall, spring, summer, every year) Studies of approved projects, either theoretical or experimental.

EE 4981H. Senior Honors Project I. (2.0 cr.; prereq ECE honors, sr; #; fall, every year) Experience in research/design for electrical/computer engineering. Oral/written reports.

EE 4982V. Senior Honors Project II. (2.0 cr.; prereq 4981; spring, every year) Experience in research/design for electrical/computer engineering. Oral/written reports.

EE 5041. Industrial Assignment for Graduate Students. (1.0 cr.; S-N only; prereq Consent of Advisor and Office of the DGS; fall, spring, summer, every year) Optional industrial work assignment. Evaluation based on student's formal written report covering semester's work assignment. This course counts for 6 credits of Academic Progress for the semester in which it is taken.

EE 5121. Transistor Device Modeling for Circuit Simulation. (3.0 cr.; prereq [3115, 3161, CSE grad student] or #; fall, spring, offered periodically) Basics of MOS, bipolar theory. Evolution of popular device models from early SPICE models to current industry standards.

EE 5141. Introduction to Microsystem Technology. (4.0 cr.; prereq [3161, 3601, CSE grad student] or #; spring, every year) Microelectromechanical systems composed of microsensors, microactuators, and electronics integrated onto common substrate. Design, fabrication, and operation principles. Labs on micromachining, photolithography, etching, thin film deposition, metallization, packaging, and device characterization.


EE 5164. Semiconductor Properties and Devices II. (3.0 cr.; prereq 5163 or #; spring, every year) Principles/properties of semiconductor devices. Charge control in different FETs, transport, modeling. Bipolar transistor models (Ebers-Moll, Gummel-Poon), heterostructure bipolar transistors. Special devices.

EE 5171. Microelectronic Fabrication. (4.0 cr.; prereq CSE grad student or #; fall, every year) Fabrication of microelectronic devices. Silicon integrated circuits, GaAs devices. Lithography, oxidation, diffusion. Process integration of various technologies, including CMOS, double poly bipolar, and GaAs MESFET.

EE 5173. Basic Microelectronics Laboratory. (1.0 cr.; prereq [[5171 or &5171], CSE grad student] or #; fall, every year) Students fabricate a polysilicon gate, single-layer metal, NMOS chip, performing 80 percent of processing, including photolithography, diffusion, oxidation, and etching. In-process measurement results are compared with final electrical test results. Simple circuits are used to estimate technology performance.


EE 5231. Linear Systems and Optimal Control. (3.0 cr.; prereq [3015, CSE grad student] or #; fall, every year) Properties and modeling of linear systems. Linear quadratic and linear-quadratic-Gaussian regulators. Maximum principle.

EE 5235. Robust Control System Design. (3.0 cr.; prereq CSE grad, 3015, 5231 or #; spring, every year) Development of control system design ideas; frequency response techniques in design of single-input/single-output (and MIMO) systems. Robust control concepts. CAD tools.


EE 5324. VLSI Design II. (3.0 cr.; prereq [5323, CSE grad student] or #; spring, every year) CMOS arithmetic logic units, high-speed carry chains, fast CMOS multipliers. High-speed performance parallel shifters. CMOS memory cells, array structures, read/write circuits. Design for testability, including scan design and built-in self test. VLSI case studies.

EE 5327. VLSI Design Laboratory. (3.0 cr.; prereq [4301, [5323 or &5323], CSE grad student] or #; spring, every year) Complete design of an integrated circuit. Designs evaluated by computer simulation.

EE 5329. VLSI Digital Signal Processing Systems. (3.0 cr.; prereq [[5323 or &5323],...
EE 5333. Analog Integrated Circuit Design. (3.0 cr.; prereq [5115, CSE grad student] or %; fall, every year) Fundamental circuits for analog signal processing. Design issues associated with MOS/BJT devices. Design/testing of circuits. Selected topics (e.g., modeling of basic IC components, design of operational amplifier or comparator or analog sampled-data circuit filter).

EE 5351. Applied Parallel Programming. (3.0 cr.; prereq [4363 or equivalent], programming experience (C/C++ preferred); fall, every year) Parallel programming/architecture. Application development for many-core processors. Computational thinking, types of parallelism, modeling models, mapping computations effectively to parallel hardware, efficient data structures, paradigms for efficient parallel algorithms, application case studies.

EE 5364. Advanced Computer Architecture. (3.0 cr.; [CSCI 5204; prereq [[4363 or CSCI 4203, CSE grad student] or %; fall, every year) Instruction set architecture, processor microarchitecture. Memory and I/O systems. Interactions between computer software and hardware. Methodologies of computer design.

EE 5371. Computer Systems Performance Measurement and Evaluation. (3.0 cr.; [EE 5863; prereq [4363 or 5361 or CSCI 4203 or 5201], [CSE grad student] or %; fall, spring, offered periodically) Tools/techniques for analyzing computer hardware, software, system performance. Benchmark programs, measurement tools, performance metrics. Deterministic/probabilistic simulation techniques, random number generation/testing. Bottleneck analysis.

EE 5381. Telecommunications Networks. (3.0 cr.; prereq [4501, 5531, CSE grad student] or %; fall, spring, offered periodically) Fundamental concepts of modern telecommunications networks, mathematical tools required for their performance analysis. Layered network architecture, point-to-point protocols/links, delay models, multiaccess communication/routing.


EE 5561. Image Processing and Applications. (3.0 cr.; prereq [4541, 5581, CSE grad student] or %; spring, every year) Two-dimensional digital filtering transforms. Application to image enhancement, restoration, compression, and segmentation.

EE 5581. Information Theory and Coding. (3.0 cr.; prereq [5531, CSE grad student] or %; fall, even years) Source/channel models, codes for sources/channels. Entropy, mutual information, capacity, rate-distortion functions. Coding theorems.

EE 5583. Error Control Coding. (3.0 cr.; prereq [3025, Math 2373] or equiv), [CSE grad student or %; spring, offered periodically) Error-correcting codes. Concepts, properties, polynomial representation. BCH, Golay, Reed-Muller/Reed-Solomon codes. Convolutional codes. Iterative codes.


EE 5602. RF/Microwave Circuit Design. (3.0 cr.; prereq [5601 or equiv]), [CSE grad student or %; fall, spring, offered periodically) Transmission lines, network analysis concepts. CAD tools for passive/active designs. Diode based circuit designs (detectors, frequency multipliers, mixers). Transistor based circuit design (amplifiers, oscillators, mixer/doubler).

EE 5611. Plasma-Aided Manufacturing. (4.0 cr.; A-F or Audit; [ME 5361]; prereq [[ME 3321, ME 3322] or equiv, [upper div CSE or grad student]] or %; fall, spring, offered periodically) Manufacturing using plasma processes. Plasma properties as a processing medium. Plasma spraying, welding and microelectronics processing. Process control and system design; industrial speakers. Cross-disciplinary
experience between heat transfer design issues and manufacturing technology.

EE 5613. RF/Microwave Circuit Design Laboratory. (2.0 cr.; A-F only; prereq [5601 or &5601], CSE grad student or %; spring, every year) Scattering parameters, planar lumped circuits, transmission lines, RF/microwave substrate materials, matching networks/tuning elements, resonators, filters, combiners/dividers, couplers. Integral lab.

EE 5616. Antenna Theory and Design. (3.0 cr.; prereq [5601 or &5601], CSE grad student or %; fall, spring, offered periodically) Antenna performance parameters, vector potential/radiation integral, wire antenna structures, broadband antenna structures, microstrip/ aperture theory, antenna measurements.

EE 5621. Physical Optics. (3.0 cr.; prereq [3015, CSE grad student] or %; spring, every year) Physical optics principles, including Fourier analysis of optical systems/images, scalar diffraction theory, interferometry, and coherence theory. Diffractive optical elements, holography, astronomical imaging, optical information processing, microoptics.


EE 5624. Optical Electronics. (4.0 cr.; prereq [3601 or Phys 3002], CSE grad student] or %; fall, every year) Fundamentals of lasers, including propagation of Gaussian beams, optical resonators, and theory of laser oscillation. Polarization optics, electro-optic, acousto-optic modulation, nonlinear optics, phase conjugation.


EE 5628. Fiber Optics Laboratory. (1.0 cr.; prereq [5627 or &5627], CSE grad student] or %; spring, even years) Experiments in fiber optics. Dielectric waveguides, modes in optical fibers, fiber dispersion/attenuation, properties of light sources/detectors, optical communication systems.


EE 5655. Magnetic Recording. (3.0 cr.; prereq CSE grad student or %; spring, offered periodically) Magnetic fundamentals, recording materials, idealized models of magnetic records/reproduction, analytic models of magnetic record heads, sinusoidal magnetic recording, digital magnetic recording, magnetic recording heads/media, digital recording systems.

EE 5657W. Physical Principles of Thin Film Technology. (4.0 cr.; prereq CSE grad student or %; fall, every year) Fabrication, characterization, and application of thin film and nanostructured materials/devices. Focuses on vacuum deposition. Materials science. Hands-on, team-based labs.


EE 5707. Electric Drives in Sustainable Energy Systems Laboratory. (1.0 cr.; prereq 5705 or &5705; spring, offered periodically) Lab to accompany 5705.

EE 5721. Power Generation Operation and Control. (3.0 cr.; prereq [4721, CSE grad student] or %; spring, every year) Engineering aspects of power system operation. Economic analysis of generation plants & scheduling to minimize total cost of operation. Scheduling of hydro resources and thermal plants with limited fuel supplies. Loss analysis, secure operation. State estimation, optimal power flow. Power system organizations.


EE 5940. Special Topics in Electrical Engineering I. (1.0-4.0 cr.; [max 12.0 cr.]; fall, spring, summer, every year) Special topics in electrical and computer engineering. Topics vary.

EE 5950. Special Topics in Electrical Engineering II. (1.0-4.0 cr.; [max 12.0 cr.]; fall, spring, every year) Special topics in electrical and computer engineering. Topics vary.

EE 5960. Special Topics in Electrical Engineering III. (1.0-4.0 cr.; [max 12.0 cr.]; fall, spring, every year) Special topics in electrical and computer engineering. Topics vary.

EE 5970. Special Topics in Electrical Engineering IV. (1.0-4.0 cr.; [max 12.0 cr.]; prereq EE or CompE grad student or %; only available for Rochester Campus; fall, spring, offered periodically) Special topics in electrical and computer engineering. Topics vary.

EE 5990. Curricular Practical Training. (1.0-2.0 cr. [max 6.0 cr.]; S-N or Audit; fall, spring, summer, every year) Industrial work assignment involving advanced electrical engineering technology. Review by faculty member. Final report covering work assignment.

Endodontics (ENDO)
School of Dentistry


ENDO 5304. Advanced Clinical Endodontics. (1.0-6.0 cr.; A-F or Audit; fall, summer, every year) Diagnosis/treatment of clinical cases. Complex cases, new/unique techniques.

ENDO 5305. Advanced Clinical Endodontics. (1.0-6.0 cr.; A-F or Audit; prereq 5304; fall, every year) Diagnosis/treatment of clinical cases. Complex cases, new techniques.
ENDO 5306. Advanced Clinical Endodontics. (1.0-6.0 cr.; A-F or Audit; spring, every year) Diagnosis/treatment of clinical cases. Complex cases, new techniques.

ENDO 5307. Advanced Clinical Endodontics. (1.0-6.0 cr.; A-F or Audit; prereq 5306; summer, every year) Diagnosis/treatment of clinical cases. Complex cases, new techniques.

ENDO 5308. Advanced Clinical Endodontics. (1.0-6.0 cr.; A-F or Audit; prereq 5307; %; fall, every year) Diagnosis/treatment of clinical cases. Complex cases, new techniques.

ENDO 5309. Advanced Clinical Endodontics. (1.0-6.0 cr.; A-F or Audit; prereq 5308; spring, every year) Diagnosis/treatment of clinical cases. Complex cases, new techniques.

ENDO 5310. Advanced Clinical Endodontics. (1.0-6.0 cr.; A-F or Audit; prereq 5309; summer, every year) Diagnosis/treatment of clinical cases. Complex cases, new techniques.

ENDO 5311. Advanced Endodontic Emergencies. (1.0 cr.; S-N or Audit; prereq %; summer, every year) Each student is assigned weekly periods (8 hours/week) and is responsible for all emergencies in the endodontic clinic during this time.

ENDO 5312. Advanced Endodontic Emergencies. (1.0 cr.; S-N or Audit; prereq 5311; fall, every year) Students assigned 8 hrs/wk, are responsible for emergencies in clinic.

ENDO 5313. Advanced Endodontic Emergencies. (1.0 cr.; S-N or Audit; prereq 5312; spring, every year) Students assigned 8 hrs/wk, are responsible for emergencies in clinic.

ENDO 5314. Advanced Endodontic Emergencies. (1.0 cr.; S-N or Audit; prereq 5313; summer, every year) Students assigned 8 hrs/wk, are responsible for emergencies in clinic.

ENDO 5315. Advanced Endodontic Emergencies. (1.0 cr.; S-N or Audit; prereq 5314; %; fall, every year) Students assigned 8 hrs/wk, are responsible for emergencies in clinic.

ENDO 5316. Advanced Endodontic Emergencies. (1.0 cr.; S-N or Audit; prereq 5315; spring, every year) Students assigned 8 hrs/wk, are responsible for emergencies in clinic.

ENDO 5317. Advanced Endodontic Emergencies. (1.0 cr.; S-N or Audit; prereq 5316; summer, every year) Students assigned 8 hrs/wk, are responsible for emergencies in clinic.

ENDO 5329. Review of Cases. (1.0 cr.; A-F or Audit; prereq %; fall, every year) Oral/visual presentation of endodontic cases with follow up. Presentation of surgery cases before surgery.

ENDO 5330. Review of Cases. (1.0-2.0 cr.; A-F or Audit; prereq 5329; spring, summer, every year) Oral/visual presentation of endodontic cases with follow up. Presentation of cases before surgery.

ENDO 5331. Review of Cases. (1.0 cr.; A-F or Audit; prereq 5330; fall, every year) Oral/visual presentation of endodontic cases with follow up. Presentation of cases before surgery.

ENDO 5332. Review of cases. (1.0 cr.; A-F or Audit; prereq %; spring, every year) Oral and visual presentation of endodontic cases with follow up. Presentations of surgery cases before surgeries.

ENDO 5400. Advanced Endodontics for the General Dentist. (1.0 cr.; S-N or Audit; prereq %; fall, spring, offered periodically) Advanced diagnosis/treatment of endodontics in clinic/office setting. Internship.


ESL 5. SIEP: Beginning Grammar. (0.0 cr.; S-N or Audit; prereq Non-native English speaker; summer, every year) Reading short passages of limited difficulty. Main ideas, vocabulary, reading speed, skimming/escanning. Writing fundamentals, spelling, punctuation, paragraphing, organization. Writing exercises, free writing.

ESL 5. SIEP: Beginning Grammar. (0.0 cr.; S-N or Audit; prereq Non-native English speaker; fall, spring, every year) Reading short passages of limited difficulty. Main ideas, vocabulary, reading speed, skimming/escanning. Writing fundamentals, spelling, punctuation, paragraphing, organization. Writing exercises, free writing.

ESL 10. Beginning Grammar. (0.0 cr.; S-N or Audit; prereq Non-native English speaker; fall, spring, every year) Developing English grammar skills by focusing on meaning, form, use of basic grammar structures. Intended for students with some prior English.

ESL 15. SIEP: Beginning Reading and Composition. (0.0 cr.; S-N or Audit; prereq Non-native English speaker; summer, every year) Developing English grammar skills. Intended for students with some prior English.

ESL 20. Beginning Reading and Composition. (0.0 cr.; S-N or Audit; prereq Non-native English speaker; fall, spring, every year) Developing skills/strategies for reading/writing in English. Fundamentals of writing at sentence/basic paragraph level. Vocabulary development.
Non-native speaker of English; see Minnesota English as a Second Language Program for override; summer, every year

English reading and composition skills.

**ESL 220. Intermediate Reading and Composition.** (0.0 cr.; S-N or Audit; prereq Nonnative English speaker; fall, spring, summer, every year)

Reading for main/supporting ideas with increased speed. Vocabulary development through study of word formation and use of dictionary. Writing fundamentals. Organization. Writing as process.

**ESL 225. SIEP. Intermediate Oral Skills.** (0.0 cr.; S-N only; prereq Non-native speaker of English; summer, every year)

English spoken language skills, community contact.

**ESL 230. Intermediate Oral Skills.** (0.0 cr.; S-N or Audit; prereq Nonnative English speaker; fall, spring, summer, every year)


**ESL 305. SIEP: Advanced Grammar.** (0.0 cr.; S-N or Audit; prereq Non-native speaker of English; see English as a Second Language Program for override; fall, every year)

English grammar skills.

**ESL 410. English Grammar for Academic Purposes.** (0.0 cr.; S-N or Audit; prereq Non-native speaker of English; fall, spring, summer, every year)

Production of grammatically sophisticated structures in writing. Students edit their assignments.

**ESL 415. SIEP: High-Advanced Reading and Composition.** (0.0 cr.; S-N or Audit; prereq Non-native speaker of English; see Minnesota English as a Second Language Program for override; summer, every year)

English reading/composition skills.

**ESL 420. High Advanced Reading/Composition.** (0.0 cr.; S-N or Audit; prereq Non-native speaker of English; fall, spring, summer, every year)

Reading for academic purposes. Comprehension of scholarly reading selections. Increasing reading efficiency. Writing process, academic-style assignments.

**ESL 425. SIEP, High Advanced Oral Skills.** (0.0 cr.; S-N or Audit; prereq Non-native speaker of English; summer, every year)

English spoken language skills, community contact.

**ESL 430. High Advanced Oral Skills.** (0.0 cr.; S-N or Audit; prereq Non-native speaker of English; fall, spring, every year)

Listening/speaking skills. Understanding U.S. culture through interaction with American students. Weekly seminar with American university students. Students visit local schools and present about their home country. Pronunciation instruction focuses on individual needs.

**ESL 611. Advanced Grammar.** (0.0 cr.; S-N or Audit; prereq Non-native speaker of English; fall, spring, summer, every year)

Difficult areas of grammar, resources to work on them. Meaning, use, form. Complex sentence patterns.

**ESL 901. American Culture.** (0.0 cr.; S-N or Audit; prereq Non-native speaker of English; spring, every year)

Areas of U.S. culture such as humor, religions, ethnic groups, lifestyles, and popular culture.

**ESL 902. Academic Skills for the American University.** (0.0 cr.; S-N or Audit; prereq Non-native speaker of English; fall, spring, summer, every year)

English language needed to interact within university setting. Academic life, student/instructor roles, communicating by email, classroom interactions, discussion/panel presentation skills.

**ESL 903. Business English.** (0.0 cr.; S-N or Audit; prereq Non-native English speaker; fall, spring, summer, every year)

Oriel/written communication skills in business setting.

**ESL 904. TOEFL Preparation.** (0.0 cr.; S-N or Audit; fall, spring, summer, every year)

Preparing for Internet-based TOEFL (iBT). Listening, speaking, grammar, writing, reading. Students examine types of questions and practice strategies useful on the test.

**ESL 905. Topics in ESL.** (0.0 cr.; S-N or Audit; prereq Non-native speaker of English; fall, spring, offered periodically)

Varying topics in learning English as a second language.

**ESL 906. English for Business Interactions.** (0.0 cr.; S-N or Audit; prereq Non-native English speaker; fall, spring, every year)

Zero-credit course designed for high-intermediate to advanced non-native speakers of English currently working in professional settings or wish to study business. Writing for business communication, self-editing skills, communication styles, presentations, telephone communication.

**ESL 907. English for Science and Engineering.** (0.0 cr.; S-N or Audit; prereq Non-native English Speaker, %; fall, spring, every year)

Zero-credit course is designed for students who are high-intermediate to advanced non-native speakers of English in Intensive English Program (IEP) preparing for admission to science/engineering programs at university level. Open to students at higher levels in Intensive English Program in Minnesota English Language Program (MELP).

**ESL 921. Academic Writing.** (0.0 cr.; S-N or Audit; prereq Non-native speaker of English; fall, spring, every year)

Writing for academic purposes.

**ESL 931. Academic Speaking.** (0.0 cr.; S-N or Audit; prereq Non-native speaker of English; fall, spring, every year)

American academic interactions. Lectures, presentations, seminar-style discussions, informal exchanges. Presenting oneself professionally/socially in collegial settings with accuracy, variety, and flexibility.

**ESL 941. Research Writing for the American University.** (0.0 cr.; S-N only; prereq [Non-native speaker of English, [TOEFL iBT 79 or IELTS 6.5 or MNBatt 80 or equiv]] or %; fall, spring, every year)
Comprehension of main ideas, organization, and support in longer authentic English texts. Expanded vocabulary comprehension. Fluency, focus, and persuasiveness through draft/revision. Focuses on accuracy/variety of expression.

ESL 3202. Academic Reading and Composition. (5.0 cr. [max 10.0 cr.]; prereq 3201; Non-native speaker of English, [IBT score of at least 68 or equiv]; %; fall, every year) Academic writer's purpose, main ideas, and supporting evidence in English language texts. Expansion of academic vocabulary. Use of source material in English research writing in different academic genres. Focuses on revision to improve fluency/accuracy.

ESL 3302. Writing for Academic Purposes. (4.0 cr. [max 8.0 cr.]; prereq 3202, non-native speaker of English, [C-TOEFL score of at least 190 or equiv]; %; fall, every year) Writing process. Idea generation/development, drafting, revision, editing. Focuses on different genres of academic writing, including critical response to scholarly argument, scholarly review, and incorporation of source material in writing. "Rush writing" under time pressure to improve fluency in writing.

ESL 3402. Research Writing for the American University. (4.0 cr. [max 8.0 cr.]; prereq [Non-native speaker of English, [TOEFL iBT 79 or IELTS 6.5 or MN Batt 80 or equiv]] or %; fall, spring, every year) Methods of citation, conventions of style and organization, and critical thinking skills necessary for writing college-level research papers. Students select topics derived from a contemporary academic theme and apply a process approach to produce a research paper. Students learn to use the library effectively. Structure and vocabulary usage.

ESL 3501. Advanced English Listening and Speaking. (5.0 cr. [max 10.0 cr.]; prereq Non-native speaker of English, [IBT score 53-67 or equiv], %; fall, every year) Speaking/listening naturally spoken English in academic activities such as lecture comprehension, note taking, class discussions, and oral presentations. Emphasizes cross-cultural interaction related to academic subject matter.

ESL 3502. Academic Listening and Speaking. (5.0 cr. [max 10.0 cr.]; prereq 3501; non-native speaker of English, [IBT score of at least 68 or equiv], %; fall, spring, every year) Understanding lectures and academic discussions. Focuses on critical listening. Students produce academic presentations and participate in discussions on subjects of general academic interest. Cross-cultural awareness. Negotiation of disagreement/ misunderstanding.


ESL 3602. Speaking for Academic Purposes. (4.0 cr. [max 8.0 cr.]; prereq 3502, non-native speaker of English, [C-TOEFL score of at least 190 or equiv]; %; spring, every year) Students participate in American academic interactions of various types: lectures, presentations, seminar-style discussions, informal exchanges. Presenting oneself professionally/socially in collegial settings with accuracy, variety, and flexibility.

ESL 3900. Special Topics in ESL. (1.0-5.0 cr. [max 10.0 cr.]; prereq Non-native speaker of English, program consent; fall, spring, every year) Topics vary.

ESL 5006. English for Business Interactions. (2.0 cr. [max 4.0 cr.]; prereq Grad, non-native English speaker; fall, spring, every year) Designed for high-intermediate to advanced non-native speakers of English who are currently business majors or in closely related major. Writing for business communication, self-editing skills, communication styles, presentations, telephone communication.
ENGL 1301W. Introduction to Multicultural Literatures of the United States. (4.0 cr.; [ENGL 1301V]; fall, summer, every year)

Representative works by African American, American Indian, Asian American, and Chicano/Chicana writers, chiefly from 20th century. Social-cultural factors informing America's literary past/present.

ENGL 1401H. Honors: Introduction to "Third World" Literatures in English. (4.0 cr.; A-F or Audit; [ENGL 1401W]; prereq Honors or #; fall, spring, every year)

Diverse work produced in English outside the United States and Britain. Works represent different cultures, but treat concerns derived from a common post-colonial legacy.

ENGL 1401W. Introduction to "Third World" Literatures in English. (4.0 cr.; [ENGL 1401V]; fall, spring, every year)

Diverse works produced in English outside the United States and Britain. Works represent different cultures, but treat concerns derived from common post-colonial legacy.

ENGL 1501W. Literature of Public Life. (4.0 cr.; A-F only; fall, spring, every year)


ENGL 1701H. Modern Fiction. (3.0 cr.; [ENGL 1701H]; fall, spring, summer, every year)

Basic techniques for analyzing/understanding fiction. Readings from novels and short stories written in English-speaking countries and elsewhere (in translation). Introduction to fictional techniques such as point of view, fictional conventions, and some forms of experimentation.

ENGL 1902. Topics: Freshman Seminar. (3.0 cr.; A-F or Audit; prereq Fr; fall, every year)

Topics specified in Class Schedule.

ENGL 1904. Topics: Freshman Seminar. (3.0 cr.; A-F or Audit; prereq Fr; fall, spring, offered periodically)

Topics specified in Class Schedule.

ENGL 1905. Topics: Freshman Seminar. (3.0 cr.; A-F or Audit; prereq freshman; fall, every year)

Topics specified in Class Schedule.

ENGL 1907W. Topics: Freshman Seminar. (3.0 cr.; A-F or Audit; fall, offered periodically)

Topics specified in Class Schedule.

ENGL 1910W. Topics: Freshman Seminar. (3.0 cr.; A-F or Audit; prereq freshman; fall, every year)

Topics specified in Class Schedule.

ENGL 3001V. Honors: Textual Analysis, Methods. (4.0 cr.; A-F only; [ENGL 3001W]; prereq Honors, [English major or minor or approved BIS or IDIM program with English area]; fall, spring, every year)

Training/practice in analyzing various literary forms. Emphasizes poetry. Argument, evidence, and documentation in literary papers. Introduction to major developments in contemporary criticism.

ENGL 3001W. Textual Analysis: Methods. (4.0 cr.; A-F only; [ENGL 3001V]; prereq English major or minor or premajor or BIS/IDIM-English; fall, spring, summer, every year)

Close/critical reading, placing literature in history/culture. Idea of multiple approaches to literary works. Analysis of various literary forms, including poetry.

ENGL 3002. Modern Literary Criticism and Theory. (3.0 cr.; [ENGL 3002H]; fall, spring, every year)

Problems of interpretation/criticism. Questions of meaning, form, authority, literary history, social significance.

ENGL 3002H. Honors: Modern Literary Criticism and Theory. (3.0 cr.; [ENGL 3002]; prereq Honors or #; fall, spring, every year)

Problems of interpretation/criticism. Questions of meaning, form, authority, literary history, social significance.

ENGL 3003W. Historical Survey of British Literatures I. (4.0 cr.; fall, spring, summer, every year)

An introductory historical survey of British literature and culture from the Anglo-Saxon invasions through the end of the 18th century.

ENGL 3004W. Historical Survey of British Literatures II. (4.0 cr.; fall, spring, summer, every year)

An introductory historical survey of British literature and culture in the 19th and 20th centuries. Includes Romantic, Victorian, and Modernist authors, such as Wordsworth, Keats, Tennyson, the Brontes, Austen, Dickens, Wilde, Yeats, Woolf, and Thomas.

ENGL 3005W. Survey of American Literatures and Cultures I. (4.0 cr.; fall, spring, summer, every year)

Readings in American literature from first European contact, through colonial times, to mid-19th century. Texts in several genres by diverse authors. Classics, less familiar works. Historical, social, and aesthetic contexts.

ENGL 3006W. Survey of American Literatures and Cultures II. (4.0 cr.; fall, spring, summer, every year)

Readings from the mid-19th to the mid-20th century; including the realists’ and regionalists’ response to the growth of industrial capitalism, Modernism in the 1920s, and the issues which united and divided the country throughout the 20th century.

ENGL 3007. Shakespeare. (3.0 cr.; A-F or Audit; [ENGL 3007H]; fall, spring, summer, every year)

Plays from all of Shakespeare's periods, including at least A Midsummer Night's Dream, Hamlet, the history plays, King Lear, Macbeth, The Tempest, Twelfth Night, Antony and Cleopatra, Othello, and The Winter's Tale.

ENGL 3007H. Honors: Shakespeare. (3.0 cr.; A-F or Audit; [ENGL 3007]; prereq Honors or #; fall, spring, every year)

Plays from all of Shakespeare's periods, including at least A Midsummer Night's Dream, Hamlet, the history plays, King Lear, Macbeth, The Tempest, Twelfth Night, Antony and Cleopatra, Othello, and The Winter's Tale.

ENGL 3008H. Research in English: In and Out of the Archives. (3.0 cr.; A-F only; prereq [CLA honors, [English major or English minor or BIS/IDIM English]] or #; fall, spring, every year)


ENGL 3010. Studies in Poetry. (3.0 cr.; [max 9.0 cr.]; [ENGL 3010H]; fall, offered periodically)

Special topics related to reading poetry in various interpretive contexts.

ENGL 3010H. Honors: Studies in Poetry. (3.0 cr.; A-F only; [ENGL 3010]; prereq Honors or #; spring, offered periodically)

Special topics related to reading poetry in various interpretive contexts.

ENGL 3011. Diaspora Poetics. (3.0 cr.; fall, spring, offered periodically)

Verbal art, historic or recent, produced by displaced persons as basis for engagement with idea of creative, survivalist displacement of language itself.

ENGL 3012. Poetry as Cultural Critique. (3.0 cr.; [CSCL 3174]; spring, offered periodically)

Examines the status of "poetry" in several cultures of the Americas bringing together techniques of close reading and broad cultural inquiry.

ENGL 3013. Poems about Cities. (3.0 cr.; spring, offered periodically)

Read/respond to selection of poems about various cities. Emphasis on poetry written in English from 18th through 21st century. Some poetry in translation/from other periods.

ENGL 3020. Studies in Narrative. (3.0 cr.; [max 9.0 cr.]; [ENGL 5020, ENGL 5020H]; fall, summer, odd years)

Examine issues related to reading and understanding narrative in a variety of interpretive contexts. Topics may include "The 19th-century English (American, Anglophone) novel, "Introduction to Narrative," or "Techniques of the Novel." Topics specified in the Class Schedule.

ENGL 3020H. Honors: Studies in Narrative. (3.0 cr.; A-F or Audit; [ENGL 5020, ENGL 5020H]; prereq honors student; fall, odd years)

Issues related to reading/understanding narrative in various interpretive contexts. Topics may include nineteenth-century English (American, Anglophone) novel, narrative, or techniques of the novel. Topics specified in Class Schedule.

ENGL 3021. Captivity in Literature and Film: From the Barbary Coast to Guantanamo
ENGL 3022. Science Fiction and Fantasy. (3.0 cr.; fall, spring, every year) Variety of science fiction/fantasy authors, such as Mary Shelley, J.R.R. Tolkien, and Neil Gaiman.

ENGL 3023. Children’s Literature. (3.0 cr.; fall, spring, every year) Range of children’s literature, from classic fairy tales such as “Little Red Riding Hood” to contemporary texts such as Harry Potter and the Sorcerer’s Stone.

ENGL 3023H. Honors: Children’s Literature. (3.0 cr.; A-F only; prereq Honors; spring, offered periodically) Range of children’s literature, from classic fairy tales such as Little Red Riding Hood to contemporary texts such as Harry Potter and the Sorcerer’s Stone.

ENGL 3024. The Graphic Novel. (3.0 cr.; fall, spring, every year) Graphic novel as well as manga.

ENGL 3025. The End of the World in Literature and History. (3.0 cr.; fall, every year) Apocalypse through readings of text that focus on pandemic, extraterrestrial attack, nuclear holocaust, prophecy, cybernetic revolt, divine judgment, resource depletion, meteoric impact.

ENGL 3027W. The Essay. (4.0 cr.; fall, spring, summer, every year) Incorporating narrative, descriptive, analytical, and persuasive techniques into writing on general topics. Effective argumentation through critical reading. Use of library resources. Awareness of context/audience.

ENGL 3030. Studies in Drama. (3.0 cr. [max 9.0 cr.]; = [ENGL 5030, ENGL 3030H]; spring, summer, every year) Topics may include English Renaissance tragedy, English Restoration and 18th century, or American drama by writers of color. Single-author courses focus on writers such as Tennessee Williams and Eugene O’Neill, or issues/themes such as gender/performance.

ENGL 3032. Shakespeare in London. (3.0 cr.; summer, even years) How are different interpretations of Shakespeare’s works embodied in the theater? How are they transformed by location/context? Students attend/discount theatrical productions.

ENGL 3040. Studies in Film. (3.0 cr. [max 9.0 cr.]; = [ENGL 3040H]; fall, spring, summer, every year) Topics regarding film in variety of interpretive contexts, from range/historic development of American, English, Anglophone film.

ENGL 3046. Black and White. (4.0 cr.; spring, even years) Photography, cinema, print. Documentary, fantasy, film noir: how they have infected our aesthetic imagination. Social themes. Racial divisions marking American/global systems.

ENGL 3060. Studies in Literature and the Other Arts. (3.0 cr. [max 9.0 cr.]; spring, every year) Examine literature’s role in conjunction with other arts, including music, visual arts, dance, etc. Topics specified in Class Schedule.

ENGL 3061. Literature and Music. (3.0 cr.; spring, every year) Explore various parallels/intersections between literature/music, both in terms of form/content.

ENGL 3070. Studies in Literary and Cultural Modes. (3.0 cr. [max 9.0 cr.]; fall, odd years) Modes of literary expression/representation that transcend conventional demarcations of genre and historical periods. Topics may include horror, romance, mystery, comedy, and satire.

ENGL 3071. The American Food Revolution in Literature and Television. (3.0 cr.; fall, every year) Native food landscape in 1930s. Classic literature from rise of movement. Recent work that focuses on personal/environmental ethics of food.

ENGL 3090. General Topics. (3.0 cr. [max 9.0 cr.]; fall, spring, summer, every year) Topics specified in Class Schedule.

ENGL 3101. Survey of Medieval English Literature. (3.0 cr.; A-F or Audit; fall, every year) Major/representative Medieval English works, including Sir Gawain the Green Knight, Chaucer’s Canterbury Tales, Piers Plowman, Book of Margery Kempe, Julian of Norwich’s Revelations, and Malory’s Morte D’Arthur.

ENGL 3102. Chaucer. (3.0 cr.; A-F or Audit; fall, spring, every year) Major/representative works written by Chaucer, including The Canterbury Tales, Troilus and Criseyde, and the dream visions. Historical, intellectual, and cultural background of the poems. Language, poetic theory, form.

ENGL 3110. Medieval Literatures and Cultures: Intro to Medieval Studies. (3.0 cr. [max 9.0 cr.]; = [ENGL 5110]; spring, every year) Major and representative works of the Middle Ages. Topics specified in the Class Schedule.

ENGL 3122. Shakespeare II: The Major Themes. (3.0 cr.; prereq 3007 or #; spring, offered periodically) Shakespeare’s intellectual community, its language/values. In-class readings from at least six plays. Quizzes on dramatic speeches. Written assignments.

ENGL 3132. The King James Bible as Literature. (3.0 cr.; fall, odd years) Literature of Jewish Bible (“Old Testament”). Narratives (Torah through Kings), prophets (including Isaiah), writings (including Psalms, Job, Ecclesiastes). God’s words/deeds as reported by editors/translators.

ENGL 3134. Milton and Rebellion. (3.0 cr.; A-F or Audit; = [ENGL 3134H]; fall, spring, offered periodically) Milton’s prose/minor poems from the Revolution (1641-1660). Post-revolutionary works (Paradise Lost, Samson Agonistes). Emphasizes Milton’s lifelong effort to bring about reform (“change”).

ENGL 3141. The Restoration and the Eighteenth Century. (3.0 cr.; A-F or Audit; = [ENGL 5140]; spring, every year) Major/representative works of the Restoration and 18th century (1660-1789). Typical authors: Dryden, Behn, Swift, Pope, Fielding, Burney.

ENGL 3151. Romantic Literatures and Cultures. (3.0 cr.; A-F only; fall, spring, every year) British literature written between 1780 and 1830. Concept of Romanticism. Effects of French Revolution on literary production. Role of romantic artist.

ENGL 3161. Victorian Literatures and Cultures. (3.0 cr.; = [ENGL 3161H]; spring, every year) The literature of the British Victorian period (1832-1901) in relation to its cultural and historical contexts. Typical authors include Tennyson, the Brownings, Dickens, Arnold, Hopkins, and the Brontes.

ENGL 3161H. Honors: Victorian Literatures and Cultures. (3.0 cr.; A-F only; = [ENGL 3161]; prereq Honors or #; fall, spring, offered periodically) Literature of British Victorian period (1832-1901) in relation to its cultural/historical contexts. Typical authors: Tennyson, the Brownings, Dickens, Arnold, Hopkins, the Brontes.

ENGL 3175. 20th-Century British Literatures and Cultures I. (3.0 cr.; = [ENGL 5175]; fall, offered periodically) Survey of principal writers, intellectual currents, conventions, and genres/themes in Britain/Ireland, from 1900 to 1945. Fiction/nonnction by Conrad, Richardson, Forster, Joyce, Mansfield, Rhys, West, Woolf, Lawrence, and Huxley. Poetry by Hardy, Hopkins, Loy, H.D., Yeats, Pound and Eliot. Drama by Synge and Shaw.

ENGL 3180. Contemporary Literatures and Cultures. (3.0 cr. [max 9.0 cr.]; = [ENGL 3180H, ENGL 5180]; fall, summer, every year) Examine issues related to the reading and understanding of British, American, and Anglophone fiction and poetry in a variety of interpretive contexts.

ENGL 3212. American Poetry from 1900. (3.0 cr.; spring, odd years) Famous and lesser-known poems from the Modernist era, the time of Frost, HD, Pound, Eliot and the Harlem Renaissance. The course attends to the intellectual and cultural
ENGL 3211. American Novel to 1900. (3.0 cr.; fall, even years)
Novels, from early Republic, through Hawthorne, Melville, and Stowe, to writers at end of 19th century (e.g., Howells, Twain, James, Chopin, Crane). Development of a national literature. Tension between realism and romance. Changing role of women as writers and as fictional characters.

ENGL 3222. American Novel from 1900. (3.0 cr.; [ENGL 3222H]; fall, spring, every year)
Novels from early 1900’s realism through Modernist (e.g., Faulkner, Hemingway, Fitzgerald) to more recent writers (e.g., Ellison, Bellow, Erdrich, Pynchon). Stylistic experiments, emergence of voices from formerly under-represented groups, novelists’ responses to society.

ENGL 3231. American Drama. (3.0 cr.; [ENGL 3231H]; fall, spring, offered periodically)
Representative dramas from 18th through 20th centuries. Topics include staging of national identities, aesthetics of modern/contemporary drama. Production concerns of mainstream, regional, community theaters.

ENGL 3301. Asian America Through Arts and Culture. (3.0 cr.; [AAS 3301]; spring, odd years)
Interdisciplinary questions of Asian American experience, identity, and community. Literature, dance, music, photography, film, theater, other cultural forms. Students work with local Asian American arts groups/organizations. Attend local arts events.

ENGL 3330. Gay, Lesbian, Bisexual, and Transgendered Literature. (3.0 cr.; [max 9.0 cr.]; spring, even years)
Literature/culture produced by/about gay, lesbian, bisexual, and transgendered people. Emphasizes importance of materials falsified/ignored in earlier literary/cultural studies. How traditional accounts need to be revised in light of significant contributions of GLBT people.

ENGL 3350H. Honors: Women Writers. (3.0 cr.; A-F or Audit; [ENGL 3350]; prereq Honors or #; spring, even years)
Groups of writers in 19th or 20th century. Either focuses on writers from a single country or is comparative. Organized thematically or according to topics of contemporary/theoretical interest.

ENGL 3352. Weird Books by Women. (3.0 cr.; [ENGL 3352H]; spring, odd years)
Weirdness as non-normativity that creates discomfort. Weirdness as incestuous creepiness, dissociation, hysteria, paranoia. Weirdness as identifying, but not wanting to, with a twisted reality. Weirdness created through experimental text, form, and narrative.

ENGL 3352H. Honors: Weird Books by Women. (3.0 cr.; A-F only; [ENGL 3352]; prereq Honors or #; fall, offered periodically)
Weirdness as non-normativity that creates discomfort. Weirdness as incestuous creepiness, dissociation, hysteria, paranoia. Weirdness as identifying, but not wanting to, with a twisted reality. Weirdness created through experimental text, form, and narrative.

ENGL 3350. Public Discourse: Coming to Terms With the Environment. (3.0 cr.; spring, even years)
Public discourse in various geographic regions and historical periods. See Course Guide for specific course description.

ENGL 3350. Community Learning Internships I. (3.0 cr.; A-F or Audit; fall, every year)
Connections between literature/literacy, theory/practice, community work and academic study. Students work as interns in local community-based education projects. Interns meet with faculty and community representatives to reflect on daily work and practical relevance. Students receive initial training from Career and Community Learning Center and Minnesota Literacy Council, and orientations at community sites. Four hours weekly work at community site, readings, journal writing, monthly short papers.

ENGL 3356. Learning Internships II. (4.0 cr.; A-F or Audit; prereq 3505 in preceding semester or #; spring, every year)
Students work at a community site. In weekly meetings with faculty and community representatives, students explore relationship between their academic skills and community experiences. Social functions of literacy and liberal education in the United States. Eight hours weekly work at community site. Readings in history/theory of literacy, written reflection exercises, design/execution of scholarly or educational project at community site.

ENGL 3507W. Introduction to Chicana/o Literature. (3.0 cr.; [CHIC 3507W]; fall, spring, every year)
Cultural, intellectual, and sociopolitical traditions of Mexican Americans as they are represented in creative literature. Genres/forms of creative cultural expression and their significance as representations of social, cultural, and political life in the United States. Novels, short stories, creative nonfiction, drama, essay, poetry, and hybrid forms of literature.

ENGL 3592W. Introduction to Black Women Writers in the United States. (3.0 cr.; [AFRO 3592W]; fall, spring, every year)
Literature of African American women writers explored in novels, short stories, essays, poetry, autobiographies, drama from 18th to late-20th century.

ENGL 3597W. Introduction to African American Literature and Culture I. (4.0 cr.; [AFRO 3597W]; fall, every year)
African American oral tradition, slave narrative, autobiography, poetry, essay, fiction, oratory, and drama, from colonial era through Harlem Renaissance.

ENGL 3598W. Introduction to African American Literature and Culture II. (4.0 cr.; [AFRO 3598W]; spring, every year)
African American oral tradition, autobiography, poetry, essay, fiction, oratory, and drama. From after Harlem Renaissance to end of 20th century.

ENGL 3601. Analysis of the English Language. (4.0 cr.; fall, spring, summer, every year)

ENGL 3711. Literary Magazine Production Lab I. (4.0 cr.; A-F only; fall, every year)
First of two courses. Students produce undergraduate art/literary magazine Ivory Tower. Students decide upon identity, tone, and direction of the issue. They take on magazine staff responsibilities, call for submissions, make selections, edit/design, set budget, and begin fund-raising.

ENGL 3712. Literary Magazine Production Lab II. (4.0 cr.; A-F only; prereq 3711; spring, every year)
Second of two courses. Produce undergraduate art/literary magazine Ivory Tower. Contact writers/artists, edit final selections, design/layout pages, select printer, distribute, and market journal. Reading/writing assignments on history of literary magazines.

ENGL 3741. Literary and American Cultural Diversity. (4.0 cr.; fall, spring, every year)

ENGL 3883V. Honors Thesis. (1.0-4.0 cr.; A-F or Audit; fall, spring, every year)
See guidelines available from English honors advisor. Prereq-Hons candidacy in English, consent of English honors advisor.

ENGL 3993. Directed Study. (1.0-4.0 cr.; max 8.0 cr.; fall, spring, every year)
Guided individual reading or study. Prereq-One 3XX, [English major or minor or [BIS or IDIM or ICP] with English concentration], [jr or sr], instr consent, dept consent, college consent.

ENGL 4003. History of Literary Theory. (3.0 cr.; A-F or Audit; fall, odd years)
How thinkers from classical to modern times posed/answered questions about language (how words mean), audience (to whom they mean), and the literary (how literary writing differs from other forms of writing). Works by Plato, Aristotle, Augustine, Christine de Pizan,
ENGL 4613. Old English II. (3.0 cr.; prerequisite 4612; spring, even years) Critical reading of texts. Introduction to versification. Readings of portions of Beowulf.

ENGL 4721. Electronic Text. (3.0 cr.; fall, offered periodically) Status/function of text, related questions as framed by electronic text.

ENGL 4722. Alphabet to Internet: History of Writing Technologies. (4.0 cr.; fall, spring, every year) Equivocal relation of memory and writing. Literacy, power, control. Secrecy and publicity. Alphabetization and other ways of ordering word. Material bases of writing. Typographical design/expression. Theories of technological determinism.

ENGL 5001. Ph.D. Colloquium: Introduction to Literary Theory and Literary Studies in the Modern University. (3.0 cr.; fall, every year) Where and what is literary study vis-à-vis the discipline, of the humanities, and of the university—all in the context of a graduate education. Literary theory focusing on key theoretical works that address the discipline, the humanities, and the university.

ENGL 5020. Readings in Narrative. (3.0 cr.; max 9.0 cr.; =ENGL 3020, ENGL 3020H; prerequisite Grad student or #; fall, odd years) Issues related to reading/understanding narrative in various interpretive contexts. Topics may include "The 19th-century English (American, Anglophone) Novel," "Introduction to Narrative," or "Techniques of the Novel."

ENGL 5040. Theories of Film. (3.0 cr.; max 9.0 cr.; prerequisite Grad student or #; offered periodically) Advanced topics regarding film in a variety of interpretive contexts, from the range and historic development of American, English, and Anglophone film (e.g., "Fascism and Film," "Queer Cinemas"). Topics and viewing times announced in Class Schedule.

ENGL 5090. Readings in Special Subjects. (1.0-4.0 cr. max 9.0 cr.; =ENGL 5100; prerequisite grad student or #; fall, spring, every year) General background preparation for advanced study. Diverse selection of literatures written in English, usually bridging national cultures and time periods. Readings specified in Class Schedule.

ENGL 5110. Readings in Modern Literature and Culture. (3.0 cr.; max 9.0 cr.; prerequisite Grad student or #; spring, every year) Wide reading in literature of period. Relevant scholarship/criticism. Topics vary. See Class Schedule.

ENGL 5121. Readings in Early Modern Literature and Culture. (3.0 cr.; max 9.0 cr.; prerequisite Grad student or #; fall, spring, offered periodically) Topical readings in early modern poetry, prose, fiction, and drama. Attention to relevant scholarship or criticism. Preparation for work in other courses or seminars.

ENGL 5140. Readings in 18th Century Literature and Culture. (3.0 cr.; =ENGL 3141; prerequisite Grad student or #; spring, every year) Literature written in English, 1660-1798. Topics may include British literature of Reformation and 18th century, 18th-century American literature, a genre (e.g., 18th-century novel).

ENGL 5150. Readings in 19th-Century Literature and Culture. (3.0 cr.; max 9.0 cr.; prerequisite Grad student or #; fall, spring, summer, offered periodically) Topics may include British Romantic or Victorian literatures, American literature, important writers from a particular literary school, a genre (e.g., the novel). Readings.

ENGL 5510. Readings in Criticism and Theory. (3.0 cr.; max 9.0 cr.; prerequisite Grad student or #; spring, even years) Major works of classical criticism in the English critical tradition from Renaissance to 1920. Leading theories of criticism from 1920 to present. Theories of fiction, narratology. Feminist criticisms. Marxist criticisms. Psychoanalytic criticisms. Theories of postmodernism.

ENGL 5579. Theory of Black Literature and Culture. (3.0 cr.; prerequisite Grad student or #; fall, spring, every year) Minor works of modern American literature (written by U.S. citizens). Theories of race, ethnicity, and American culture. The imaginative power of race. The narrative of the racial search. Topics specified in Class Schedule.

ENGL 5597. Harlem Renaissance. (3.0 cr.; =AFRO 5627, AFRO 3627, ARTH 3627; prerequisite Grad student or #; fall, spring, every year) Multidisciplinary review of Jazz Age's Harlem Renaissance: literature, popular culture, visual arts, political journalism, major black/white figures.


ENGL 5711. Introduction to Editing and Publishing. (4.0 cr.; fall, spring, every year) Editor-writer relationship, manuscript reading, author querying, rewriting, style. Some discussion of copy editing. Students develop editing skills by working on varied writing samples.

ENGL 5743. History of Rhetoric and Writing. (3.0 cr.; prerequisite Grad student or #; fall, spring, offered periodically) Assumptions of classical/contemporary rhetorical theory, especially as they influence interdisciplinary field of composition studies.

ENGL 5790. Topics in Rhetoric, Composition, and Language. (3.0 cr.; max 9.0 cr.; prerequisite Grad student or #; fall, spring, offered periodically) Topics specified in Class Schedule.

ENGL 5800. Practicum in the Teaching of English. (1.0-3.0 cr.; prerequisite Grad student or #; fall, every year) Discussion of and practice in recitation, lecture, small-groups, tutoring, individual conferences, and evaluation of writing/reading. Emphasizes theory informing effective course design/teaching for different disciplinary goals. Topics vary. See Class Schedule.

ENGL 5805. Writing for Publication. (3.0 cr.; prerequisite Grad student or #; fall, even years) Conference presentations, book reviews, revision of seminar papers for journal publication, and preparation of a scholarly monograph. Style, goals, and politics of journal

ENGL 5992. Directed Readings, Study, or Research. (1.0-3.0 cr. [max 45.0 cr.]; fall, spring, summer, every year) TBD Prereq-Grad student or instr consent.

English: Creative Writing (ENGW)
College of Liberal Arts

ENGW 1101W. Introduction to Creative Writing. (4.0 cr.; Student Option No Audit; prereq Students may not audit this course; fall, spring, every year) Writing poetry/prose. Small group workshops, lectures by visiting writers.

ENGW 1102. Fiction Writing (Intro). (3.0 cr.; Student Option No Audit; fall, spring, every year) Beginning instruction in art of fiction: characterization, plot, dialogue, and style. Writing exercises to generate ideas. Students read/discuss published fiction and their own writing.

ENGW 1103. Poetry Writing (Intro). (3.0 cr.; Student Option No Audit; fall, spring, summer, every year) Beginning instruction in art of poetry. Discussion of student poems and contemporary poetry. Ideas for generating material. Writing exercises in/out of class.

ENGW 1104. Journal, Essay, Memoir Writing (Introduction). (3.0 cr.; Student Option No Audit; prereq [EngW 1101 OR 1102 OR 1103 OR 1104], students cannot audit course; fall, spring, every year) Art of literary nonfiction. Discussion of student work and contemporary creative nonfiction. Ideas for generating material. Writing exercises.

ENGW 3102. Fiction Writing (Intermediate). (3.0 cr.; Student Option No Audit; prereq [EngW 1101 OR 1102 OR 1103 OR 1104], students cannot audit course; fall, spring, every year) Exercises, experiments, assigned readings, discussion of student work.

ENGW 3104. Poetry Writing (Intermediate). (3.0 cr.; Student Option No Audit; prereq [EngW 1101 OR 1102 OR 1103 OR 1104], students cannot audit course; fall, spring, every year) Exercises, experiments, assigned readings, discussion of student work.

ENGW 3106. Journal, Essay, Memoir Writing (Intermediate). (3.0 cr.; Student Option No Audit; prereq [1101 or 1102 or 1103 or 1104], students cannot audit course; fall, spring, every year) Exercises, experiments, assigned readings, discussion of student work.

ENGW 3110. Topics in Creative Writing. (3.0 cr. [max 9.0 cr.]; Student Option No Audit; prereq 1101 or 1102 or 1103 or 1104 or %; fall, spring, summer, every year) Topics specified in Class Schedule.

ENGW 3960W. Writing Workshop for Majors. (4.0 cr.; A-F only; prereq Engl major, 6 cr of ENGW [including 3xxx appropriate for workshop genre], [jr or sr], major adviser approval, %; fall, spring, every year) Topics specified in Class Schedule.

ENGW 5102. Advanced Fiction Writing. (4.0 cr. [max 8.0 cr.]; Student Option No Audit; prereq Students may not audit this course; fall, spring, every year) Advanced workshop for graduate students with considerable experience in writing fiction.

ENGW 5104. Advanced Poetry Writing. (4.0 cr. [max 8.0 cr.]; Student Option No Audit; prereq Students may not audit this course; fall, spring, every year) Advanced workshop for graduate students with considerable experience in writing poetry. Explore new poetic possibilities/read contemporary poetry/poetics.

ENGW 5106. Advanced Literary Nonfiction Writing. (4.0 cr. [max 8.0 cr.]; Student Option No Audit; prereq Students may not audit this course; fall, offered periodically) Advanced workshop for graduate students with considerable experience in writing literary nonfiction.

ENGW 5130. Topics in Advanced Creative Writing. (4.0 cr. [max 16.0 cr.]; prereq #; fall, spring, every year) Workshop. Might include work in more than one genre.

ENGW 5202. Journal and Memoir Writing. (3.0 cr.; fall, spring, summer, every year) Using memory in writing, from brainstorming to drafting to revision, in several genres (poems, traditional memoir essays, fiction). How diverse cultures shape memory differently.

ENGW 5205. Screenwriting. (4.0 cr.; Student Option No Audit; prereq [jr or sr], one EngW 3xxx course, permission number available in creative writing office), students may not audit this course.; fall, spring, every year) Advanced workshop. Contact creative writing program for specific description.

ENGW 5210. Topics in Advanced Literary Nonfiction. (4.0 cr. [max 16.0 cr.]; prereq %; fall, spring, offered periodically) Special topics in essay writing (e.g., arts reviewing, writing about public affairs, writing in personal voice). Topics specified in Class Schedule.

ENGW 5310. Reading as Writers. (4.0 cr. [max 8.0 cr.]; Student Option No Audit; prereq Students may not audit course.; fall, every year) Special topics in reading fiction, literary nonfiction, poetry. Topics specified in Class Schedule.

ENGW 5593. Directed Study in Writing. (1.0-4.0 cr.; spring, summer, every year) Projects in writing poetry, fiction, drama, and nonfiction, or study of ways to improve writing. Prereq-instr consent, dept consent, college consent.

Entomology (ENT)
College of Food, Agricultural and Natural Resource Sciences

ENT 1005. Insect Biology. (4.0 cr.; fall, every year) Diverse biology of insects and their arthropod relatives. Insect behavior (including social insects), pollination, herbivory, insects as disease vectors, beneficial insects, insect population dynamics/ecology. Insects' role in natural, agricultural, and urban, systems. Lecture/lab.

ENT 1905. Topics: Freshman Seminar. (1.0-3.0 cr.; prereq Fr; fall, every year) Topics vary.

ENT 3281. Veterinary Entomology. (3.0 cr.; A-F or Audit; fall, every year) Biology/management of insects, mites, ticks that affect livestock, poultry, companion animals. Emphasizes problem identification/solving. Lecture, lab.

ENT 3925. Insects, Aquatic Habitats, and Pollution. (3.0 cr.; A-F or Audit; prereq [3305 or Biol 3407 or FW 2001], [jr or sr] or #; fall, every year) Effects differing classes of pollutants have on insects that are aquatic. Insect life-cycle dynamics, trophic guilds, community structure. Hypotheses to explain community structure in streams, rivers, wetlands, ponds, lakes, reservoirs. Organic pollution, eutrophication, heavy metal pollution, runoff/siltation, acidification, thermal pollution. Changes in aquatic insect community structure. Designing/maintaining biological monitoring networks.

ENT 4015. Ornamentals and Turf Entomology. (3.0 cr.; prereq 1xxx course in biol or hort or forest resources; spring, every year) Diagnosis and management of insect pests in landscape plants. Emphasis on the principles of biological control, biorational pesticides, and integrated pest management.

ENT 4021. Honey Bees and Insect Societies. (3.0 cr.; prereq Biol 1009 or #; fall, odd years) Natural history, identification, and behavior of honey bees and other social insects. Evolution of social behavior, pheromones and communication, organization and division of labor, social parasitism. Lab with honey bee management and maintenance of other social bees for pollination.

ENT 4022. Honey Bee Management. (1.0 cr.; prereq Biol 1009 or #; & 4021 recommended; summer, even years) Field course for students interested in honey bee management and the conservation and maintenance of other bee pollinators. Work with live bee colonies and participate in field research problems related to honey bee behavior and management.

ENT 4096. Professional Experience Program: Internship. (1.0-3.0 cr.; S-N or Audit; prereq COAFES jr or sr, complete internship contract available in COAFES Career Services before enrolling, UC only; #; fall, spring, summer, every year) Professional experience in entomology firms or government agencies through supervised practical experience; evaluative reports and consultations with faculty advisers and employers.
ENT 4231. Insect Behavior. (3.0 cr.; A-F or Audit; prereq Biol 1009 or equiv or #; [3005 or EEB 3111 recommended]; ) Diversity of behavior in insects. Modes of perception, ways in which stimuli are translated into behavior. Genetic basis of behavior. Behavioral traits with Mendelian and more complex modes of inheritance. Natural history of insect behavior. Emphasizes how evolution has shaped diversity of behaviors. Movement/dispersal, feeding, defense/escape, mating/ reproduction, sociality. Case studies.

ENT 4251. Forest and Shade Tree Entomology. (3.0 cr.; fall, every year) Biology, ecology, population management of forest/shade tree insects. Emphasizes predisposing factors/integrated management. Lecture/lab.

ENT 5009. Pesticides in Horticulture: Their Use and Abuse. (3.0 cr.; A-F or Audit; prereq [4015 or 4251], PIPA 2001) or #; spring, every year) History of pesticide use. Case studies on specific pesticide issues, such as DDT, atrazine, Temik, and imidacloprid. Pesticides use, application methods, environmental concerns. Training for pesticide certification license for Minnesota. Test given near campus during course.

ENT 5011. Insect Structure and Function. (4.0 cr.; A-F or Audit; prereq 3005 or #; spring, every year) Comparative study of insect structures/functions from evolutionary perspective. Introduction to physiology of digestion, respiration, other organ systems.


ENT 5025. Field Methods in Insect Taxonomy. (1.0 cr.; prereq An undergraduate course in entomology is preferred; fall, odd years) Field methods in insect taxonomy. Preservation, mounting, curatorial techniques. Entomological nets/traps for terrestrial/aquatic species, dry/fluid preservation techniques, slide mounting, habitat selection, geo-reference/field data records, morphological preparation.

ENT 5041. Insect Ecology. (3.0 cr.; prereq Biol 5041 or EBB 5122 or #; fall, even years) Synthetic analysis of the causes of insect diversity and of fluctuations in insect abundance. Focus on abiotic, biotic, and evolutionary mechanisms influencing insect populations and communities.


ENT 5121. Applied Experimental Design. (4.0 cr.; = [AGRO 5121]; prereq Stat 5021 or equiv or #; ) Principles of sampling methodologies, experimental design, and statistical analyses. Methods/procedures in generating scientific hypotheses. Organizing, initiating, conducting, and analyzing scientific experiments using experimental designs and statistical procedures. Offered with AGRO 5121.

ENT 5241. Ecological Risk Assessment. (3.0 cr.; prereq #; spring, every year) Evaluating current/potential impact of physical, chemical, biological agents on ecosystems. Identifying ecological stressors, assessing level of exposure, measuring ecological responses, communicating/managing risks. Class participation, two reaction papers, final exam, small-group project.

ENT 5275. Medical Entomology. (3.0 cr.; prereq #; fall, even years) Biology of arthropod vectors of human disease. Emphasizes disease transmission and host, vector, and pathogen interactions.

ENT 5341. Biological Control of Insects and Weeds. (3.0-4.0 cr.; prereq 3001, Biol 1009, EEB 3001 or grad; spring, offered periodically) Biological control of arthropod pests and weeds. Analysis of relevant ecological theory and case studies; biological control agents. Lab includes natural enemy identification, short experiments, and computer exercises.


ENT 5361. Aquatic Insects. (4.0 cr.; A-F or Audit; prereq #; spring, every year) Taxonomy, natural history of aquatic insects including their importance in aquatic ecology, water resource management, recreation, and conservation. Emphasizes family-level identification of immatures/adults. Field trips scheduled to local aquatic habitats. A collection is required.

ENT 5371. Principles of Systematics. (3.0 cr.; prereq #; offered alt yrs; spring, every year) Theoretical/practical procedures of biological systematics. Phylogeny reconstruction, including computer assisted analyses, morphological/molecular approaches, species concepts, specialization, comparative methods, classification, historical biogeography, nomenclature. Use/value of museums.

ENT 5900. Basic Entomology. (1.0-6.0 cr. [max 12.0 cr.]; prereq #; fall, spring, every year) For graduate students who need to make up certain deficiencies in their biological science background.

ENT 5910. Special Problems in Entomology. (1.0-6.0 cr. [max 10.0 cr.]; prereq #; fall, spring, every year) Individual field, lab, or library studies in various aspects of entomology.

ENT 5920. Special Lectures in Entomology. (2.0-4.0 cr. [max 12.0 cr.]; fall, spring, every year) Lectures or labs in special fields of entomological research. Given by visiting scholar or regular staff member.

Entrepreneurship (ENTR)
Curtis L. Carlson School of Management

ENTR 3010. Introduction to Entrepreneurship. (4.0 cr.; A-F only; prereq Mgmt 3001, 45 cr, CSOM student; ) Fundamentals of entrepreneurship. Career paths, including new business start-ups, franchising, acquisitions (including family business succession), corporate venturing, and entrepreneurial services. Legal structures for new business formation, aspects of business law/business ethics.

Environmental Sciences, Policy, and Management (ESPM)
College of Food, Agricultural and Natural Resource Sciences

ESPM 1001. Freshmen Orientation to Environmental Sciences, Policy, and Management. (1.0 cr.; A-F or Audit; fall, every year) Academic planning, ESPM careers, liberal education requirements, internships. Building relationships with other students/faculty, student life, information technology, critical computer skills. New freshmen.

ESPM 1002. Transfer Orientation Seminar. (1.0 cr.; A-F or Audit; fall, every year) Academic planning, ESPM careers, liberal education requirements, internships. Building relationships with other students/faculty, student life, information technology, critical computer skills. Transfer and continuing students.

ESPM 1011. Issues in the Environment. (3.0 cr.; fall, spring, every year)

ESPM 1012H. Environmental Science and Society. (3.0 cr.; A-F only; prereq Honors student; spring, every year) Selection of current environmental issues affecting our daily lives. Scientific methodology used to investigate and resolve those issues. Global biogeochemical cycles (e.g., carbon, nitrogen, water). Scientific and social approach of investigation to environmental issues. How everything we do affects the environment in different ways. Visits to selected UMN laboratories.

ESPM 1202. People, Land, and Water: Systems Under Stress. (3.0 cr.; A-F only; fall, every year) Policies/community engagement around water sustainability. Students engage directly with local case on Mississippi River.


ESPM 1901. Topics: Freshman Seminar. (3.0 cr.; prereq Fr; spring, every year) Topics vary.

ESPM 1905. Freshman Seminar. (1.0-3.0 cr.; fall, spring, every year) Freshman Seminar: Topics Vary

ESPM 2021. Environmental Sciences: Integrated Problem Solving. (3.0 cr.; A-F or Audit; prereq 1011, ESPM major; spring, every year) Simulations of environmental problem. Student teams develop strategy for kinds of data needed, analyzing data, and integrating findings. International perspectives on environmental problems/solutions.

ESPM 2401. Environmental Education/Interpretation. (3.0 cr.; prereq Soph; fall, every year) Foundational view of environmental education/interpretation, its history, theories, and methodologies. Practical skills for teaching in the outdoors. Educational content, state/national standards, effective pedagogy for informal learning environments.

ESPM 3000. Seminar on Current Issues for ESPM. (1.0 cr. [max 6.0 cr.]; A-F or Audit; prereq Jr; fall, spring, every year) Environmental issues students will have to address in their future careers. Small group discussion, in-depth/focused intellectual debate. Topics depend on faculty selection or student interest.

ESPM 3011W. Ethics in Natural Resources. (3.0 cr.; fall, spring, every year) Normative/professional ethics, and leadership considerations, applicable to managing natural resources and the environment. Readings, discussion, discussion.

ESPM 3012. Statistical Methods for Environmental Scientists and Managers. (4.0 cr.; A-F or Audit; = [STAT 5021, STAT 3011, ANSC 3011]; prereq Two yrs of high school math; spring, every year) Introduction to statistical principles, foundations, and methods for examining data and drawing conclusions. Regression modeling of relationships in environmental and natural resource science and management problems.

ESPM 3031. Applied Global Positioning Systems for Geographic Information Systems. (3.0 cr.; A-F or Audit; = [ESPM 5031]; prereq Intro GIS course, [jr or sr]; spring, every year) GPS principles, operations, techniques to improve accuracy. Datum, projections, and coordinate systems. Differential correction, accuracy assessments discussed/applied in lab exercises. Code/carrier phase GPS used in exercises. GPS handheld units, PDA based ArcPad/GPS equipment. Transferring field data to/from desktop systems, integrating GPS data with GIS.

ESPM 3072. Site Assessment for Ecological Restoration. (1.0 cr.; fall, spring, summer, every year) Introduction to site assessment/goal-setting for ecological restoration projects. Topography, soil, land use, hydrology, vegetation, biodiversity. Pre-requisite for other courses in series.

ESPM 3073. Designing and Using Seed Mixes in Restoration. (1.0 cr.; fall, spring, summer, every year) Various steps of restoration seeding including designing seed mixes, preparing planting sites, obtaining seed, installing seed, caring for establishing vegetation.

ESPM 3074. Designing, Installing, & Managing Native Plantings in Restoration. (1.0 cr.; fall, spring, summer, every year) Successful steps for designing, installing, managing native species planting project.

ESPM 3075. Vegetation Management of Restored Ecosystems. (1.0 cr.; fall, spring, summer, every year) Re-establishing natural disturbances, controlling invasive species.

ESPM 3076. Monitoring Ecological Restorations. (1.0 cr.; fall, spring, summer, every year) How to design efficient/effective monitoring program that yields information helpful for ongoing restoration management decisions/problem solving.

ESPM 3011W. Ethics in Natural Resources. (3.0 cr.; fall, spring, every year) Normative/professional ethics, and leadership considerations, applicable to managing natural resources and the environment. Readings, discussion, discussion.

ESPM 3101W. Conservation of Plant Biodiversity. (3.0 cr.; A-F or Audit; = [ESPM 5011]; prereq Biol 1001 or Biol 1009; fall, every year) Introduction to principles underlying assessment/conservation of plant biodiversity at individual, population, and community levels. Case studies in management of biodiversity to restore/maintain ecosystem function. Issues such as genetics, timber harvesting, invasive species, plant reproduction.

ESPM 3102. Managing International Natural Resources Programs and Projects: Forests, Water and Land Use. (3.0 cr.; A-F only; fall, every year) Global hot spots where biodiversity is threatened by multiple stressors (zoonotic disease, rapid growth, opening of new frontiers, climate change). Strategies to address complex situations. Interdisciplinary applied skills, best management practices, hands-on techniques of international organizations.

ESPM 3108. Ecology of Managed Systems. (3.0 cr.; = [ESPM 5108]; prereq Biol 1001 or Biol 1009 or Hort 1001 or #; fall, every year) Ecology of ecosystems that are primarily composed of managed plant communities, such as managed forests, field-crop agroecosystems, rangelands and nature reserves, parks, and urban open-spaces. Concepts of ecology and ecosystem management.

ESPM 3111. Hydrology and Water Quality Field Methods. (3.0 cr.; A-F or Audit; = [ESPM 5111]; prereq 4061 or EEB 4601 or GEO 4601 or FR 3114; spring, every year) Integrates water quality, surface/groundwater hydrology. Case studies, hands-on field data collection, calculations of hydrological/water quality parameters. Meteorological data, snow hydrology, stream gauging, well monitoring, automatic water samplers. Designing water quality sampling program. Geomorphology, interception, infiltration.

ESPM 3111W. Hydrology and Water Quality Field Methods. (3.0 cr.; A-F or Audit; = [ESPM 5111]; prereq 4061 or EEB 4601 or GEO 4601 or FR 3114; spring, every year) Integrates water quality, surface/groundwater hydrology. Case studies, hands-on field data collection, calculations of hydrological/water quality parameters. Meteorological data, snow hydrology, stream gauging, well monitoring, automatic water samplers. Designing water quality sampling program. Geomorphology, interception, infiltration.

ESPM 3131. Environmental Physics. (3.0 cr.; A-F or Audit; prereq Phys 1101; spring, every year) Concepts/principles of classic/modern physics applied to environmental problems arising from interaction between humans and the natural environment. Forms of pollution (e.g., land, water, air). Transport mechanisms. Anthropogenic greenhouse gas emissions. Global climate change. Social issues related to environmental problems.

ESPM 3202W. Environmental Conflict Management, Leadership, and Planning. (3.0 cr.; A-F or Audit; = [ESPM 5202]; spring, every year) Negotiation of natural resource management issues. Use of collaborative planning. Case study approach to conflict management, strategic planning, and building leadership qualities. Emphasizes analytical concepts, techniques, and skills.

ESPM 3204. Sustainable Community Based Natural Resource Management. (3.0 cr.; A-F only; spring, every year) Part of spring 2014 Nepal Semester Abroad Program. Principles of natural resource based sustainable development in developing country setting. International perspectives on sustainable resource use/management in developed/developing countries, including...
ESPM 3201. Survey, Measurement, and Modeling for Environmental Analysis. (3.0 cr.; =ESP M 5211; prereq [MATH 1031 or MATH 1051]; [3012 or FW 4001 or STAT 3011 or SOC 3811]; computer competency; spring, every year)

ESPM 3211. Soil Conservation and Land-Use Management. (3.0 cr.; prereq SOIL 1125 or 2125 or #; spring, every year)

ESPM 3241W. Natural Resource and Environmental Policy. (3.0 cr.; =ESP M 5241; spring, every year)
Political processes in management of the environment. How disagreements are addressed by different stakeholders, private-sector interests, government agencies, institutions, communities, and nonprofit organizations.

ESPM 3245. Sustainable Land Use Planning and Policy. (3.0 cr.; A-F or Audit; =ESP M 5245; prereq Jr or sr; fall, every year)
Policies affecting land use planning at local, state, and federal levels. Ecosystem and landscape scale planning. Collaborative and community-based approaches to planning for ecological, social, and economic sustainability. Class project applies interdisciplinary perspectives on planning and policy, including information gathering techniques, conservation planning tools, and evaluation of planning options.

ESPM 3251. Natural Resources in Sustainable International Development. (3.0 cr.; A-F or Audit; =LAS 3251, ESPM 5251; fall, every year)
International perspectives on resource use and sustainable development. Integration of natural resource issues with social, economic, and policy considerations. Agriculture, forestry, agroforestry, non-timber forest products, water resources, certification, development issues. Global case studies. Impact of consumption in developed countries on sustainable development in lesser developed countries.

ESPM 3261. Economics and Natural Resources Management. (4.0 cr.; A-F or Audit; =ESP M 5261; prereq MATH 1031 or MATH 1051 or MATH 1142 or MATH 1155 or MATH 1271 or ESPM 3012 or STAT 3011 or Soc 3811 or equiv; fall, every year)

ESPM 3271. Environmental Policy, Law, and Human Behavior. (3.0 cr.; A-F or Audit; fall, every year)
What is necessary to achieve sustainable societies. What influences societal deliberation/decisions about environmental issues. How our behaviors affect natural systems. Key theoretical concepts of environmental social psychology and political science. How people respond to policies, using theoretical concepts from social psychology about attitudes, values, and social norms; applying these ideas to specific environmental problems and ethical debates.

ESPM 3425. Atmospheric Pollution: From Smog to Climate Change. (3.0 cr.; A-F only; prereq [CHEM 1061, PHYS 1101W, MATH 1142 or 1271] or equiv or #; fall, every year)

ESPM 3480. Topics in Natural Resources. (1.0-4.0 cr.; [max 6.0 cr.]; fall, spring, summer, every year)
Lectures by visiting scholar or regular staff member. Topics specified in Class Schedule.

ESPM 3575. Wetlands. (3.0 cr.; =ESP M 5575; spring, every year)
Freshwater wetland classification, wetland biota, current/historic status of wetlands, value of wetlands. National, regional, Minnesota wetlands conservation strategies, ecological principles used in wetland management.

ESPM 3601. Sustainable Housing--Community, Environment, and Technology. (3.0 cr.; A-F or Audit; =HS G 3482; spring, every year)
How sustainable housing practices build community. How community growth has impacted the environment and how natural events impact our communities. Science and technology required to build high performance houses.

ESPM 3602. Regulations and Corporate Environmental Management. (3.0 cr.; A-F only; =ESP M 5602, MGMT 3602; prereq APEC 1101 or ECON 1101 or 3261W; spring, every year)
Concepts/issues relating to industrial ecology and industry as they are influenced by current standards/regulations at local, state, and national levels.

ESPM 3603. Environmental Life Cycle Analysis. (3.0 cr.; A-F only; =MGMT 3603; fall, every year)
Concepts/issues relating to inventory, subsequent analysis of production systems. Production system from holistic point of view, using term commonly used in industrial ecology: "metabolic system."

ESPM 3604. Environmental Management Systems and Strategy. (3.0 cr.; A-F only; =ESP M 5604); fall, every year)
Environmental problems such as climate change, ozone depletion, and loss of biodiversity.

ESPM 3605. Recycling: Extending Raw Materials. (3.0 cr.; A-F only; =ESP M 5605); spring, every year)
Basic principles of recycling and its role in raw materials utilization, energy, and the environment. Recycling processes for commonly recycled materials, products, and their properties and environmental implications of recycling.

ESPM 3606W. Pollution Prevention: Principles, Technologies, and Practices. (3.0 cr.; A-F only; =ESP M 5606; prereq CHEM 1011 or [CHEM 1015, CHEM 1017] or #; fall, every year)
Pollution prevention, green chemistry, cleaner production. Design for the Environment (DIE), life cycle management. Practices and technologies that reduce industrial emissions/costs by preventing pollution.

ESPM 3607. Natural Resources Consumption and Sustainability. (3.0 cr.; A-F only; spring, every year)
Current world trends for industrial raw materials; environmental/other tradeoffs related to options for satisfying demand/needs; global and systemic thinking; provides a framework for beginning a process of thinking critically about complex environmental problems/potential solutions in a diverse global economy.

ESPM 3612W. Soil and Environmental Biology. (3.0 cr.; prereq Biol 1009 or equiv; Chem 1021 or equiv; 2125 recommended; fall, every year)

ESPM 3656. Composting and Organics Utilization. (3.0 cr.; A-F or Audit; prereq [SOIL 1125 or SOIL 2125], junior standing; spring, every year)
Practical introduction to composting technology/organics utilization for undergraduate students/industry professionals. How organics can be utilized in soils. Scientific steps involved in compost process. Application methods/rates.

ESPM 3703. Agroforestry in Watershed Management. (3.0 cr.; =ESP M 5703; spring, every year)
Biological, physical, and environmental attributes of agroforestry as pertains to watershed management. Coupling production with watershed protection benefits. Implications for policy, economics, and human dimensions in sustainable development. Examples, case
ESPM 4021W. Problem Solving: Environmental Review. (4.0 cr.; prereq Jr or sr; spring, every year)
Roles of governmental agencies, consultants, and private citizens in EIS process. Students read EIS/EAW, analyze their content/scope, and prepare an EAW and EIS according to Minnesota EQB guidelines.

ESPM 4041W. Problem Solving for Environmental Change. (4.0 cr.; A-F or Audit; prereq ESPM sr; fall, every year)
Capstone course. Students working with a team on a real world project related to selected track, gather/analyze data relevant to client’s objectives, and make recommendations for future use. Students produce a final written report and formal presentation, and present findings to client group.

ESPM 4061W. Water Quality and Natural Resources. (3.0 cr.; fall, every year)
Water quality decision making. International focus. Ecology of aquatic ecosystems, how they are valuable to society and changed by landscape management. Case studies, impaired waters, TMDL process, student engagement in simulating water quality decision making.

ESPM 4093. Directed Study. (1.0-7.0 cr. [max 20.0 cr.]; prereq #; fall, spring, summer, every year)
Research, readings, and instruction.

ESPM 4094. Directed Research. (1.0-7.0 cr.; prereq #; fall, spring, summer, every year)
Research under the direction of department faculty.

ESPM 4096. Professional Experience Program: Internship. (1.0 cr. [max 6.0 cr.]; A-F only; prereq CFANS undergrad, #, completed internship contract; fall, spring, summer, every year)
Students create oral/written report based on paid or volunteered work or field experience.

ESPM 4216. Contaminant Hydrology. (3.0 cr.; A-F or Audit; fall, every year)
Principles of contaminant transport in percolation solution and in overland flow. Hydrologic cycle, percolation/runoff processes, contaminant transport, leachate sampling methods, remediation technologies, scale effects on runoff water quality, tillage technologies, control of sediment/chemical losses. Discussions mostly descriptive, but involve some computations.

ESPM 4242. Methods for Environmental and Natural Resource Policy Analysis. (3.0 cr.; A-F or Audit; =ESP 5242; prereq [3241 or equiv], [3261 or equiv], prereq jr or sr; fall, every year)
Methods, formal/informal, for analyzing environmental/natural resource policies. How to critically evaluate policies, using economic/non-economic decision-making criteria. Application of policy analysis to environmental/natural resource problems. Recognizing politically-charged environment in which decisions over use, management, and protection of resources often occur.

ESPM 4256. Natural Resource Law and the Management of Public Lands and Waters. (3.0 cr.; A-F or Audit; =ESP 5256; prereq 3241 or #; spring, every year)

ESPM 4295W. GIS in Environmental Science and Management. (4.0 cr.; A-F or Audit; prereq FR 3131 or #; fall, every year)
Application of spatial data inventory/analysis in complex environmental planning problems. Spatial data collection, database development methods including GPS, DLG, TIGER, NWI data, spatial analysis. Topics identified by non-University partners.

ESPM 4601. Soils and Pollution. (3.0 cr.; prereq [2125, Chem 1021 or equiv], [Phys 1042 or equiv] or #; 3416 recommended; fall, every year)
Principles of microbiology, chemistry, physics applied to evaluation of pollution of soils. Mitigation of pollution in agricultural/urban settings, remediation of polluted sites.

ESPM 4607. Industrial Biotechnology and the Environment. (3.0 cr.; A-F only; =ESP 5607); prereq BIOL 1009, CHEM 1021; spring, every year)
Biotechnology pertaining to biobased products development, their environmental impact.

ESPM 4609. Air Pollution Impacts, Management, and Ethical Challenges. (3.0 cr.; A-F or Audit; =ESP 5609); prereq [BIOL 1001 or BIOL 1009], [CHEM 1011 or CHEM 1021]; CHEM 1017; spring, every year)
Air pollutants, sources, and impacts on humans, plants, animals, soil, water, atmosphere, and planet. Emission rates, measurement, control technologies, air pollution laws/regulations. Personal perspectives/ethics related to air pollution, how they impact professional/civic life.

ESPM 4811. Environmental Interpretation. (3.0 cr.; A-F or Audit; =ESP 5811); prereq Jr or sr or grad student; spring, every year)

ESPM 5019. Business, Natural Environment, and Global Economy. (2.0 cr.; A-F only; =MGMT 5019); fall, every year)
Business strategies that affect natural environment. Ways business strategies/practices can produce win-win outcomes for the environment and business.

ESPM 5031. Applied Global Positioning Systems for Geographic Information Systems. (3.0 cr.; A-F or Audit; =ESP 3031; prereq Grad student or #; spring, every year)
GPS principles, operations, techniques to improve accuracy. Datum, projections, and coordinate systems. Differential correction, accuracy assessments discussed/applied in lab exercises. Code/carrier phase GPS used in exercises. GPS handheld units, PDA based ArcPad/GPS equipment. Transferring field data to/from desktop systems, integrating GPS data with GIS.

ESPM 5061. Water Quality and Natural Resources. (3.0 cr.; prereq Grad student or #; fall, spring, every year)
Recent literature in field. Complements 4061. Ecology of aquatic ecosystems, how they are valuable to society and changed by landscape management. Case studies, impaired waters, TMDL process, student engagement in simulating water quality decision making.

ESPM 5071. Ecological Restoration. (4.0 cr.; prereq [One college course in ecology, one college course in [plant science or botany]] or #; fall, every year)

ESPM 5101. Conservation of Plant Biodiversity. (3.0 cr.; A-F or Audit; =ESP 3101; prereq Grad student or #, fall, every year)
Introduction to principles underlying assessment/conservation of plant biodiversity at individual, population, and community levels. Case studies in management of biodiversity to restore or maintain ecosystem function. Genetics, timber harvesting, invasive species, plant reproduction.

ESPM 5102. Managing International Natural Resources Programs and Projects: Forests, Water and Land Use. (3.0 cr.; A-F only; fall, every year)
Global hot spots where biodiversity is threatened by multiple stressors (zoontic disease, rapid growth, opening of new frontiers, climate change). Strategies to address complex situations. Emphasis on learning interdisciplinary applied skills, management practices, hands-on techniques.

ESPM 5108. Ecology of Managed Systems. (4.0 cr.; A-F or Audit; =ESP 3108; prereq Sr or grad student; fall, every year)
Analysis of functioning of ecosystems primarily structured by managed plant communities. Managed forests, field-crop agroecosystems, rangelands, aquatic systems. Structure-function relations. Roles of biodiversity in productivity, resource-use efficiency, nutrient cycling, resilience. Emerging principles for design of sustainable managed ecosystems, provision of ecological services.
ESPM 5111. Hydrology and Water Quality Field Methods. (3.0 cr.; A-F or Audit; [ESPM 3111]; prereq Grad student or #; spring, every year) Integrates water quality, surface/groundwater hydrology. Case studies, hands-on field data collection, calculations of hydrological/water quality parameters. Meteorological data, snow hydrology, stream gauging, well monitoring, automatic water samplers. Designing water quality sampling program. Geomorphology, interception, infiltration.

ESPM 5202. Environmental Conflict Management, Leadership, and Planning. (3.0 cr.; A-F or Audit; [ESPM 3202W]; prereq Grad or #; spring, every year) Negotiation of natural resource management issues. Use of collaborative planning. Case study approach to conflict management, strategic planning, and building leadership qualities. Emphasizes analytical concepts, techniques, and skills.


ESPM 5211. Survey, Measurement, and Modeling for Environmental Analysis. (3.0 cr.; [ESPM 3211]; prereq Grad student or #; spring, every year) Introduction to survey, measurement, and modeling concepts/methods for study of natural resources and environmental issues. Emphasizes survey design for data collection, estimation, and analysis for issues encompassing land, water, air, vegetation, animal, soil, and human/societal variables.

ESPM 5241. Natural Resource and Environmental Policy. (3.0 cr.; [ESPM 3241W]; prereq Grad student or #; spring, every year) Political processes at play in management of environmental and how disagreements are addressed by different stakeholders, private-sector interests, government agencies and institutions, communities, and nonprofit organizations.

ESPM 5242. Methods for Natural Resource and Environmental Policy. (3.0 cr.; A-F or Audit; [ESPM 4242]; prereq [3241 or equiv], [3261 or equiv], [sr or grad student]; fall, every year) Methods, formal and informal, for analyzing environmental/natural resource policies. How to critically evaluate environmental/natural resource policies using economic/non-economic decision-making criteria. Application of policy analysis principles/concepts to environmental/natural resource problems.

ESPM 5245. Sustainable Land Use Planning and Policy. (3.0 cr.; A-F or Audit; [ESPM 3245]; prereq Grad student or #; fall, every year) Planning theories, concepts, and constructs. Policies, processes, and tools for sustainable land use planning. Scientific/technical literature related to land use planning. Skills needed to participate in sustainable land use planning.

ESPM 5251. Natural Resources in Sustainable International Development. (3.0 cr.; A-F or Audit; [LAS 3251, ESPM 3251]; prereq Grad student or #; fall, every year) International perspectives on resource use in developing countries. Integration of natural resource issues with social, economic, and policy considerations. Agriculture, forestry, agroforestry, non-timber forest products, water resources, certification, development issues. Latin American case studies.


ESPM 5295. GIS in Environmental Science and Management. (4.0 cr.; A-F; Audit; prereq Grad student or #; fall, every year) Application of spatial data inventory/analysis in complex environmental planning problems. Spatial data collection. Database development methods, including GPS, DLG, TIGER, NWI data, and spatial analysis. Topics identified by non-University partners.

ESPM 5402. Biometeorology. (3.0 cr.; prereq MATH 1271, PHYS 1201, STAT 3011, [Grad or #]; fall, even years) Calculus-based introduction to atmospheric boundary layer (ABL), interface between earth's surface and the atmosphere. ABL development, turbulence, surface energy balance, ABL clouds, air quality, microclimate, observational/modeling methods.

ESPM 5480. Topics in Natural Resources. (1.0-4.0 cr. [max 6.0 cr.]; prereq Sr or grad student; fall, spring, summer, every year) Lectures by visiting scholar or regular staff member. Topics specified in Class Schedule.

ESPM 5555. Wetland Soils. (3.0 cr.; A-F or Audit; [SOIL 5555]; prereq 1125 or 2125 or equiv or #; & 4511 recommended; fall, every year) Morphology, chemistry, hydrology, formation of mineral/organic soils in wet environments. Soil morphological indicators of wet conditions, field techniques of identifying hydric soils for wetland delineations. Peatlands. Wetland benefits, preservation, regulation, mitigation. Field trips, lab, field hydric soil delineation project.

ESPM 5575. Wetlands. (3.0 cr.; [ESPM 3575]; prereq 3575, [sr or grad student or #]; spring, every year) Freshwater wetland classification, wetland biota, current/historic status of wetlands, value of wetlands. National, regional, Minnesota wetlands conservation strategies. Ecological principles used in wetland management.


ESPM 5602. Regulations and Corporate Environmental Management. (3.0 cr.; A-F only; [MGMT 3602, ESPM 3602]; prereq APEC 1101 or ECON 1101; spring, every year) Concepts, major issues relating to industrial ecology and industry as they are influenced by current standards/regulations at local, state, and national levels.

ESPM 5603. Environmental Life Cycle Analysis. (3.0 cr.; A-F only; prereq [Math 1142 or [Math 1271, Math 1282]]; [ECON 1101 or ApEc 1101]; fall, every year) Concepts, major issues relating to inventory and subsequent analysis of production systems. Production system from holistic point of view, using term commonly used in industrial ecology: "the metabolic system."

ESPM 5604. Environmental Management Systems and Strategy. (3.0 cr.; A-F only; [ESPM 3604]; fall, every year) Environmental problems such as climate change, ozone depletion, and loss of biodiversity.


ESPM 5606. Pollution Prevention: Principles, Technologies, and Practices. (3.0 cr.; A-F only; [ESPM 3606W]; prereq CHEM 1011 or [CHEM 1015, CHEM 1017] or #; fall, every year) Pollution prevention, green chemistry, cleaner production, Design for the Environment (DfE),
Various in vitro models used to evaluate drug metabolism or chemical entity, pros/cons of each. Factors involved in conducting in vivo studies. Components used to predict in vivo drug disposition from in vivo studies.

**ECP 5993. Directed Study in Experimental and Clinical Pharmacology.** (1.0-4.0 cr.; [max 8.0 cr.]; fall, spring, every year) Student working with faculty member designs a directed study course, including a complete syllabus, appropriate time commitment, and workload for number of credits.

**ECP 5994. Directed Research in Experimental and Clinical Pharmacology.** (1.0-4.0 cr.; fall, spring, every year) Student works with faculty adviser to design a scientific research project.

**FMCH 5345. Curriculum Design and Teaching Strategies for Medical Education I.** (3.0 cr.; A-F or Audit; prereq concurrent enrollment in 5346; #; spring, every year) Identifying/developing course goals. Developing course, teacher, learner evaluations. Students must also take 5346, which follows immediately after 5345.

**FMCH 5346. Curriculum Design and Teaching Strategies for Medical Education II.** (1.0 cr.; A-F or Audit; prereq &5345, #; summer, odd years) Taken with 5345. Practicum of lecture, demonstration, small-group discussion, clinical teaching, and computer-assisted instruction. Academic ethics, policies, copyright issues, tenure, academic freedom, problem-based learning.

**FMCH 5564. Family Practice Seminar.** (1.0 cr. [max 9.0 cr.]; O-N or Audit; prereq MD or DO degree; fall, spring, every year) Knowledge, skills, and attitudes in biomedical and behavioral sciences that form foundation for academic discipline of family medicine; medical decision making, common problems and procedures, family theory and assessment, clinical pharmacy, human sexuality.

**FMCH 5650. Principles of Geriatrics I.** (1.0 cr. [max 5.0 cr.]; P-N or Audit; prereq Medical School or dental school or GNP School graduate; fall, every year) First in two-course sequence. Survey of major topics in geriatric medicine. Epidemiology, etiology, diagnosis, and treatment of major geriatric syndromes and illnesses.

**FMCH 5651. Principles of Geriatrics II.** (1.0 cr. [max 5.0 cr.]; P-N or Audit; prereq Medical School or dental school or GNP School graduate; ) Second in two-course sequence. Survey of major topics in geriatric medicine. Epidemiology, etiology, diagnosis, and treatment of major geriatric syndromes and illnesses.

**FMCH 5950. Clinical Issues in Human Sexuality.** (2.0 cr.; O-N or Audit; prereq Enrollment in health sci grad programs in CSPP, Psy, PubH, SW or FSoS or #; fall, spring, every year) Assessment and treatment techniques pertaining to common sexual problems.

**FMCH 5955. Directed Study.** (1.0-10.0 cr.; O-N or Audit; prereq #; qualified students may arrange for work on a tutorial basis; fall, spring, summer, every year) Studies on special topics as arranged between student and faculty.

**Family Social Science (FSOS) College of Education and Human Development**

**FSOS 1101. Intimate Relationships.** (4.0 cr.; fall, spring, every year) Couple dynamics. Overview of how to develop, maintain, and terminate an intimate relationship. Communication, conflict resolution, power, roles. Programs for marriage preparation, marriage enrichment, and marital therapy.

**FSOS 1201. Human Development in Families: Lifespan.** (4.0 cr.; fall, spring, every year) Human development in a family context. Life-course and human development theories. Individual/family development, mate selection, birth, life cycle. Physical, cognitive, language, social, social, and personality development. Historical, social, and cultural factors. How theory/research are applied to everyday lives.

**FSOS 1301. Cash or Credit: You Need to Know.** (1.0 cr.; A-F or Audit; fall, spring, summer, every year) Factual information about basic money management skills. Topics covered can be applied to everyday life. Online, interactive learning based class.

**FSOS 1905. Freshman Seminar.** (1.0-3.0 cr. [max 6.0 cr.]; prereq Fr; fall, spring, every year) Interdisciplinary seminar. Topics specified in Class Schedule.

**FSOS 2101. Preparation for Working With Families.** (2.0 cr.; A-F or Audit; fall, spring, every year) Systematic preparation for upper division education, research/field internships, and career possibilities in Family Social Science.

**FSOS 2103. Family Policy.** (3.0 cr.; =FSOS 4103; fall, spring, every year) Connections between policies that governments enact, and families and their well-being. Conceptual frameworks for influences underlying policy choices. Evaluating consequences of such choices for diverse families.

**FSOS 2105. Methods in Family Research.** (3.0 cr.; =FSOS 4105; prereq STAT 3011 or PSTL 1004 or STAT 1001 or ESPPY 3264 or SOC 3881 or SOC 2550 or PSY 3801 or #; fall, spring, every year) Scientific method. Major questions/objectives of family research. Data collection/analysis/reporting. Social context of family research.

**FSOS 2191. Independent Study in Family Social Science.** (1.0-4.0 cr. [max 12.0 cr.];...
prereq Soph, #; fall, spring, summer, every year
Independent reading or writing or research under faculty supervision.

FSOS 3101. Personal and Family Finances. (3.0 cr.; prereq At least soph or #; fall, spring, summer, every year)

FSOS 3102. Family Systems and Diversity. (3.0 cr.; =FSOS 5101; prereq At least soph or #; fall, spring, summer, every year)
Family systems/theories applied to dynamics/processes relevant to family life. Diversity issues related to gender, ethnicity, sexual orientation, and disability. Divorce, single parenthood, remarriage. Family strengths/problems.

FSOS 3104. Global and Diverse Families. (3.0 cr.; =FSOS 4102; prereq at least Soph or #; fall, spring, every year)
Perspectives on family dynamics of various racial/ethnic populations in the United States/other countries in context of national/international economic, political, and social processes.

FSOS 3191. Independent Study in Family Social Science. (1.0-5.0 cr. [max 12.0 cr.]; prereq Jr. #; fall, spring, summer, every year)
Independent reading or writing or research under faculty supervision.

FSOS 3426. Alcohol and Drugs: Families and Culture. (3.0 cr.; =FSOS 5426; fall, spring, every year)

FSOS 3429. Counseling Skills Practicum I. (3.0 cr.; =FSOS 5429; fall, spring, every year)
Basic counseling skills. Counselor needs/motivations, non-verbal communication, basic/advanced empathy, identifying strengths, maintaining focus, challenging discrepancies, use of self. Emphasizes building from client strengths, learning through role-playing.

FSOS 4101. Sexuality and Gender in Families and Close Relationships. (3.0 cr.; prereq At least jr or #; fall, spring, summer, every year)
Human ecology/development as frameworks for examining sexuality in close relationships. Diversity of sexual beliefs, attitudes, behaviors within differing social contexts. Using scientific knowledge to promote sexual health among individuals, couples, families through various life stages.

FSOS 4104W. Family Psychology. (3.0 cr.; prereq At least jr or #; fall, spring, summer, every year)
Processes in families of origin, families of choice, and other close relationships, within diverse social contexts. Evaluating current research on family dynamics within/across generations.

FSOS 4106. Family Resource Management. (3.0 cr.; prereq APEC 1101 or APEC 1102 or ECON 1101 or ECON 1102 or ECON 1104 or #; fall, spring, every year)
Analysis of how individuals/families use interpersonal, economic, natural, and community resources to make decisions, solve problems, and achieve central life purposes.

FSOS 4150. Special Topics in Family Social Science. (1.0-4.0 cr. [max 12.0 cr.]; prereq [Varies by topic], at least jr; summer, every year)
Review of research/scholarly thought. Topics specified in Class Schedule.

FSOS 4152. Gay, Lesbian, and Bisexual People in Families. (3.0 cr.; prereq At least jr or #; spring, summer, offered periodically)
Perspectives on gay, lesbian, and bisexuals (GLB) in families. Unique contributions of GLB to understanding diversity among families. Homophobia, mythologies, coming-out, identity, gender, social networks, intimacy, sexuality, children, parenting, aging, AIDS, ethnicity.

FSOS 4153. Family Financial Counseling. (3.0 cr.; A-F or Audit; prereq [3101, 3102, 3429] or #; fall, spring, summer, every year)
Introduction to family financial management applications through different stages in family financial life cycle. Case studies.

FSOS 4154W. Families and Aging. (3.0 cr.; prereq At least jr or #; fall, spring, offered periodically)
Aging families from diverse socioeconomic/cultural groups as complex multigenerational systems interacting within ever-changing social structures.

FSOS 4155. Parent-Child Relationships. (3.0 cr.; A-F or Audit; prereq At least Jr or #; fall, spring, every year)
History, theories, research, and contemporary practices of parent-child relationships in diverse families/cultures across the life span. Preparation for professionals in education, social work, and other human service occupations.

FSOS 4156. Legal-Economic Controversies in Families. (3.0 cr.; prereq 3101 or #; fall, spring, offered periodically)
Interdisciplinary course for critical thinking about legal-economic controversies across family life span. Principles of argumentation/debate are used to analyze controversies for public decision making about controversial family issues.

FSOS 4160H. Honors Capstone Project. (2.0 cr. [max 4.0 cr.]; A-F only; prereq FSOS honors; fall, spring, every year)
Individualizes the honors experience by connecting aspects of major program with special academic interests.

FSOS 4191. Independent Study in Family Social Science. (1.0-4.0 cr. [max 12.0 cr.]; prereq Sr, #; fall, spring, summer, every year)
Independent reading or writing or research under faculty supervision.

FSOS 4294. Research Internship. (1.0-4.0 cr. [max 12.0 cr.]; prereq [FSOS major, at least Jr] or #; fall, spring, summer, every year)
Research project with faculty. May include planning, proposal writing, literature review, data collection/coding/cleaning/analysis, and reporting.

FSOS 4296. Field Study: Working With Families. (1.0-12.0 cr.; S-N or Audit; prereq 2101 or #; fall, spring, summer, every year)
Directed paraprofessional work experience related to student's area of study.

FSOS 5014. Quantitative Family Research Methods I. (3.0 cr.; prereq Grad student or #; fall, every year)
Family research methods, issues associated with multiple levels of analysis. Conducting family-focused data analyses using basic/intermediate methods (through ANOVA and multiple regression), including power analysis. Ethical issues involved in family research such as IRB/HIPAA regulations.

FSOS 5015. Family Research Laboratory. (1.0 cr.; S-N or Audit; prereq Grad student or #; fall, every year)
Application of basic family research methods into experiential learning using statistical software. Analyses that correspond with problem situations in 5014 and that involve secondary data analyses. Using statistical software for basic family research. Preparation to work with quantitative family data sets.

FSOS 5032. Family Systems Theories and Interventions. (3.0 cr.; prereq Grad student or #; fall, offered periodically)
Systemic/cybernetic frameworks as they apply to diverse families. Thinking systemically about families across multiple ecological systems. How to identify crucial epistemological issues in theoretical/applied areas of family science. Theoretical frameworks. Experiential role-playing, guest presenters, videos, field work, research projects, reading clubs, class discussion.

FSOS 5150. Special Topics in Family Social Science. (1.0-4.0 cr. [max 24.0 cr.]; prereq #; fall, summer, every year)
Review of research/scholarly thought. Topics specified in Class Schedule.

FSOS 5193. Directed Study in Family Social Science. (1.0-6.0 cr.; prereq FSOS or grad student in related field; fall, spring, summer, every year)
tbd

FSOS 5426. Alcohol and Drugs: Families and Culture. (3.0 cr.; =FSOS 3426; fall, spring, summer, offered periodically)
Overview of psychology/sociology of drug use/abuse. Life-span, epidemiological, familial, cultural data regarding use. Fundamentals of licit/illicit drug use behavior. Gender, ethnicity, social class, sexuality, sexual orientation, disability.

FSOS 5429. Counseling Skills Practicum I. (3.0 cr.; =FSOS 4294; fall, spring, summer, offered periodically)
Basic counseling skills. Counselor needs/motivations, non-verbal communication, basic/advanced empathy, identifying strengths, maintaining focus, challenging discrepancies, use of self. Emphasizes building from client strengths, learning through role-playing.

FSOS 5429. Research Internship. (1.0-4.0 cr. [max 12.0 cr.]; prereq [FSOS major, at least Jr] or #; fall, spring, summer, every year)
Research project with faculty. May include planning, proposal writing, literature review, data collection/coding/cleaning/analysis, and reporting.

FSOS 5426. Field Study: Working With Families. (1.0-12.0 cr.; S-N or Audit; prereq 2101 or #; fall, spring, summer, every year)
Directed paraprofessional work experience related to student's area of study.

FSOS 5014. Quantitative Family Research Methods I. (3.0 cr.; prereq Grad student or #; fall, every year)
Family research methods, issues associated with multiple levels of analysis. Conducting family-focused data analyses using basic/intermediate methods (through ANOVA and multiple regression), including power analysis. Ethical issues involved in family research such as IRB/HIPAA regulations.

FSOS 5015. Family Research Laboratory. (1.0 cr.; S-N or Audit; prereq Grad student or #; fall, every year)
Application of basic family research methods into experiential learning using statistical software. Analyses that correspond with problem situations in 5014 and that involve secondary data analyses. Using statistical software for basic family research. Preparation to work with quantitative family data sets.
advanced empathy, identifying strengths, maintaining focus, challenging discrepancies, use of self. Emphasizes building from client strengths, learning through role-playing.

FSOS 5900. Special Topics in Family, Youth, and Community. (1.0-4.0 cr. [max 20.0 cr.]; fall, spring, summer, every year) Topics not dealt with in regular courses. Topics vary by offering.

FSOS 5902. Family Education Perspectives. (3.0 cr.; A-F or Audit; fall, summer, every year) Origins, evolution, and critique of alternative perspectives on family education. Implications for educators, programs, and participants.

FSOS 5906. Program Planning in Family Education. (3.0 cr.; A-F or Audit; spring, every year) Curriculum research/theory. Alternative perspectives, their concomitant implications for families. Development of and evaluation of family education curriculum/programs.

FSOS 5908. Family and Work Relationships. (3.0 cr.; A-F only; summer, every year) Interactions of work/family roles, responsibilities, and aspirations. Resources, legal aspects, gender.

FSOS 5932. Introduction to Parent Education. (1.0 cr.; A-F only; fall, summer, every year) Philosophy, history, and models of parent education. Ethical, critically reflective professional practice.


FSOS 5942. Everyday Experiences of Families. (2.0 cr.; A-F only; summer, every year) Culture and everyday experiences of diverse families. Relevance to parent education and to professional development of parent educators. Research/theoretical knowledge woven with observation/personal reflection.

FSOS 5943. Parent Learning and Development: Implications for Parent Education. (2.0 cr.; A-F only; fall, every year) Research/theoretical perspectives critiqued. Challenging assumptions, examining competencies.

FSOS 5944. Parent Education Curriculum. (2.0 cr.; A-F only; prereq 5943 or #; fall, every year) How parent learning/development, child development, and family systems theories influence curriculum approaches/materials in parent education. Student develop construct, critique, and select curriculum.

FSOS 5945. Teaching and Learning in Parent Education. (2.0 cr.; A-F only; prereq 5943 or #; spring, every year) Students select/use parent education teaching strategies/processes to meet needs of various populations of adult learners. Critical reflection, ethical practices, parent educator competencies.

FSOS 5946. Assessment and Evaluation in Parent Education. (2.0 cr.; A-F only; prereq 5943 or #; spring, every year) Theory, terminology, issues, and approaches in assessment/evaluation. Application to monitoring parent education program performance, assessing program quality, and measuring parent learning/development.

FSOS 5949. Student Teaching in Parent Education. (2.0 cr.; A-F only; prereq #; spring, every year) Supervised parent education practice to meet individual student needs/interests. Online discussion, reflection, cooperative learning.

Finance (FINA)
Curtis L. Carlson School of Management

FINA 1905. Freshman Seminar. (1.0-3.0 cr. [max 6.0 cr.]; A-F only; prereq Fr; fall, every year) Topics vary. See Class Schedule.


FINA 4121. Financial Markets and Interest Rates. (2.0 cr.; A-F or Audit; =FINA 4121H); prereq 3001, CSOM major; fall, spring, every year) Valuing fixed income securities. Term structure on interest rates. Forward rates. Fixed income valuation. Treasury, corporate, municipal, and securitization markets.

FINA 4121H. Portfolio Management and Performance Evaluation. (2.0 cr.; A-F or Audit; =FINA 4121); prereq 3001, CSOM major, can take 4122; fall, spring, summer, every year) Investment environment. Concepts used to manage security portfolios. Risk/return tradeoffs, diversification. Asset allocation, Active portfolio management versus indexed portfolios. Portfolio performance evaluation.

FINA 4224. Real Options: Valuing Strategic Flexibility. (2.0 cr.; A-F only; prereq 4422, 4522;) Financial options developed in derivatives course. How to apply them to some corporate settings where traditional DCF analysis cannot capture value of flexibility in project.

FINA 4242W. Corporate Investment Decisions. (4.0 cr.; A-F or Audit; prereq 3001, 4121, 4221, 4522, CSOM major; fall, spring, every year) Managing firm's investment in working capital/fixed assets. Capstone course requiring application of corporate valuation principles from earlier coursework to cases involving working capital management, making capital budgeting decisions, targeting/evaluating firm performance, assessing mergers/acquisitions, and other topics.


FINA 4325. Behavioral Finance. (2.0 cr.; A-F only; prereq 4321; spring, every year) How to use psychology/realistic settings to guide/develop alternative theories of financial market. How insights of behavioral finance complement traditional paradigm/shed light on trading patterns, behavior of asset prices, corporate finance, various Wall Street practices.

FINA 4329. Security Analysis Capstone. (2.0 cr.; A-F only; =FINA 4329); prereq 4211, 4321, 4422, 4522, ACCT 5100 or ACCT 5101; fall, spring, every year) Valuation of equity securities. Principles. Relationship between various valuation approaches. Tools to test self-designed security selection rules.

FINA 4422. Financial Modeling. (2.0 cr.; A-F only; prereq 3001, 4221, ACCT 5100 or 5101, CSOM major; fall, spring, every year) Projecting financial statements to identify financing needs and perform DCF analysis in decision making. APV-, FCF-, and WACC-based methods.

FINA 4522. Options & Derivatives I. (2.0 cr.; A-F only; =FINA 4523, FINA 4541); prereq 3001, 4121, 4321 (can be concurrent), CSOM major; fall, spring, every year) Forwards/futures, options, swaps. Markets these derivatives trade in, their valuation, how
they are used to speculate/manage risk in financial markets. Multi-period binomial model.
FINA 4529. Derivatives II Capstone. (2.0 cr.; A-F only; prereq 4522 or 4523; spring, every year)
Quantitatively advanced material such as Black-Scholes model for valuing option sensitivities (the Greeks). Value-at-risk methods. Valuation/uses of credit derivatives such as default swaps/collateralized debt obligations.
FINA 4621. The Global Economy (Macro). (2.0 cr.; A-F only; =FINA 4641; prereq 3001, CSOM major; fall, spring, every year)
Survey of macroeconomic policies in emerging markets and developed countries. International dimensions of corporate finance. Exchange rates, interest rate parity, trade deficit/surplus.
FINA 4622. International Finance. (2.0 cr.; A-F only; prereq CSOM major, 3001, 4121, 4221; fall, every year)

Financial Mathematics (FM)
Institute of Technology

FM 5001. Preparation for Financial Mathematics I. (3.0 cr.; prereq Grad MFM major or MFM program director approval; fall, every year)
Mathematics needed for MFM program.

FM 5002. Preparation for Financial Mathematics II. (3.0 cr.; prereq 5001, program director approval; spring, every year)
Mathematics needed for MFM program.

FM 5011. Mathematical Background for Finance I. (4.0 cr.; prereq [5001, 5002] with grade of at least B or [MFM program director approval, grad MFM major]; fall, every year)
Mathematics needed for MFM program. Focuses on finance.

FM 5012. Mathematical Background for Finance II. (4.0 cr.; prereq 5011, grad MFM major, program director approval; spring, every year)
Mathematics needed for MFM program. Focuses on finance.

FM 5021. Mathematical Theory Applied to Finance I. (4.0 cr.; prereq [5011 or &5011], grad MFM major, program director approval; fall, every year)
Bridge between theory and application.

FM 5022. Mathematical Theory Applied to Finance II. (4.0 cr.; prereq 5021, [5012 or &5012], grad MFM major, program director approval; spring, every year)
Bridge between theory and application.

FM 5031. A Practitioner's Course in Finance I. (4.0 cr.; prereq [5021 or &5021], grad MFM major, program director approval; fall, every year)
Practical course taught by industry professionals. Focuses on hands-on real-world problem solving.

FM 5032. A Practitioner's Course in Finance II. (4.0 cr.; prereq 5031, [5022 or &5022], grad MFM major, program director approval; spring, every year)
Taught by industry professionals. Focuses on hands-on real-world problem solving.

FIN 5091. Computation, Algorithms, and Coding in Finance I. (4.0 cr.; prereq Grad MFM major, program director approval; fall, every year)
Implements popular finance models and numerical techniques using mainstream computational tools/languages.

FIN 5092. Computation, Algorithms, and Coding in Finance II. (4.0 cr.; prereq 5091, grad MFM major, program director approval; spring, every year)
Implements popular finance models and numerical techniques using mainstream computational tools/languages.

Finnish (FIN)

College of Liberal Arts

FIN 1001. Beginning Finnish. (5.0 cr.; =FIN 4001); fall, spring, summer, every year)
Emphasis on working toward novice-intermediate low proficiency in all four language modalities (listening, reading, speaking, writing). Topics include every day subjects (shopping, directions, family, food, housing, etc.).

FIN 1002. Beginning Finnish. (5.0 cr.; =FIN 4002); prereq 1001; fall, spring, summer, every year)
Continues the presentation of all four language modalities (listening, reading, speaking, writing), with a proficiency emphasis. Topics include free-time activities, careers, and the Finnish culture.

FIN 1003. Intermediate Finnish. (5.0 cr.; =FIN 4003); prereq 1002; fall, every year)
Emphasis on intermediate proficiency in listening, reading, speaking, and writing. Contextualized work on grammar and vocabulary is combined with authentic readings and essay assignments.

FIN 1004. Intermediate Finnish. (5.0 cr.; =FIN 4004); prereq 1003; spring, every year)
Emphasis on developing intermediate mid-high proficiency in listening, reading, speaking, and writing. Contextualized work on grammar and vocabulary is supported by work with authentic readings and essay assignments.

FIN 3011. Advanced Finnish. (3.0 cr.; =FIN 4011); prereq 1004 or 4004; fall, every year)
Designed to help students achieve advanced proficiency in Finnish. Discussion of fiction, film, journalistic, and professional prose is complemented by grammar, vocabulary building exercises, and review of oral/written modes of communication.

FIN 3012. Advanced Finnish. (3.0 cr.; =FIN 4012); prereq 3011 or 4011; spring, every year)
Discussion of novels, short stories, plays, articles. Structural, stylistic, vocabulary-building exercises.

Fisheries and Wildlife (FW)
College of Food, Agricultural and Natural Resource Sciences

FW 1001. Orientation in Fisheries, Wildlife, and Conservation Biology. (1.0 cr.; A-F or Audit; fall, every year)
Survey of technical requirements and education needed for careers in fisheries, wildlife, and conservation biology. Introduction to fields of work, problems, career opportunities.

FW 2001W. Introduction to Fisheries, Wildlife, and Conservation Biology. (3.0 cr.; prereq BIOL 1001 or BIOL 1009; fall, spring, every year)

FW 2002. Threatened and Endangered Wildlife: Causes, Consequences, and Future Conservation. (3.0 cr.; prereq Intro biology course; fall, offered periodically)
Introduction to extinction as a process both natural and human caused. Illustrates differences in extinction events and why we should be concerned about rate of extinction. Definitions of current jargon used to describe imperiled species due to their legal/biological connotations. Case history examples of wildlife species that are threatened or endangered.

FW 2003. Introduction to Marine Biology. (3.0 cr.; prereq BIOL 1001 or BIOL 1009 or BIOL 2002 or ESCI 1006 or ESCI 1106 or #; spring, every year)
Nature of oceans, their role sustaining life on planet. Diversity/ecology of organisms that

FW 3106. Important Plants in Fisheries and Wildlife Habitats. (1.0 cr.; A-F or Audit) [soph, jr, sr] FW major; summer, every year) Common vegetation sampling methods used for habitat assessments. Identify approximately 75 vascular plant species typical of Minnesota terrestrial/aquatic ecosystems using taxonomic keys/readyly observable traits. Importance of plants for providing food, cover, nesting habitat.


FW 3480. Topics in Fisheries and Wildlife. (1.0-4.0 cr. [max 12.0 cr.]; fall, spring, summer, every year) Lectures by visiting scholar or regular staff member. Topics specified in Class Schedule.

FW 3565. Fisheries and Wildlife Ecology and Management: Field Trip. (2.0 cr.; A-F only; prereq #; spring, every year) Eight-day field trip to Wyoming and points en route during spring break. Emphasizes broad range of fisheries and wildlife management, including big game, waterfowl, endangered species.

FW 3840. Project on Ecological Services, Biodiversity or Socio-economic Issues. (3.0 cr.; A-F only; spring, every year) Culmination project for students in Nepal semester program. Research project undertaken individually or in small teams on topic of interest generated from experience. Study abroad program. No on-campus component.

FW 3925. Human Dimensions of Fisheries and Wildlife Management. (3.0 cr.; A-F only; spring, every year) Human dimensions of fish/wildlife concerns. Theory/methods from social sciences to address challenges/issues of managing fish/wildlife resources. Integrating social science information into fish/wildlife decision-making. Guest lecturers.

FW 4001. Biometry. (4.0 cr.; A-F or Audit) prereq Math 1031; fall, every year) Basic statistical concepts such as probability, sampling space, and frequency distributions. Descriptive statistics: sample tests, linear regression (simple and multiple), ANOVA, goodness of fit, nonparametric method and other relevant selected topics (e.g., clustering and classification).

FW 4009. Biodiversity Assessment and Monitoring. (3.0 cr.; A-F only; spring, every year) Part of 4-course sequence in spring 2013 Nepal Semester Abroad Program. Techniques in assessing status/monitoring vertebrate population in Chitwan National Park. Current statistical methods to estimate abundance/habitat occupancy. Human/natural factors that explain population numbers.

FW 4101. Herpetology. (4.0 cr.; prereq BIOL 1001 or BIOL 2012; spring, every year) Reptiles/amphibians, their systematics, behavior, ecology, physiology, development, and morphology. Diversity of reptiles/amphibians. Focuses on Minnesota fauna. Lab.

FW 4102. Principles of Conservation Biology. (3.0 cr.; prereq Biol 1009 or equiv; spring, every year) Introduction to themes/concepts of diverse, dynamic, and interdisciplinary field. Biological/social underpinnings of conservation problems/solutions.

FW 4103. Principles of Wildlife Management. (3.0 cr.; prereq Intro biology course, [jr or sr]; spring, every year) Foundation for understanding discipline of wildlife management. Preparation for upper division wildlife courses.

FW 4136. Ichthyology. (4.0 cr.; prereq BIOL 1001 or BIOL 2012; fall, every year) Fish biology, adaptations to different environments and modes of living, and environmental relationships. Lab emphasizes anatomy and identification of Minnesota fishes.

FW 4291. Independent Study: Fisheries. (1.0-5.0 cr. [max 15.0 cr.]) prereq; fall, spring, summer, every year) Individual field, library, and lab research in fisheries.

FW 4292. Special Lectures: Fisheries. (1.0-5.0 cr. [max 15.0 cr.]) [FW 5292]; prereq #; fall, spring, summer, every year) Lectures in special fields of fisheries given by visiting scholar or regular staff member.

FW 4391. Independent Study: Wildlife. (1.0-5.0 cr.; prereq #; fall, spring, summer, every year) Individual field, library, and lab research in wildlife.

FW 4401. Fish Physiology and Behavior. (3.0 cr.; prereq 4136, BIOL 2012, CHEM 1021 [may be taken concurrently]; fall, odd years) Fish mechanisms/behavior. Links between fish biology, fisheries ecology, management, aquaculture. Homeostasis, neurobiology, bioenergetics, reproduction, movement.

FW 4701. Fisheries and Wildlife Problem Solving. (2.0 cr.; prereq FW sr or grad student or #; spring, every year) Management problem identification/analysis, information gathering/analysis, oral/written reporting. Selected management issues.

FW 5003. Human Dimensions of Biological Conservation. (3.0 cr.; prereq [BIOL 1001 or BIOL 1009], BIOL 3407; fall, every year) Survey of social, psychological, economic, policy aspects of managing/conserving fisheries, and related resources.

FW 5051. Analysis of Populations. (4.0 cr.; prereq [4001 or STAT 3011 or ESPM 3012], [BIOL 3407 or BIOL 3408 W or BIOL 3807], Senior or grad student; spring, every year) Regulation, growth, general dynamics of populations. Data needed to describe populations, population growth, population models, regulatory mechanisms.

FW 5292. Special Lectures: Fisheries. (1.0-5.0 cr. [max 15.0 cr.]) [FW 4292]; prereq Grad student or #; fall, spring, every year) Lectures in special fields of fisheries given by visiting scholar or regular staff member.

FW 5392. Special Lectures: Wildlife. (1.0-5.0 cr. [max 15.0 cr.]) [FW 4392]; prereq Grad student or #; fall, spring, every year) Lectures given by visiting scholar or staff member.

FW 5401. Fish Physiology and Behavior. (3.0 cr.; prereq &FW 4136, CHEM 1021, BIOL 2012; fall, odd years) Fish physiology/behavior. Links between fish biology, fisheries ecology, management, aquaculture. How to write a research proposal. Homeostasis, neurobiology, bioenergetics, reproduction, movement.

FW 5601. Fisheries Population Analysis. (3.0 cr.; A-F or Audit; prereq [4001 or Stat 5021], BIOL 3407, Math 1142 or Math 1271; fall, every year) Introduction to theory/methods for estimating vital statistics of fish populations. Using microcomputers/statistical software to describe, analyze, model attributes of fish populations. Case studies from literature of marine/ freshwater fisheries management.

FW 5603W. Habitats and Regulation of Wildlife. (3.0 cr.; A-F or Audit; prereq [4102 or 4103], [BIOL 3407 or BIOL 3408 or BIOL 3807]; fall, every year) Environmental interactions of wildlife at population/community levels. Environmental threats from human activities. Habitat management practices. Objectives, polices, regulations in population management.

FW 5604W. Fisheries Ecology and Management. (3.0 cr.; prereq EEB 3603 or EEB 4601 or EEB 5601; spring, every year) Managed species/systems. Applied aquatic/fish ecology related to fisheries. Role of planning in fisheries management. Application of management tools, assessment of their efficacy.

FW 5625. Wildlife Handling and Immobilization for Research and Management. (2.0 cr.; S-N or Audit; prereq General biology, grad student or vet med student or FW sr); spring, every year) Practical techniques to maximize human/animal safety and encourage effective operations. Preparation procedures, legal responsibilities, capture drugs/delivery systems, safety measures, ethical issues, basic veterinary procedures for handling wildlife. Field course. Uses live animals.

Food Science and Nutrition (FSCN)
College of Food, Agricultural and Natural Resource Sciences
FSCN 1001. Orientation to the Majors: Food Science and Nutrition. (1.0 cr.; A-F only; prereq Major in Food Science or Nutrition; fall, spring, every year) Advising, student opportunities, networking, what kinds of jobs will be available after graduating. Offered both fall/spring semesters.

FSCN 1011. Science of Food and Cooking. (4.0 cr.; fall, spring, every year) Soufflés, custards, sauces, coffee brewing, candy making used to examine physics/chemistry of heat transfer, foams, gels, emulsions, extractions, crystallization.

FSCN 1012. Sports Nutrition. (2.0 cr.; fall, spring, summer, every year) Physiological function and metabolic fate of all six classes of nutrients ingested by active individuals to improve athletic performance. Impact on physiology of ergogenic aids and various dietary supplements. Overview of these components in fulfilling energy/recovery needs for continual/progressive athletic performance. Web-based course.


FSCN 1090. Topics. (1.0-4.0 cr.; fall, spring, offered periodically) Topics in Food Science/Nutrition. Different courses semester to semester depending on what is offered. First runs of new courses, special topics, visiting lecturers may be hosted.

FSCN 1102. Food: Safety, Risks, and Technology. (3.0 cr.; Student Option No Audit; fall, spring, every year) Introduction to inherent risks/safety of food supply. Use of public policy and food technology to reduce risks. Microbiological, chemical, and environmental hazards, government/industry controls.

FSCN 1112. Principles of Nutrition. (3.0 cr.; prereq High school [biology, chemistry]; fall, spring, summer, every year) Fundamental concepts of nutrition, nutrient functions, human nutritional requirements, food sources. Evaluating nutrition information/food safety. Role of nutrition in chronic disease, public policy, and the environment.

FSCN 1905. Topics: Freshman Seminar. (1.0-3.0 cr.; A-F or Audit; prereq Fr; fall, spring, every year) Topics vary.


FSCN 2002. Healthy Foods, Healthy Lives - Cooking on a Student's Budget. (1.0 cr.; fall, spring, every year) Skills/tools necessary to be comfortable/confident home cooks, knowledgeable about preparation of nutritional/safely prepared foods. Food safety, basic nutrition, technique instruction, budgeting, time management, menu design, measuring, cooking methods, preservation.

FSCN 2021. Introductory Microbiology. (4.0 cr.; A-F only; prereq BIOL 1009, CHEM 1015; fall, spring, every year) How microbes impact our world in deadly/life-saving ways. Roles of bacteria, fungi, and viruses as agents of human diseases; in food spoilage/food borne diseases; and in food preservation/health promotion. Preventing plant diseases, food/drug production, cleaning up oil spills. Genetic engineering.

FSCN 3102. Introduction to Food Science. (3.0 cr.; prereq CHEM 1022 or [CHEM 1062 and CHEM 1066]; fall, every year) Introduction to chemical/physical properties of foods. Evaluating interaction/reaction of foods due to formulation, processing, preparation.


FSCN 3480. Topics in Food Science and Nutrition. (1.0-4.0 cr.; fall, spring, summer, every year) Lectures by visiting scholar or regular staff member. Topics specified in Class Schedule.

FSCN 3612. Life Cycle Nutrition. (3.0 cr.; prereq 1112, Chem 1022; fall, every year) Nutritional changes throughout lifecycle. Pregnancy, lactation, childhood, adulthood, aging. Topics relevant to lifecycle changes (e.g., body composition, immunity, sports nutrition).

FSCN 3614. Nutrition Education and Counseling. (3.0 cr.; prereq 1112; fall, every year) Application of theories/principles of learning, behavior change, instructional methods to nutrition education and counseling in community settings.

FSCN 3615. Sociocultural Aspects of Food, Nutrition, and Health. (3.0 cr.; A-F only; spring, every year) Sociocultural aspects of regional/cultural diversity in food preferences and food behavior, food habits, demographics, lifestyles, food consumption, and expenditures. Effect of socioeconomic status, religious beliefs, age, and cultural meaning of foods on food choices.

FSCN 3731. Food Service Operations Management Laboratory. (2.0 cr.; A-F or Audit; prereq [3102 or & 3102], [3732 or & 3732]; fall, every year) Experience in managing a food service operation. On/off-campus commercial/institutional restaurants used as labs. Required field trips.

FSCN 3732. Food Service Operations Management. (3.0 cr.; A-F or Audit; prereq 3102 or & 3102; fall, every year) Planning, preparing, delivering, serving, managing foods served away from home.

FSCN 4096. Professional Experience Program. Internship. (1.0-4.0 cr.; max 24.0 cr.; A-F only; prereq Undergraduate in the Department of Food Science and Nutrition enrolled in either the Food Science or Nutrition major or minor. To register, students must fill out FScN Internship Agreement form, available at www.fscn.umn.edu. Contact fscnug@umn.edu with questions.; fall, spring, summer, every year) Apply knowledge from Food Science BS or Nutrition BS program to real-life problems in professional internship. Performance evaluated for credit.


FSCN 4121. Food Microbiology. (3.0 cr.; Student Option No Audit; prereq BIOC 3021, [2021 or VBS 2032 or MICB 3301]; spring, every year) Microorganisms involved in food-borne disease, food fermentations, and food spoilage. Methods for their control/detection. Food microbiology. Foodborne pathogens. Microbial food spoilage. Control of microorganisms in food.

FSCN 4122. Food Fermentations and Biotechnology. (2.0 cr.; prereq [MICB 3301, BIO 4003] or #; fall, every year) Major food fermentations important for food industry. Microbiological components. Impact of biotechnology on food production. Genetic tools. Improvement of microbes used in food production by biotechnological approaches.

**FSCN 4311. Food Quality.** (3.0 cr.; prereq 1102, Jr; fall, every year)
Management systems in processing/distribution of foods that ensure food quality/compliance with food laws/regulations. Quality management, HACCP, audits, plant/equipment design for sanitation, specifications, recalls, control systems.

**FSCN 4312W. Food Analysis.** (4.0 cr.; prereq 4112, STAT 3011; fall, every year)
Components in foods. Focuses on analytical measurement. Chemical, physical, and sensory techniques to identify/characterize major/minor components in food systems.

**FSCN 4332. Food Processing Operations.** (3.0 cr.; A-F or Audit; prereq 4331 or BAE 4744; fall, spring, offered periodically)

**FSCN 4345. Flavor Technology.** (3.0 cr.; prereq 4112, 4121, 4331; fall, even years)
Flavor-off/avor development in foods. Industrial production of food flavorings, their proper application to food systems.

**FSCN 4349. Food Science Capstone.** (2.0 cr.; A-F only; prereq 4112, 4121, 4311, 4312, 4332, BBE 4744, Food Science Major, senior; fall, spring, every year)
Planning of process or product development project. Defining goals, preparing/following time line, reviewing literature, coordinating with experts, procuring supplies, writing progress reports. Determining ingredient specifications, lab/pilot plant production. Chemical, microbiological, sensory testing. Oral/written presentations.

**FSCN 4481. Sensory Evaluation of Food Quality.** (1.0 cr.; A-F only; prereq 3102, Stat 3011; spring, every year)
Fundamentals of sensory perception. Test designs/methods used in studying sensory qualities of foods/consumer responses to foods.

**FSCN 4612. Advanced Human Nutrition.** (4.0 cr.; prereq 1112, CHEM 1022 or CHEM 1062 and CHEM 1066), BioC 3021 or PHSL 3051 or ANSC 3031 or BIOL 3211; fall, every year)

**FSCN 4613. Experimental Nutrition.** (2.0 cr.; prereq 4612, BioC 3021, Stat 3011; spring, every year)
Lab in chemical/biochemical methods of analysis of nutritional status.

**FSCN 4614. Community Nutrition.** (3.0 cr.; A-F only; prereq FSCN 1112; spring, every year)
Nutrition risks associated with different age, sex, ethnic, and socioeconomic groups. Community needs assessment. Program planning and evaluation. Programs developed to address the needs and interests of people at different stages of the life cycle, ethnic or cultural backgrounds, and literacy levels.

**FSCN 4621W. Nutrition and Metabolism.** (4.0 cr.; prereq 4612, BIOC 3021, ANSC 3301.
If a prerequisite is missing, students must obtain approval from academic adviser or course instructor in order to enroll; (fall, every year)
Carbohydrate, lipid, protein metabolism. Uses systems/holistic approach to emphasize how metabolic pathways interrelate.

**FSCN 4622. Nutritional Toxicology, the basic science of diet-related toxicants.** (3.0 cr.; A-F only; [NUTR 5627]; prereq BIOC 3021; designed for students majoring in nutrition or food science or toxicology); spring, every year)

**FSCN 4664. Senior Capstone: Becoming a Registered Dietitian.** (1.0 cr.; S-N or Audit; prereq 4665 or 4666); Nutrition/dietetics subplan of nutrition major or P, fall, every year)
Preparation for advancement in career as registered dietitian, including completion of dietetic internship application. Current issues in dietetics.

**FSCN 4665. Medical Nutrition Therapy I.** (3.0 cr.; A-F or Audit; prereq 4665 or 4666); Nutrition/dietetics subplan of nutrition major or P, fall, every year)
Nutrition assessment and support. Pathology, management, and nutrition therapy for disorders of the gastrointestinal, immune, and respiratory systems, and cancer.

**FSCN 4666. Medical Nutrition Therapy II.** (3.0 cr.; A-F or Audit; prereq 4665; spring, every year)
Pathology, management, and nutrition therapy for disorders of the cardiovascular, endocrine, urinary, and neuro muscular and skeletal systems. Nutrition intervention for inborn errors of metabolism, and eating disorders and obesity.

**FSCN 4667. Senior Seminar for the Didactic Program in Dietetics.** (2.0 cr.; S-N only; prereq Senior Nutrition Major with DP}

**FSCN 4732. Food and Nutrition Management.** (3.0 cr.; A-F or Audit; prereq 3732; spring, every year)
Financial and human resource management applied to a variety of business and institutional settings. Field trips may be required.

**FSCN 5101. Food Regulation in the United States.** (2.0 cr.; A-F or Audit; prereq [Grad or sq] food science or nutrition major) or #; spring, every year)
U.S. system of regulation of food product formulation, manufacturing, labeling and advertising, including insight into the manner in which regulation and the underlying food laws are affected by scientific developments and changing societal values and concerns.

**FSCN 5122. Food Fermentations and Biotechnology.** (2.0 cr.; A-F only; prereq MICB 3301, BIOL 4003; fall, every year)
Major food fermentations important for today's food industry, with particular focus on microbiological components. Fermentations cover all major commodity food groups of dairy, cereal, meat, vegetables, fruits.

**FSCN 5123. Molecular Biology for Applied Scientists.** (1.0 cr.; A-F only; prereq MICB 3301 or FScN 2021 or #, fall, every year)
Half semester course. Two hours per week for 8 weeks. Basics of molecular biology/its use has been used for biotechnological applications. Origins of molecular biology from discovery of DNA as inheritance material within cells to advent of gene cloning/sequencing technologies.

**FSCN 5131. Food Quality for Graduate Credit.** (3.0 cr.; A-F only; prereq Food Science grad student; fall, every year)
Management systems, statistical procedures, regulatory requirements involved with producing quality food/ingredients. Risk assessment/management, good manufacturing practices, hazard analysis critical control point (HACCP), statistical methods for process control, total quality management, food/drug laws.

**FSCN 5312. Food Analysis.** (4.0 cr.; A-F only; prereq 4112, STAT 3011; fall, every year)
Analytical tools needed for investigation in Food Science/Technology, whether by food industry, governmental agencies, or universities. Application of quantitative/qualitative physical, chemical/instrumental methods used for analysis/examination of food constituents. Sensory evaluation techniques, evaluation of methods/interpretation of results.

**FSCN 5441. Introduction to New Product Development.** (2.0 cr.; prereq 4111, 4331; fall, spring, even years)
Interactive course that introduces students to the principles of new product development, from identification and testing of new product concepts, through prototype testing, to basic process design using examples from industry.
FSCN 5461. Food Packaging. (2.0 cr.; prereq 1102, 3102, Phys 1102 or Phys 1302; fall, odd years) Materials, principles, and procedures of packaging as they apply to food products. Emphasis is on consumer products, but the principles also apply to bulk and institutional foods and ingredients.


FSCN 5521. Flavor Technology. (2.0 cr.; prereq 4112; spring, odd years) Overview of flavor chemistry/related technology. Analytical techniques, mechanisms of flavor development (chemical/biogenesis), off-flavors, industrial production/application of food flavorings.

FSCN 5531. Grains: Introduction to Cereal Chemistry and Technology. (2.0 cr.; prereq Biol 1009, Chem 1022) Origins, structure, biochemistry, and cellular properties of major cereal grains as they relate to primary processing (milling) and secondary processing (production of cereal products).

FSCN 5541. Dairy Product Chemistry and Technology. (2.0 cr.; prereq 3102, 4112, Food Science major, upper division undergraduate or graduate student; fall, odd years) Designed for upper division Food Science undergraduate/graduate students. Physiology of milk production in ruminants. Resulting composition. Chemical, physical, microbiological properties of milk components. How milk products are manufactured.

FSCN 5601. Management of Eating Disorders. (3.0 cr.; prereq Sr or grad student in Nutrition or health related program or #; fall, spring, every year) Etiology, occurrence, course, treatment, prevention of eating disorders from multidisciplinary perspective. Roles/ responsibilities of eating disorder treatment team members of varying types across various treatment milieus.

FDSY 2101. Plant Production Systems. (3.0 cr.; prereq College level general biology course or Hort 1001 or #; spring, every year) How food production systems fit within overall food system. Fundamentals of soils, plant nutrition, plant production metabolites as they affect food production systems. Decisions that differentiate among conventional sustainable/ organic systems.

FDSY 2102. Diversity of Agricultural Production Systems. (3.0 cr.; A-F only; summer, every year) Examination of agricultural production systems, including organic, alternative, conventional systems. History of production systems/implications for producer lifestyles, social/natural environments, economics at local to global scales. Farm visits, producer interviews, group projects, classroom presentations.

FDSY 4101. Holistic Approaches to Improving Food Systems Sustainability. (3.0 cr.; A-F only; prereq [ApEc 3202, BBE 3201, 2101 or #; spring, every year) Capstone course introduces soft-systems methodology (SSM). In strongly experiential/community-engaged learning environment, students will address sustainability challenges/opportunities in local food systems.

FSCN 3104. Forest Ecology. (4.0 cr.; prereq Biol 1001 or Biol 1009; summer, every year) Field examination of natural history of northern/boreal forests with respect to soils, ecological characteristics of trees, community-environment relationships, stand development, succession, and regeneration ecology. Taught at Cloquet Forestry Center.

FSCN 3101. Park and Protected Area Management. (3.0 cr.; A-F or Audit; = [FSCN 5101]; fall, odd years) Interaction of resource based tourism with cultural/natural environments. Impacts of tourism on environment.

FSCN 3104. Forest Ecology. (4.0 cr.; A-F or Audit; = [FSCN 5104]; prereq Biol 1001 or 1009; 1 semester college chemistry recommended; fall, every year) Form/function of forests as ecological systems. Characteristics/dynamics of species, populations, communities, landscapes, and ecosystem processes. Examples applying ecology to forest management. Weekly discussions focus on research topics in forest ecology, exercises applying course concepts, and current issues in forest resource management. Required weekend field trip.


FNRM 3131. Geographical Information Systems (GIS) for Natural Resources. (4.0 cr.; A-F only; = [FNRM 5131]; prereq Soph or jr or sr or UHP fr; fall, spring, every year) Spatial data development/analysis in science/management of natural resources. Data structures/sources/collection/quality. Geodesy, map projections, spatial/tabular data analysis. Digital terrain analysis, cartographic modeling, modeling perspectives, limits of technology.
FNRM 3201. Introduction to Travel and Tourism. (3.0 cr.; A-F only; =FNRM 5201); spring, every year) Travel/tourism is one of the world's largest industries. Course introduces the nature, structure and complexity of the industry. Begins with overview of travel/tourism — definition, evolution of travel/tourism, and magnitude globally. Examine types and functions of various sectors, tourism distribution system and role of various stakeholders in creation/delivery of tourism. Explore motivations for travel as means of understanding demand for tourism.

FNRM 3203. Forest Fire and Disturbance Ecology. (3.0 cr.; A-F or Audit; =FNRM 5203); prereq 3104 or equiv; spring, every year) Ecology, history, management, control of fire, wind, insect infestation, deer browsing, other disturbances in forests, including disturbance regimes of boreal, northern hardwood, savannahs of North America. Influence of disturbance on wildlife habitat, urban/wildland interfaces, forest management, stand/landscape dynamics. Tree mortality in fires, succession patterns created by fires, interactions of life history traits of plants with disturbances.

FNRM 3204. Landscape Ecology and Management. (3.0 cr.; A-F or Audit; =FNRM 5204); prereq Ecology course; fall, every year) Introduction to landscape ecology at different scales in time/space. Development/implications of broad-scale patterns of ecological phenomena, role of disturbance in ecosystems, characteristic spatial/temporal scales of ecological events. Principles of landscape ecology as framework for landscape research, analysis, conservation, and management.

FNRM 3206. Park and Protected Area Management Field Studies. (2.0 cr. [max 3.0 cr.; A-F only; prereq Junior status or higher; summer, every year) Directed field study of park/protected areas. Recreation planning/visitor management, cultural/natural resource management, nature-based tourism management, resource interpretation. Communication across local, state, federal, tribal park, protected areas in northern Minnesota.

FNRM 3208. Tropical Forest Ecology, Natural History and Measurements. (3.0 cr.; A-F only; spring, every year) Nepal Semester Abroad course. Forest ecology/measurement skills applicable in variety of settings from forests of Minnesota to community of forests of Nepal. Participatory approach. Students work directly with members of Community Forest User Groups.

FNRM 3218. Measuring and Modeling Forests. (3.0 cr.; A-F or Audit; =FNRM 5218); prereq [ESP 3012 or STAT 3011]; MATH 1151; spring, every year) Sampling design, survey techniques to assess resource conditions. Applying metrics/sampling methods to forest vegetation. Calculating tree/stand volume. Modeling approaches. Case studies of modeling to project future growth. Landscape processes, characterization, modeling.

FNRM 3262. Remote Sensing of Natural Resources and Environment. (3.0 cr.; =FNRM 5262); fall, every year) Principles/techniques of remote sensing and its applications to mapping/monitoring land/water resources from local to global scales. Forest and natural resource inventory. Forest cover and soil mapping. Landuse/global change analysis. Lab provides hands-on experience working with aerial photography and digital sensing imagery.

FNRM 3411. Managing Forest Ecosystems: Silviculture. (3.0 cr.; =FNRM 5411), prereq [5413, FNRM [major or minor]] or #; spring, every year) Management of forest ecosystems for sustaining ecological integrity, soil productivity, water quality, wildlife habitat, biological diversity, commodity production in landscape context. Silvics, forest dynamics, disturbances, regeneration, restoration, silvicultural systems. Ramifications of management choices. Weekend field trip.

FNRM 3431. Timber Harvesting and Road Planning. (2.0 cr.; =FNRM 5431); prereq 3411 or #; spring, every year) Introduction to forest operations. Terminology, basic engineering, equipment and harvesting system options, productivity/costs. Relationship to forest management and silviculture. Road planning, forest management guidelines, approaches for mitigating potential impacts to soil/water resources. Environmental implications of method/equipment choices. Selling timber. Sale design, layout, and administration. Two all-day field trips.

FNRM 3471. Forest Planning and Management. (3.0 cr.; A-F or Audit; =FNRM 5471); prereq Intro silviculture or concurrent registration in silviculture or #; spring, every year) Processes/techniques for scheduling forest management activities. Goals of landowners, industry, government, and society. Predicting forest outcomes, financial analysis, forest regulation, mathematical models, linear programming, economic analysis. Landscape-level management, desired conditions, historical range of variability, wildlife management, carbon sequestration, resource monitoring, certification, adaptive management.

FNRM 3480. Topics in Natural Resources. (1.0-3.0 cr.; =FNRM 5480); fall, spring, offered periodically) Lectures in special fields of natural resources given by visiting scholar or faculty member. Topics specified in Class Schedule.

FNRM 3501. Arboriculture: Selection and Maintenance of Trees. (3.0 cr.; prereq [1101 or Hort 1012], Biol 2022; spring, every year) Selection, growth, propagation, and maintenance of trees for urban spaces. Tree selection, site preparation, plant health care management. Prevention, diagnosis, and remediation of urban tree risks such as insects, pathogens, pollution, development, and climate change.

FNRM 4293. Directed Study. (1.0-5.0 cr. [max 15.0 cr.; prereq #; fall, spring, summer, every year) Study/project on topic of personal interest in consultation with faculty member. Initial proposal, reports of accomplishments.

FNRM 4501. Urban Forest Management: Managing Greenspaces for People. (3.0 cr.; =FNRM 5501); prereq [1101, 3501, Ent 4251, PIPa 3003, [UF major or minor]] or #; spring, every year) Management concepts for green infrastructure of cities, towns, and communities. Urban forest as a social/biological resource. Emphasizes management of urban forest ecosystem to maximize benefits to people. Tree selection, risk assessment, cost-benefit analysis, landscape planning, values, perceptions. How urban forestry can be a tool to improve community infrastructure.

FNRM 4511. Field Silviculture. (2.0 cr.; prereq [3104, 3411] or #; summer, every year) Collection of field data to prepare/write silvicultural prescriptions for regeneration, thinning, and harvesting in context of landscape, watershed, and wildlife habitat issues. Field exercises in forest entomology, pathology, tree improvement, and non-timber forest products. Tree planting. Marking stands for harvest. Taught at Cloquet Forestry Center. Field trips to forests managed by state/industry.

FNRM 4515. Field Remote Sensing and Resource Survey. (2.0 cr.; prereq [3218, 3262] or #; summer, every year) Field applications of remote sensing, sampling/measurement methods to inventory/mapping of forest and other natural resources. Offered at Cloquet Forestry Center.


FNRM 5101. Park and Protected Area Tourism. (3.0 cr.; A-F or Audit; =FNRM 3101); prereq Grad student or #; fall, odd years) Interaction of resource based tourism with cultural/natural environments. Impacts of tourism on environment.

FNRM 5104. Forest Ecology. (4.0 cr.; A-F or Audit; =FNRM 3104); prereq [[Biol 1001 or

FNRM 5131. Geographical Information Systems (GIS) for Natural Resources. (4.0 cr.; A-F or Audit; [FNRM 3131]; prereq Grad student or #; fall, every year) Geographic information systems (GIS) focusing on spatial data development and analysis in the science and management of natural resources. Basic data structures, sources, collection, and quality; geodesy and map projections; spatial and tabular data analyses; digital elevation data and terrain analyses; cartographic modeling and layout. Lab exercises provide practical experiences complementing theory covered in lecture.

FNRM 5146. Science and Policy of Global Environmental Change. (3.0 cr.; [EEB 5146]; prereq 3104 or Biol 3407 or equiv; spring, offered periodically) Intro to critical issues underpinning global change and its biological implications. Current scientific literature on evidence for global change and potential effects on a wide range of biological processes. Economic/political impact on global change.

FNRM 5153. Forest Hydrology & Watershed Biogeochemistry. (3.0 cr.; prereq [Basic hydrology course, one course in ecology, and one course in chemistry [upper div or grad student]] or #; spring, odd years) This rigorous course examines hydrology and biogeochemical cycling in forested watersheds. Topics include role of forests in hydrologic processes (precipitation, runoff generation, and streamflow) and exports (sediment, carbon, and nitrogen). Readings from primary literature, active discussion participation, research/review paper.

FNRM 5161. Northern Forest Field Course. (2.0 cr.; A-F or Audit; prereq #; summer, every year) Field identification of common trees, shrubs, and nonwoody vascular plants. Plant communities, soil site relationships, wildlife values. Natural history of northern/boreal forests in terms of soils, ecological characteristics of trees, community-environment relationships, stand development, succession, and regeneration ecology. Land survey, tree/forest stand measurement, forest sampling techniques. Taught at Cloquet Forestry Center.

FNRM 5201. Introduction to Travel and Tourism. (3.0 cr.; A-F only; [FNRM 3201]; prereq Grad student or #; spring, every year) Nature, structure and complexity of tourism industry. Overview of travel/tourism: definition, evolution, magnitude globally. Types/functions of various sectors, tourism distribution system, role of various stakeholders in creation/delivery of tourism. Motivations for travel as means of understanding demand for tourism.

FNRM 5203. Forest Fire and Disturbance Ecology. (3.0 cr.; A-F or Audit; [FNRM 3203]; prereq Grad student or #; spring, every year) Ecology, history, management, control of fire, wind, insect infestation, deer browsing, other disturbances in forests, including disturbance regimes of boreal, northern hardwood, savannas of North America. Influence of disturbance on wildlife habitat, urban/wildland interfaces, forest management, stand/landscape dynamics. Tree mortality in fires, successional patterns created by fires, interactions of life history traits of plants with disturbances.

FNRM 5204. Landscape Ecology and Management. (3.0 cr.; A-F or Audit; [FNRM 3204]; prereq Grad student or #; fall, every year) Introduction to landscape ecology at different scales in time/space. Development/implications of broad-scale patterns of ecological phenomena, role of disturbance in ecosystems. Characteristic spatial/temporal scales of ecological events. Principles of landscape ecology as framework for landscape research, analysis, conservation, and management.

FNRM 5206. Park and Protected Area Management Field Studies. (2.0 cr. [max 3.0 cr.]; A-F only; prereq Junior status or higher; summer, every year) Directed field study of park/protected areas. Recreation planning/visitor management, cultural/natural resource management, nature-based tourism management, resource interpretation/communication across local, state, federal tribal park/protected areas in northern Minnesota.

FNRM 5208. Tropical Forest Ecology, Natural History and Measurements. (3.0 cr.; A-F only; spring, every year) Nepal Semester Abroad course. Forest ecology/forest measurement skills applicable in variety of settings from forests of Minnesota to community forests of Nepal. Participatory approach. Students work directly with members of Community Forest User Groups.

FNRM 5218. Measuring and Modeling Forests. (3.0 cr.; A-F or Audit; [FNRM 3218]; prereq Grad student or #; spring, every year) General sampling design and survey techniques to assess current resource conditions. Application of metrics/sampling methods to forest vegetation. Calculation of tree/stand volume, selection of modeling approaches. Case studies of modeling to project future growth. Landscape processes, characterization, and modeling.

FNRM 5228. Advanced Assessment and Modeling. (3.0 cr.; A-F or Audit; prereq 3218, Math 1272, Stat 5021; fall, even years) Application of recently developed mathematics, computer science, and statistics methodologies to natural resource functioning, management, and use problems. Specific topics, software, and methodologies vary.


FNRM 5259. Visitor Behavior Analysis. (3.0 cr.; prereq Major or ESPM major or grad student or #; fall, even years) Social science theory/methods to behavioral research. Recreation/nature-based tourism/environmental management. Analysis of surveys/observations/focus groups/interviews. Implications for sustainable resource management, visitor experiences, and environmental stewardship. Course is online or in-person, depending on semester.

FNRM 5262. Remote Sensing of Natural Resources and Environment. (3.0 cr.; [FNRM 3262]; prereq Grad student or #; fall, spring, every year) Principles/techniques of remote sensing. Mapping/monitoring land/water resources from local to global scales. Forest and natural resource inventory. Forest cover and soil mapping. Landuse/global change analysis. Lab provides hands-on experience working with aerial photography and digital sensing imagery.

FNRM 5264. Advanced Forest Management Planning. (3.0 cr.; prereq 3471 or #; fall, every year) Applied models for forest planning to integrate forest resource conditions/uses. Stand-level management. Forest-wide/landscape-level planning. Regional timber supply analysis. Optimization models and heuristic techniques as tools. Integrating sustainable timber production with desirable future conditions and spatial structure for biodiversity. Problems, case studies involving recent large-scale applications.

FNRM 5411. Managing Forest Ecosystems: Silviculture. (3.0 cr.; [FNRM 3411]; prereq Grad student or #; spring, every year) Management of forest ecosystems for sustaining ecological integrity, soil productivity, water quality, wildlife habitat, biological diversity, commodity production in landscape context. Silvics, forest dynamics, disturbances, regeneration, restoration, silvicultural systems. Ramifications of management choices. Weekend field trip.

FNRM 5412. Digital Remote Sensing. (3.0 cr.; prereq 3262 or grad student or #; spring, every year)
Pathology, tree improvement, and non-timber forest products. Tree planting. Marking stands for harvest. Taught at Cloquet Forestry Center. Field trips to forests managed by state/industry.

FNRN 5615. Field Remote Sensing and Resource Survey. (1.0 cr.; prereq Grad student; summer, every year) Field applications of remote sensing, sampling/measurement methods to inventory/mapping of forest and other natural resources. Offered at Cloquet Forestry Center.

FNRN 5621. Field Timber Harvesting and Road Planning. (1.0 cr.; prereq Grad student; summer, every year) Design, layout, and administration of timber sales. Forest road planning and design. Protecting residual trees during harvesting operations. Timber appraisal, forest management guidelines. Road location and profiling. Planning/layout considerations. Field trips to visit timber harvesting and road planning sites with public and private organizations. Taught at Cloquet Forestry Center.

French (FREN) College of Liberal Arts

FREN 100. Reading French in the Arts and Sciences. (0.0 cr.; S-N only; spring, every year) Basic reading knowledge of French language. Intensive reading/translation of texts from a wide variety of disciplines. Students successfully completing the course obtain language certification in French.

FREN 1001. Beginning French. (5.0 cr.; fall, spring, summer, every year) Basic listening, speaking, reading, and writing skills. Emphasis on communicative competence. Some cultural readings.

FREN 1002. Beginning French. (5.0 cr.; [FREN 4022]; prereq 1001 or equiv; fall, spring, summer, every year) Basic listening, speaking, reading, and writing skills. Emphasis on communicative competence. Some cultural readings.

FREN 1003. Intermediate French. (5.0 cr.; prereq 1002 orEntrance Proficiency Test; fall, spring, every year) Development of listening, writing, and speaking skills in the context of cultural themes related to the Francophone world. Grammar review and elaboration.

FREN 1004. Intermediate French. (5.0 cr.; prereq 1003 or Entrance Proficiency Test; fall, spring, every year) Development of listening, reading, writing, and speaking skills in the context of cultural themes related to the Francophone world. Grammar review and elaboration.

FREN 1022. Accelerated Beginning French. (5.0 cr.; [FREN 4002]; prereq 2 or more yrs high school French; fall, spring, every year) For students who have studied French in high school or at community colleges and who do not place high enough on placement exam to enter 1003. An accelerated review of Fren 1001 followed by the material covered in Fren 1002.

FREN 1904. Freshman Seminar. (3.0 cr.; A-F or Audit; prereq Freshman; fall, spring, offered periodically) Topics specified in Class Schedule.

FREN 1905. Freshman Seminar. (3.0 cr.; A-F or Audit; prereq freshman; fall, offered periodically) Topics specified in Class Schedule.

FREN 1907W. Freshman Seminar. (3.0 cr.; A-F or Audit; prereq Freshman; fall, spring, offered periodically) Topics specified in Class Schedule.

FREN 1908W. Freshman Seminar. (3.0 cr.; A-F or Audit; prereq Freshman; fall, spring, offered periodically) Topics specified in Class Schedule.

FREN 1910W. Freshman Seminar. (3.0 cr.; A-F or Audit; prereq freshman; fall, offered periodically) Topics specified in Class Schedule.

FREN 1910W. Freshman Seminar. (3.0 cr.; A-F or Audit; prereq Freshman; fall, spring, offered periodically) Topics specified in Class Schedule.

FREN 1910W. Freshman Seminar. (3.0 cr.; A-F or Audit; prereq freshman; fall, offered periodically) Topics specified in Class Schedule.

FREN 3010. French Expression. (3.0-6.0 cr.; fall, spring, every year) Intensive work in oral/written communication.

FREN 3014. French Phonetics. (3.0 cr.; prereq 1004; fall, spring, every year) Survey of major institutions/components of modern French culture with special attention to lexical enrichment/pronunciation practice. Study of linguistic description of French sounds/transcription.

FREN 3015. Advanced French Grammar and Communication. (3.0 cr.; prereq 1004 or equiv or #; fall, spring, summer, every year) Advanced study of French with particular emphasis on grammar review, vocabulary building, oral communication skills, and language usage in cultural contexts.

FREN 3016. Advanced French Composition and Communication. (3.0 cr.; prereq 3015 or equiv or #; fall, spring, every year) Advanced study of grammar in context; emphasis on writing for varied communicative purposes, reading for style and content, translation.

FREN 3017W. Advanced Writing in French: Genre, Style, Rhetoric. (3.0 cr.; A-F only; prereq 3016; fall, every year) Workshop in journalistic/literary prose writing in French. Theme of journalistic/literary readings varies. Article, editorial, review, essay, biography, tale, prose poem. Word order, sequence of tenses, indirect discourse, literary tenses. Overview of stylistics/use of rhetorical figures.

FREN 3018. French Oral Communication. (3.0 cr.; prereq 3014, 3015; fall, spring, summer, every year) Intensive work in oral expression, listening comprehension. Incorporates wide variety of cultural topics.
FREN 3022. The Language and Culture of Business in France. (3.0 cr.; prereq 3015; completion of 3016 recommended; spring, every year)
Examines French business language as well as business practices and culture in France. Includes cross-cultural analysis.

FREN 3101W. Methods in French and Francophone Studies. (4.0 cr.; prereq 3016 or equiv; fall, spring, every year)
Writing intensive. Critical methods, standards of scholarship, and body of knowledge specific to French and Francophone studies. Understand/analyze literary and nonfiction texts, cultural artifacts, and audio/visual media pertaining to France and Francophone communities across the centuries.

FREN 3111. Medieval Stories. (3.0 cr.; prereq 3101;)
Reading/discussion of major forms of medieval tale (comic, bawdy, moralizing, fantasy, historical) in modern French translation. Explores their relationship to development of French culture, especially urbanization, class relations, marriage, role of Church.

FREN 3115. Saints and Soldiers of Medieval France. (3.0 cr.; A-F only; prereq 3101W; fall, even years)

FREN 3140. Topics in Medieval and Renaissance Literature. (3.0 cr.; [max 9.0 cr.]; prereq 3101; spring, every year)
Different aspects of French literature/culture of medieval/Renaissance periods (11th-16th century). Content varies depending on instructor. Literary, historical, or social problem. Period, author, genre, or topic of interest. Readings may be literary, critical, cultural, historical, political, etc. Specific content posted in department and in Course Guide.

FREN 3181. Mapping Enlightenment in 17th- and 18th-Century French Prose. (3.0 cr.; prereq 3101;)
The themes, values, and critical strategies of the social and intellectual movement designated by the term Enlightenment. The legacy of the Enlightenment project will also be evaluated.

FREN 3240. Topics in Ancien Regime Literature. (3.0 cr. [max 9.0 cr.]; prereq 3101; fall, offered periodically)
Different aspects of French literature/culture from early modern period (17th/18th centuries). Content varies depending on instructor. Literary, historical, or social problems. Period, author, genre or topic of interest. Readings may be literary, critical, cultural, historical, political, etc. Specific content posted in department/ Course Guide.

FREN 3250. French Poetry. (3.0 cr. [max 9.0 cr.]; prereq 3101; spring, every year)
The historical, political, and social contexts of the evolution of French poetry from its origins to the modern era. While studying primarily lyric poetry, epic and dramatic poetry may also be considered when appropriate.

FREN 3260. Dramas of Culture: 20th-Century French and Francophone Theater. (3.0 cr. [max 9.0 cr.]; TH 3261; prereq 3101; fall, offered periodically)
Key movements, dramatists, and contexts of 20th-century French and Francophone theater. Areas of study include naturalist and symbolist legacies as well as existentialist, avant-garde, and contemporary performance and drama.

FREN 3310. Literature of Revolution and Upheaval. (3.0 cr. [max 9.0 cr.]; prereq 3101; )
A study of revolutionary movements in France seen through novels placed in historical context. Content may vary, but course will deal with radical historical, cultural and literary changes in France primarily in the modern period.

FREN 3321. Producing the Bourgeois Subject: The Sense of Self in 18th-Century French Literature. (3.0 cr.; prereq 3101;)
Examines the role of 18th-century literature in shaping the notion of self and social identity. Attention is given to the novel and its relation to new reading practices and publics.

FREN 3330. Literature and the Making of Modern France: 20th-Century Perspectives. (3.0 cr. [max 9.0 cr.]; prereq 3101; fall, offered periodically)
Developments of literary culture of 20th-century France in the context of historical events and social transformations.

FREN 3333. The Idea of Paris: Writing and Viewing the City. (3.0 cr.; prereq 3101W; fall, odd years)
Meanings that Paris acquired in modern French cultural imagination, particularly as protean metaphor, myth or allegory for effects of urban, national, global modernity. Literature, painting, photography, film, architecture, urban theory from Enlightenment to present.

FREN 3340. Topics in Modern French Literature. (3.0 cr. [max 9.0 cr.]; prereq 3101; spring, offered periodically)
Modern French literature/culture, defining modern period as that of post-Revolution France. Content varies depending on instructor. Literary, historical, or social problem. Period, author, genre, or topic of interest. Specific content posted in department/in Course Guide.

FREN 3350. Topics in Literature. (3.0 cr. [max 9.0 cr.]; prereq 3101; fall, spring, every year)
Focuses on a problem, period, author, or topic of interest. Specific content posted in department and listed in Course Guide.

FREN 3360. Coming of Age. (3.0 cr. [max 9.0 cr.; prereq 3101; )
A study of the literature of education and of the process of youth coming to terms with society. Readings will vary and will be drawn from a number of time periods.

FREN 3410. Quebecois Literature. (3.0 cr. [max 9.0 cr.]; prereq 3101; fall, spring, offered periodically)
Study writing produced in Quebec as a literature of its own, not simply as a part of Canadian literature. Literature will be studied in relation to other North American literatures and to Francophone literature produced elsewhere in the world.

FREN 3451. North African Cinema. (3.0 cr.; prereq 3101; fall, odd years)
Cinemas of the Maghreb, the northern African nations of Morocco, Algeria, and Tunisia. Themes may include North African cities/communities; gender, class and ethnicity; and impact of globalization in migratory patterns. Films. Readings in philosophy, history, sociology, anthropology, and cultural critique.

FREN 3471. Topics in Francophone African Literature and Cultures. (3.0 cr.; prereq 3101W; fall, odd years)
Issues relevant to cultures/societies of francophone Sub-Saharan Africa as reflected in literature, film, and cultural critique.

FREN 3479. Francophone Writers of the African Diaspora. (3.0 cr.; prereq 3101; fall, even years)
Literature from Francophone North Africa, Africa, the Caribbean of the colonial and/or post-colonial era, examined in its historical, cultural, or ideological contexts. Reading selections may include texts by immigrant or exiled writers in France.

FREN 3500. Linguisitc Analysis of French. (3.0 cr.; A-F only; prereq 3015; fall, even years)
Introduction to scientific study of French language. Concepts/terminology to describe nature/functioning of sounds, words, sentences/meaning, and variation. Taught in French.

FREN 3501. Structure of French: Phonology. (3.0 cr.; FREN 5501; prereq 3015, 3014 or 3500 or Ling 3001 or #; spring, offered periodically)
Advanced study of sound system of contemporary French.

FREN 3521. History of the French Language. (3.0 cr.; prereq 3015, 3500 or Ling 3001 or #; fall, odd years)
Origins/development of French language from Latin to contemporary French. Selected texts. Present stage/development.

FREN 3531. Sociolinguistics of French. (3.0 cr.; FREN 5531; prereq 3015, 3500 or Ling 3001 or #; spring, offered periodically)
Use of French associated with factors such as medium (oral/written), style (formal/informal), region, social, economic groups.

FREN 3541. Oral Discourse of French. (3.0 cr.; prereq 3015, 3500 or Ling 3001 or #; fall, spring, offered periodically)

FREN 3601. French Civilization and Culture I. (3.0 cr.; prereq 3015; fall, offered periodically)
Roman occupation of Gaul to 1715.
FREN 3602. French Civilization and Culture II. (3.0 cr.; prereq 3015; spring, offered periodically) 1705 to present.

FREN 3611. Deciphering Courtly Literatures of Medieval France. (3.0 cr.; A-F only; =FREN 3711; prereq 3015; fall, even years) Cultural practices of 12th-century Angevin/ Capetian courts. Lyrics, romances, texts/artworks. Patronage, authorship, representation of self, understanding of various "others" (women, Orthodox Christians, Muslims).

FREN 3612. Reading Libertinism. (3.0 cr.; =FREN 3712; prereq 3015, 3101 strongly recommended; spring, odd years) Underground, subversive, philosophical countercultures that push society to limits. Why society has underground, how it shapes understanding of individual responsibility. Shifting notions of acceptable/moral behavior. Philosophizing/imaging in creating society/values.

FREN 3636. Human Nature from Descartes to Sade. (3.0 cr.; A-F only; =FREN 3736; prereq 3015; spring, odd years) Explores ethical dimensions of human nature/legacy from Descartes to Sade.

FREN 3650. Topics in French/ Francophone Cultures. (3.0 cr. [max 9.0 cr.]; prereq 3015; fall, spring, summer, every year) French/francophone cultures in various historical, social, political, geographical contexts.

FREN 3671. Theaters of Pain: Violence and the Spectacular in Premodern France. (3.0 cr.; prereq 3015, &3016; fall, spring, every years) Why physical violence is intimately linked to spectacular representations. Theater as collective arena in which society attends to pressing problems. How/why repeated presence of violence was something meant to behold in early modern France and elsewhere.


FREN 3896. Internship in a French-Speaking Milieu. (1.0-4.0 cr.; A-F only; prereq 3016, 3014 [3018 strongly recommended], 3022 strongly recommended for students undertaking internships in business, government, or law); fall, spring, summer, every year) Volunteer or paid work in French-speaking milieu, undertaken at initiative of individual students. Work under direction of work supervisor/ advisor chosen from among regular or adjunct faculty. Complete two-three written assignments designed to enhance language/field-specific learning.

FREN 3995. Directed Teaching. (1.0-5.0 cr. [max 20.0 cr.]; S-N or Audit; prereq %; fall, every year) Directed teaching.

FREN 4001. Beginning French. (2.0 cr.; prereq Grad student; fall, spring, summer, every year) Meets concurrently with 1001. See 1001 for course description.

FREN 4002. Beginning French. (2.0 cr.; =FREN 1002; prereq Grad student; fall, spring, summer, every year) Meets concurrently with 1002. See Fren for course description.

FREN 4003. Intermediate French. (2.0 cr.; prereq Grad student; fall, spring, summer, every year) Meets concurrently with 1003. See 1003 for course description.

FREN 4004. Intermediate French. (2.0 cr.; prereq Grad student; fall, spring, summer, every year) Meets concurrently with 1004. See 1004 for course description.

FREN 4022. Accelerated Beginning French. (2.0 cr.; =FREN 1002; prereq Grad student; fall, spring, every year) Meets concurrently with 1022. See 1022 for course description.

FREN 4101V. Honors: Seminar in French Studies. (3.0 cr.; prereq Completion of all pre-elective requirements for major or permission of DUS; spring, every year) Reading/discussion of contemporary issues in French studies, workshop on senior projects.

FREN 4101W. Seminar in French Studies. (3.0 cr.; prereq Completion of all pre-elective requirements for major or permission of DUS; fall, spring, every year) Reading and discussion of contemporary issues in French studies and workshop on senior projects.

FREN 4109W. Senior Project in French and Francophone Studies. (1.0 cr.; A-F only; prereq #; completion of most major coursework or permission of DUS); fall, spring, every year) Completion of research paper based on paper written for previous course or expansion of project undertaken in concurrent course.

FREN 4110V. Honors Thesis. (1.0-2.0 cr.; [max 4.0 cr.]; A-F only; prereq [Completion of most major coursework or permission of DUS]; candidate for honors in French; #; fall, spring, every year) Directed study used to develop/complete honors thesis in French/Francophone studies.

FREN 4510. Topics in French Linguistics. (3.0 cr. [max 9.0 cr.]; prereq 3015; spring, summer, every year) Topics from French syntax, pragmatics, discourse analysis, or sociolinguistics.

FREN 4970. Directed Readings. (1.0-4.0 cr.; =FREN 3970; spring, summer, every year) Designed to meet unique requirements agreed upon by a faculty member and a student. Individual contracts are drawn up listing contact hours, number of credits, written and other work required. Each contract will vary.

FREN 5250. Promenades Poétiques: The Subject in Motion. (3.0 cr. [max 9.0 cr.]; prereq 3111 or above) The search for the subject in poetry and poetic prose as revealed through the motif of the "promenade" and experimentation with literary forms.

FREN 5301. Critical Issues in French Studies. (3.0 cr.; prereq Grad or #; spring, odd years) Introduces the methods of interpretation and critical debates that have shaped and continue to define the discipline of French studies. Provides a practical introduction to graduate-level literary research.
FREN 5350. Topics in Literature and Culture. (3.0 cr. [max 12.0 cr.]; prereq 3101 or equiv; fall, spring, every year) Problem, period, author, or topic of interest. See Class Schedule.

FREN 5470. Post/Colonial Francophone Literatures. (3.0 cr. [max 9.0 cr.]; prereq 3111 or above; fall, offered periodically) Francophone literature from North Africa, Africa, and the Caribbean of the colonial and/or post-colonial era in the light of relevant literary and cultural theories.

FREN 5501. Structure of French: Phonology. (3.0 cr.; =FREN 3501; prereq Ling 3001 or Ling 5001, grad student; ) Advanced study of sound system of contemporary French.

FREN 5531. Sociolinguistics of French. (3.0 cr.; =FREN 3531; prereq = 3531; Ling 3001 or 5001; grad ) Explores variation in the use of French associated with factors such as medium (oral/written), style (formal/informal), region, social and economic groups.

FREN 5541. Oral Discourse of French. (3.0 cr.; prereq 3015, grad student; Ling 5001 recommended; ) Nature of contemporary spoken French discourse. Focuses on spontaneous, multi-speaker discourse. Readings include examples of various linguistic approaches to such discourse. Emphasizes syntactic analysis. Phonological/lexical particularities. 'Macro' level analyses such as discourse analysis and conversation analysis.

FREN 5995. Directed Teaching. (1.0-6.0 cr. [max 24.0 cr.]; S-N or Audit; prereq #: fall, every year) Directed teaching.

French and Italian (FRIT)

College of Liberal Arts

FRIT 1905. Freshman Seminar. (3.0 cr.; A-F or Audit; prereq Freshman; fall, spring, offered periodically) Topics specified in Class Schedule.

FRIT 3600. The Renaissance. (3.0 cr.; =ARTH 3600, CLA 3600, MEST 3600, HIST 3600; spring, offered periodically) Relationships between the visual arts, literature, science, philosophy, and politics in Europe from about 1300-1600. Works of artists, writers, and intellectuals (e.g., Michelangelo Buonarroti, Niccolo Machiavelli, Michel de Montaigne), different artistic and literary forms (e.g., portrait, sonnet, essay), and broad thematic issues, including the individual, antiquity, the state, and discovery. Team taught.

FRIT 3803. New Wave Cinemas: Love, Alienation and Landscape in Post-War Italian and French Film. (3.0 cr.; spring, every year) Modernist Italian and New Wave French cinema after WWII, focusing on film syntax, constructions of gender, and the individual's relationship to the modern urban and rural landscape. Taught in English. Knowledge of Italian and French helpful but not necessary.

FRIT 3850. Topics in French and Italian Cinema. (3.0 cr. [max 9.0 cr.]; prereq Knowledge of [French or Italian] helpful but not required; fall, summer, every year) Theme, problem, period, filmmaker, or topic of interest in French/Italian cinema. See Class Schedule. Taught in English.

FRIT 3851. France, Italy and North Africa in Films on Contemporary Migrations. (3.0 cr.; prereq Knowledge of French or Italian recommended; spring, odd years) Films shot in France, Italy, and North Africa (Morocco, Algeria, Tunisia). Representations of migrants, regular/irregular immigration. Globalization, identity, hospitality, racism, modes of communication/integration. In-class films include Andrés Tácher's Far, Yasmine Kassarri's The Sleeping Child, and Io, L'Altro. All have English subtitles. Readings in English, some available in French and Italian.

FRIT 3880. Topics in French and Italian Literatures and Cultures. (3.0 cr. [max 9.0 cr.]; spring, odd years) Topic of interest in interrelations and cross-cultural exchanges that have contributed to Italian/French literature and culture, from Medieval to modern period. Topics vary with instructor. See Course Guide.

FRIT 5257. Passionate Beings: Literary and Medical Problematics in Italy and France from 1800 to the Present. (4.0 cr.; ) Literary and medical representations of the passions in France and in Italy from 1800 to the present. Texts range from theatrical works to medical treatises on the passions as ways for exploring notions of subjectivity, responsibility, order. Taught in English.

FRIT 5580. Topics in French and Italian Cinema. (3.0 cr.; prereq Knowledge of [French or Italian] helpful but not required; fall, offered periodically) Focuses on a theme, problem, period, filmmaker, or other topic of interest in French or Italian cinema. See Class Schedule. Taught in English.

GLBT 3211. History of Sexuality in Europe. (3.0 cr.; A-F or Audit; =HIST 3211; fall, spring, offered periodically) History of sexuality in Europe, from ancient Greece to present. Plato's philosophy of love, St. Augustine's conception of sin, prostitution in 15th century, sexual science of Enlightenment. Industrial revolution and homosexual subcultures. Rape scares and imperialism. Eugenics and Nazi Germany.

GLBT 3212. Dissident Sexualities in U.S. History. (3.0 cr.; A-F or Audit; =AMST 3212, HIST 3212; fall, every year) Sexualities that have challenged dominant social/cultural norms. Transgender, bisexual, lesbian, gay identities/communities. Politics of sex across lines of race/ethnicity. Controversial practices, including sex work.


GLBT 3305. Queer Cinema. (3.0 cr.; spring, every year) What queer/queering signify in relation to cinema. Directors, films, styles, genres of queer cinema. Ways in which traditional narrative codes are challenged/repackaged. Ideological dimensions. Impact of political climate. Readings, screenings, discussions, assignments.

GLBT 3404. Transnational Sexualities. (3.0 cr.; =GWSS 3404; fall, spring, offered periodically) Lesbian/gay lives throughout world. Culturally-specific/transcultural aspects of lesbian/gay identity formation, political struggles, community involvement, and global networking. Lesbian/gay life in areas other than Europe and the United States.


GLBT 3456W. Sexuality and Culture. (3.0 cr.; fall, spring, summer, every year) Historical/critical study of forms of modern sexuality (heterosexuality, homosexuality, romance, erotic domination, lynching); How discourses constitute/regulate sexuality. Scientific/scholarly literature, religious documents, fiction, personal narratives, films, advertisements.

GLBT 3472. Gay Men and Homophobia in American Culture. (3.0 cr.; fall, spring, every year)
GWSS 1004. Screening Sex: Visual and Popular Culture. (3.0 cr.; fall, spring, even years)
Film history and theory; feminist critique of popular culture.

GWSS 1005. Engaging Justice. (3.0 cr.; fall, spring, odd years)
U.S./cross-cultural studies of social movements/political organizing around justice/equality.

GWSS 1006. Skin, Sex, and Genes. (3.0 cr.; fall, odd years)
Interdisciplinary course that explores the tense relationships between science, medicine and gender and sexuality.

GWSS 1007. Introduction to GLBT Studies. (3.0 cr.; = [GWSS 1001]; fall, every year)
History of contemporary GLBT-identified communities. Terms of theoretical debates regarding sexual orientation, identity, experience. Analyzes problems produced/insights gained by incorporating GLBT issues into specific academic, social, cultural, political discourses.

GWSS 1902. Freshman Seminar. (3.0 cr.; A-F or Audit; prereq GLBT studies minor; #; fall, spring, every year)
Topics/description vary. See Class Schedule, Course Guide.

GWSS 1904. Freshman Seminar. (3.0 cr.; A-F or Audit; prereq freshman; fall, spring, offered periodically)
Topics specified in Course Schedule.

GWSS 1905. Freshman Seminar. (3.0 cr.; = [GWSS 1902H]; fall, spring, offered periodically)
Topics/description vary. See Class Schedule, Course Guide.

GWSS 1910W. Topics: Freshman Seminar. (3.0 cr.; prereq Fr; spring, every year)
Topics specified in Course Guide.

GWSS 3002V. Honors: Gender, Race and Class in the U.S. (3.0 cr.; A-F only; = [GWSS 3002W]; prerequisites Honors; spring, every year)
Comparative study of women, gender, race, class, sexuality in two or more ethnic cultures in U.S.

GWSS 3002W. Gender, Race, and Class in the U.S. (3.0 cr.; = [GWSS 3002V]; fall, every year)
Comparative study of gender, race, class, sexuality in two or more ethnic cultures throughout U.S.

GWSS 3003. Gender and Global Politics. (3.0 cr.; fall, spring, summer, every year)
Similarities/differences in women's experiences throughout world, from cross-cultural/historical perspective. Uses range of reading materials/media (feminist scholarship, fiction, film, news media, oral history, autobiography).

GWSS 3003H. Honors: Gender and Global Politics. (3.0-4.0 cr.; prereq honors; fall, offered periodically)
Similarities/differences in women's experiences throughout world from cross-cultural/historical perspective. Uses range of reading materials/media (feminist scholarship, fiction, film, news media, oral history, autobiography). Includes honors recitation.

GWSS 3004V. Honors: Point/Counterpoint: Contemporary Feminist Debates. (3.0 cr.; A-F only; = [GWSS 3004W]; prerequisites Honors; fall, offered periodically)

GWSS 3102V. Honors: Feminist Thought and Theory. (3.0-4.0 cr.; fall, every year)

GWSS 3102W. Feminist Thought and Theory. (3.0 cr.; = [GWSS 3102V]; spring, every year)

GWSS 3201. Sociology of Gender. (3.0 cr.; A-F or Audit; = [SOC 3221]; prerequisites 1001 or 1002 or #; fall, spring, offered periodically)

GWSS 3202H. Honors: Biology of Women. (4.0 cr.; fall, offered periodically)

GWSS 3203W. Blood, Bodies and Science. (3.0 cr.; fall, every year)
Ways in which modern biology has been site of conflict about race/gender. Race/gender demographics of scientific professions.

GWSS 3290. Topics. (3.0 cr.; max 9.0 cr.; A-F only; fall, spring, every year)
Topics specified in Class Schedule.

GWSS 3301W. Women Writers. (3.0 cr.; spring, every year)
Complexities of women's roles and way women writers have used various genres of literature to articulate personal and social struggles. Fiction, poetry, drama, critical nonfiction texts. Fidelity/betrayal within relationships and societal perceptions. What images of femininity do these writers convey? How do formal and stylistic devices transform meaning?
GWSS 3302. Women and the Arts. (3.0 cr.; fall, every year) Study of women in the arts, as represented and as participants (creators, audiences). Discussion of at least two different art forms and works from at least two different U.S. ethnic or cultural communities.

GWSS 3303W. Writing Differences: Literature by U.S. Women of Color. (3.0 cr.; [AAS 3303W]; fall, odd years) Interpret/analyze poetry, fiction, and drama of U.S. women minority writers. Relationship of writer’s history, ethnicity, race, class, and gender to her writings.

GWSS 3304. Novels and Nations. (3.0 cr.; [GLOS 3609]; fall, offered periodically) Explore intricacies of web of fiction without losing sight of structures that hold it up.

GWSS 3305. Queer Cinema. (3.0 cr.; spring, every year) What “queer” and “queering” signify in relation to cinema. Directors, films, styles, genres of queer cinema. Ways in which traditional narrative codes are challenged/repackaged. Ideological dimensions. Impact of political climate. Readings, screenings, discussions, assignments.

GWSS 3306. Pop Culture Women. (3.0 cr.; fall, spring, every year) Contemporary U.S. feminism as political/intellectual movement. Ways in which movement has been represented in popular culture.

GWSS 3307. Feminist Film Studies. (3.0 cr.; fall, every year) Construction of different notions of gender in film, social uses of these portrayals. Lectures on film criticism, film viewings, class discussions.

GWSS 3308W. Women’s Contemporary Fiction. (3.0 cr.; fall, spring, summer, offered periodically) Themes and features of style and content related to changes in women’s roles in novels and short stories by English-language women writers of the late 20th century. Significance of race, sexual orientation, class, and age in the conditions of women’s lives and their portrayal in literature.

GWSS 3351. Women and Diasporas in Modern History. (3.0 cr.; spring, even years) Comparing diasporas across time. Focuses on gendering of lives/identities of people whose identities continue to be shaped by forced/free migrations of past 500 years.

GWSS 3390. Topics: Visual, Cultural, and Literary Studies. (3.0 cr.; [max 6.0 cr.]; fall, spring, offered periodically) Topics specified in Class Schedule.

GWSS 3402. Pleasure, Intimacy and Violence. (3.0 cr.; spring, even years) Gender/sexual violence to poststructural, anti-racist theories/debates about social construction of sexuality. How intimacy/violence are co-constituted within normative frameworks of U.S. governmentality. Writings by black feminist criminologists who have linked incarceration, welfare reform, other forms of state regulation to deeply systemic forms of violence against people of color.

GWSS 3403W. Jewish Women in the United States. (3.0 cr.; fall, offered periodically) Twentieth century American Jewish women--historically, sociologically, religiously, and culturally--key developments over the century.

GWSS 3404. Transnational Sexualities. (3.0 cr.; [GLBT 3404]; fall, spring, odd years) Lesbian/gay lives throughout world. Culturally-specific/transcultural aspects of lesbian/gay identity formation, political struggles, community involvement, and global networking. Lesbian/gay life in areas other than Europe and the United States.

GWSS 3406. Gender, Labor, and Politics. (3.0 cr.; fall, every year) Historical developments/contemporary manifestations of women’s participation in labor force/global economy. Gender as condition for creation/maintenance of exploitable category of workers. How women’s choices are shaped in various locations. Women’s labor organizing.

GWSS 3407. Women in Early and Victorian America: 1600-1890. (3.0 cr.; [HIST 3347]; fall, every year) Varied experiences of women in American history from European settlement in North America to the end of the 19th century.

GWSS 3408. Women in Modern America. (3.0 cr.; [HIST 3484]; spring, every year) History of women in the United States from 1890 to present. Women’s changing roles in politics, in labor force, in family, and in popular culture. Work, family, sexuality, gender ideologies, women’s right struggles. Different experiences of women based on race, class, religion, and region.

GWSS 3409W. Asian American Women’s Cultural Production. (3.0 cr.; [AAS 3409W]; fall, every year) Analysis of media, art, literature, performance, on artistic contributions. History, politics, culture of Asian American women. Interpret cultural production to better understand role of race, gender, nation within American society/citizenship.

GWSS 3410. Chicana Studies: La Chicana in Contemporary Society. (3.0 cr.; [CHIC 3212]; fall, spring, every year) Scholarly/creative work of Chicanas or politically defined women of Mexican American community. Interdisciplinary. Historical context, cultural process, autoethnography.

GWSS 3412. American Indian Women: Ethnographic and Ethnohistorical Perspectives. (3.0 cr.; A-F or Audit; fall, even years) Comparative survey of ethnographic/ethnohistorical writings by/about American Indian women.

GWSS 3413. Women and Gender in Latin American History. (3.0 cr.; [HIST 3424, GLOS 3934]; spring, offered periodically) Changing gender norms in Latin America over time as compared with lives of women of diverse classes, ethnic groups. How women responded to their position in society, on continuum from accomodation to resistance.

GWSS 3415. Feminist Perspectives on Domestic Violence and Sexual Assault. (3.0 cr.; A-F only; fall, every year) History of and contemporary thinking about public policies and legal remedies directed toward domestic violence and sexual assault. How notions of public/private spheres and social constructions of gender roles, agency, and bodies contribute to attitudes/responses.


GWSS 3490. Topics: Political Economy and Global Studies. (3.0 cr.; [max 6.0 cr.]; fall, spring, summer, every year) Topics specified in Class Schedule.


GWSS 3503. Women and the Law. (3.0 cr.; fall, spring, offered periodically) Legal system as it relates to women: historical legal approach to issues related to constitutional rights of women.


GWSS 3615W. Women in European History: 1500 to the Present. (3.0 cr.; [HIST 3615W]; spring, even years) History of women in Western Europe from early modern period to present. Organized thematically around changes crucial to women’s lives in transition from early modern to modern Europe. Family/kinship structure, property, organization of work, religious, education, politics.

GWSS 3681. Gender and the Family in the Islamic World. (3.0 cr.; A-F only; [SOC 3681, GLOS 3681, RELS 3716]; prereq At least soph; spring, offered periodically) Experiences of Muslim women/families from historical/comparative perspective. Gender/family power relations in colonial representations, sexual politics, family, education/health, paid work, human rights, Islamic feminism.

GWSS 3880H. Honors Directed Instruction. (1.0-8.0 cr. [max 12.0 cr.]; prereq honors; fall, spring, offered periodically) Directed instruction.
GWSS 3890H. Topics: Honors Seminar. (1.0-8.0 cr. [max 12.0 cr.; prereq honors; fall, spring, offered periodically) Topics vary. Topics that students would like faculty to develop into a course or topics closely related to faculty research/scholarship or contemporary issues.

GWSS 3893H. Honors Directed Study. (1.0-8.0 cr. [max 12.0 cr.; prereq honors; fall, spring, offered periodically) Honors directed study.

GWSS 3894H. Honors Directed Research. (1.0-8.0 cr. [max 12.0 cr.; prereq honors; fall, spring, offered periodically) Honors directed research.

GWSS 3993. Directed Study. (1.0-12.0 cr.; fall, spring, summer, every year) TBD Prereq instr consent, dept consent, college consent.

GWSS 3994. Directed Research. (1.0-12.0 cr.; fall, spring, every year) TBD Prereq instr consent, dept consent, college consent.

GWSS 4001. Nations, Empires, Feminisms. (3.0 cr.; A-F only; spring, odd years) Feminist critiques of the nation-state and citizenship, political economy and development, globalization, and/or empire and colonialism. Overview of the broader literature and an interrogation of specific attendant questions (such as how do feminists theorize state violence; what are feminist and queer critiques of U.S. empire; and how do feminists theorize globalization from above and below).

GWSS 4002. Politics of Engagement and Social Justice. (3.0 cr.; A-F only; fall, odd years) Ways in which feminist scholars have thought about and worked to complicate the opposition between theory and praxis. Diverse efforts by intellectuals situated within the Western academy to produce scholarship that is committed to deinstitutionalizing knowledge production and relevant to political struggles confronted by their own material and institutional inequalities.

GWSS 4003. Science, Bodies, Technologies. (3.0 cr.; spring, even years) Feminist approaches to scientific methods and practices. Relationship between scientific practices and social relations, emphasizing the larger social, political, and economic context in which scientific knowledge production takes place. How scientific knowledge structures relationships of power and inequality, and constructs understandings of bodies and identities. Ways in which science shapes meanings of sex, race, gender and sexuality.

GWSS 4004. Queering Desire. (3.0 cr.; fall, spring, even years) Core perspectives of queer theory. Recent extensions and manifestations.

GWSS 4102. Women, Gender, and Science. (3.0 cr.; prereq 1001 or 1002 or 3102 or #; fall, offered periodically) Three intersecting themes analyzed from 1700s to the present: women in science, sexual and gendered concepts in modern sciences, and impact of science on conceptions of sexuality and gender in society.

GWSS 4103. Transnational Feminist Theories. (3.0 cr.; fall, spring, every year) Western/non-Western feminist theories in conversation. Historical, cultural, political context. Relation of theory to activism.

GWSS 4108. Senior Seminar: Writing. (1.0 cr.; prereq GWSS major [jr or sr]; spring, every year) Capstone course. Conduct independent research/writing in conjunction with 3xxx-, 4xxx-, or 5xxx-level GWSS class.

GWSS 4122. Philosophy and Feminist Theory. (3.0 cr.; = [PHIL 5622, PHIL 4622, GWSS 5122]; prereq 8 crs in [philosophy or women's studies] or #) Encounters between philosophy/feminism. Gender's influence in traditional philosophical problems/methods. Social role of theorist/theorizing as they relate to politics of feminism.

GWSS 4201. The Older Woman: A Feminist Perspective. (3.0 cr.; prereq 12 cr in WoSt or substantial work in psych or soci sci; fall, spring, offered periodically) Myths and realities surrounding conceptualizations of older women in public, private, personal, social, sexual, professional, and community interactions.

GWSS 4232. Chicana/o - Latina/o Gender and Sexuality Studies. (3.0 cr.; = [GLBT 4322, CHIC 4232]; fall, spring, odd years) Critical thinking of Chicanas/os, Latinas/os around construction of gender. Politics of sexual identity. How self is gendered in relationship to sexual, racial, class, national identities under different social structural conditions. Way in which "borders" that define/confine sexual norms shift over time.

GWSS 4303W. Writing Differences: Literature by U.S. Women of Color. (3.0 cr.; fall, odd years) Interpret/analyze poetry, fiction, drama of U.S. women minority writers. Relationship of writer's history, ethnicity, race, class, gender to writings.

GWSS 4390. Topics: Visual, Cultural, and Literary Studies. (3.0 cr.; prereq Sr or grad student or #; fall, spring, offered periodically) Topics specified in Class Schedule.

GWSS 4401. Chicana/Latina Cultural Studies. (3.0 cr.; fall, even years) Readings in Chicana/Latina cultural studies. TV, film, art, music, dance, theatre, literature. Identity/sexuality. Production of culture/theory.

GWSS 4402. Rebels, Radicals, and Revolutionaries: History of Western Feminisms. (3.0 cr. [max 4.0 cr.]; fall, spring, summer, every year) Survey of main currents in history of western feminist thought, politics, and social movements from 1770s to present.

GWSS 4403. Queering Theory. (3.0 cr.; = [GWSS 5503]; prereq Any GWSS or GLBT course; fall, spring, summer, every year) Lesbianism/lesbian identities as products of cultural practices, relations, meanings that are historically specific/changing.

GWSS 4404. Gender, Nation, and Literature in Latin America. (3.0 cr.; prereq [1001 or course on feminist theory]. [jr or sr]; fall, offered periodically) Latin American literature/film concerning gendered nature of Latin American politics, society, and history. Texts by (mostly) women writers/filmmakers. Texts in English but available in Spanish or Portuguese.

GWSS 4406. Black Feminist Thought in the American and African Diasporas. (3.0 cr.; = [GWSS 5406]; spring, offered periodically) Critically examine spatiality of African descendant women in Americas/larger black diaspora. Writings from black feminist/queer geographies, history, contemporary cultural criticism. Recent black feminist theorizing.


GWSS 4490. Topics: Political Economy and Global Studies. (3.0 cr.; prereq Sr or grad student or #; fall, spring, offered periodically) Topics specified in Class Schedule.

GWSS 4621W. Rhetoric of Feminism. (3.0 cr.; = [COMM 4621W]; fall, spring, offered periodically) History/criticism of rhetoric of feminism from 19th century to present.

GWSS 4690. Topics: Women, Society, and Race in the United States. (3.0 cr. [max 6.0 cr.]; spring, odd years) Topics specified in Class Schedule.

GWSS 4980. Directed Instruction. (1.0-8.0 cr. [max 12.0 cr.]; fall, spring, every year) Guided individual reading or study.

GWSS 4993. Directed Study. (1.0-5.0 cr. [max 10.0 cr.]; prereq Filled out student/faculty contract, #, %, @; fall, spring, summer, every year) TBD

GWSS 4994. Directed Research. (1.0-8.0 cr. [max 12.0 cr.]; fall, spring, every year) Guided individual reading or study.

GWSS 5101. Feminist Approaches to Ethnography. (3.0 cr.; ) Preparation for feminist ethnographic research in the social sciences. Using recent works by feminist ethnographers, focus is on the methods, politics, and ethics, as well as gender, race, class, and cross-cultural issues pertaining to fieldwork.

GWSS 5102. Feminist Approaches to History. (3.0 cr.; prereq 8 cr WoSt or grad or #) Analysis and practice of feminist history. Theories, methods, and sources that address the interrelationship of gender, race, class, and sexuality.
GWSS 5103. Feminist Pedagogies. (3.0 cr.; prereq grad or #; fall, spring, every year)
Theory and practice of feminist pedagogies by comparing and evaluating various multicultural feminist theories of education/teaching and the application of specific theories, techniques, and teaching strategies.

GWSS 5104. Transnational Feminist Theory. (3.0 cr.; fall, odd years)
Third World and transnational feminisms. Interrogating the categories of "women," "feminism," and "Third World." Varieties of power/oppression that women have endured/resisted, including colonization, nationalism, globalization, and capitalism. Concentrates on postcolonial context.

GWSS 5107. Gender, Culture, and Science. (3.0 cr.; fall, spring, offered periodically)
Critical study of some of the major papers concerning the relations of gender and scientific inquiry produced in the past 20 years.

GWSS 5122. Philosophy and Feminist Theory. (3.0 cr.; =[PHIL 5622, PHIL 4622, GWSS 4122]; prereq 8 crs in [philosophy or women's studies] or #; )
Encounters between philosophy/feminism. Gender's influence in traditional philosophical problems/methods. Social role of theorist/theorizing as they relate to politics of feminism.

GWSS 5190. Topics: Theory, Knowledge, and Power. (3.0 cr.; fall, spring, odd years)
Topics specified in Class Schedule.

GWSS 5201. Global Processes and the Politics of Sexuality. (3.0 cr.; prereq 12 cr WoSt or feminist studies grad student or #; )
Comparative examination of the social construction of sexuality. Formal/informal norms/regulations, categories of deviance, representation of sex in the media/arts, role of sexuality in relation to agency/subjectivity.

GWSS 5290. Topics: Biology, Health, and Environmental Studies. (3.0 cr.; fall, spring, offered periodically)
Topics specified in Class Schedule.

GWSS 5390. Topics: Visual, Cultural, and Literary Studies. (3.0 cr. [max 6.0 cr.]; fall, odd years)
Topics specified in Class Schedule.

GWSS 5404. Working Class Women’s Cultures. (3.0 cr.; prereq 12 cr WoSt or #; )
Myths and realities surrounding working class women and their cultures. Use sociological and literary material in an effort to learn about working class women and to hear their own voices.

GWSS 5405. Chicanas: Women and Work. (3.0 cr.; prereq #; )
Chicanas, their various relationships to family/community. Local, national, and global work forces. Questions/issues related to growing integration of world systems of production.

GWSS 5406. Black Feminist Thought in the American and African Diasporas. (3.0 cr.; =[GWSS 4406]; spring, offered periodically)
Critically examines spatiality of African descendant women in Americas/larger black diaspora. Writings from black feminist/queer geographies, history, contemporary cultural criticism. Recent black feminist theorizing.

GWSS 5490. Topics: Political Economy and Global Studies. (3.0 cr. [max 12.0 cr.]; spring, every year)
Topics specified in Class Schedule.

GWSS 5993. Directed Study. (1.0-12.0 cr.; fall, spring, summer, every year)
TBD

GWSS 5994. Directed Instruction. (1.0-12.0 cr. [max 36.0 cr.]; fall, spring, summer, every year)
TBD

GWSS 5995. Directed Research. (1.0-8.0 cr. [max 36.0 cr.]; fall, spring, every year)
TBD

General Dentistry (GEND)
School of Dentistry

GEND 5151. Advanced General Dentistry Seminar I. (5.0-10.0 cr.; S-N or Audit; fall, summer, every year)
Clinical seminars with emphasis on treatment planning, case presentation, techniques and materials, comprehensive oral healthcare and maintenance, and issues in practice management. Correlated with concurrent clinical experiences.

GEND 5152. Advanced General Dentistry Seminar II. (5.0-10.0 cr.; S-N or Audit; fall, every year)
Clinical seminars with emphasis on treatment planning, case presentation, techniques and materials, comprehensive oral healthcare and maintenance, and issues in practice management. Correlated with concurrent clinical experiences.

GEND 5153. Advanced General Dentistry Seminar III. (2.0-10.0 cr.; S-N or Audit; fall, spring, every year)
Clinical seminars with emphasis on treatment planning, case presentation, techniques and materials, comprehensive oral healthcare and maintenance, and issues in practice management. Correlated with concurrent clinical experiences.

GEND 5254. Advanced General Dentistry Clinic I. (5.0-15.0 cr.; S-N or Audit; fall, summer, every year)
Comprehensive oral health care delivered in a variety of settings, emphasizing complex restorative care, coordinating care with dental and medical specialists, special needs patients, and advanced techniques.

GEND 5255. Advanced General Dentistry Clinic II. (5.0-15.0 cr.; S-N or Audit; fall, every year)
Comprehensive oral health care delivered in a variety of settings, emphasizing complex restorative care, coordinating care with dental and medical specialists, special needs patients, and advanced techniques.

GEND 5256. Advanced General Dentistry Clinic III. (5.0-15.0 cr.; S-N or Audit; fall, spring, every year)
Comprehensive oral health care delivered in a variety of settings, emphasizing complex restorative care, coordinating care with dental and medical specialists, special needs patients, and advanced techniques.

Genetics, Cell Biology and Development (GCD)
College of Biological Sciences

GCD 2002. Ethical and Social Challenges in Genetics. (3.0 cr.; A-F only; prereq BIOL 1009 or equiv; fall, every year)
For nonscientists. Advances in genetics and their application to society. Ethical and social issues of advancements in genomics and genetics in our everyday lives.

GCD 3022. Genetics. (3.0 cr.; =BIOL 4003; prereq BIOL 2002 or BIOL 1009; fall, spring, summer, every year)
Mechanisms of heredity, implications for biological populations. Applications to practical problems.

GCD 3033. Principles of Cell Biology. (3.0 cr.; A-F only; prereq BIOL 1009 or equiv; spring, every year)
Components and activities common to eukaryotic cells. Chromosomes, membranes,
organelles and the cytoskeleton, and processes involving cellular communication, replication, motility, transport and gene expression. Relevance to human health and medicine. Appropriate for non-CBS majors.

GCD 3485. Bioinformatic Analysis: Introduction to the Computational Characterization of Genes and Proteins. (3.0 cr.; A-F only; prereq One semester of college biology; spring, every year) Use of computer applications in manipulation/analysis of DNA, RNA, and protein sequences.

GCD 4005W. Cell Biology - Writing Intensive. (4.0 cr.; A-F only; [=BIOL 4004]; prereq GCD major, [BIOL 3021 or BIOL 4331; BIOL 4003; spring, every year]) Processes fundamental to cells. Emphasizes eukaryotic cells. Assembly/function of membranes/organelles. Cell division, cell form/movement, intercellular communication, transport, secretion pathways. Cancer cells, differentiated cells.

GCD 40025. Cell Biology Laboratory. (2.0 cr.; prereq Biol 4004 or #; fall, spring, offered periodically) Experimental approaches to cell structure, function, and replication. Microscopy, autoradiography, cell fractionation, molecular/chemical analyses.

GCD 4034. Molecular Genetics. (3.0 cr.; prereq Biol 4003, Biol 4004; advanced bioscience undergrad recommended; spring, every year) Molecular genetics of prokaryotes/eukaryotes. Gene regulation, genome analysis. Modern techniques such as recombinant DNA, targeted mutations, genome manipulation, and gene chip technology.

GCD 4111. Histology: Cell and Tissue Organization. (4.0 cr.; prereq 3033 or Biol 4004 or #; spring, every year) Structure/function of vertebrate tissues/organisms. Electron microscopy, light microscopy, physiology, cell biology of higher animals. Light microscopy of mammalian tissues.

GCD 4130. Endocrinology. (3.0 cr.; prereq Biol 3211 or Biol/BioC 3021 or BioC 4331 or #; spring, every year) Survey of structure and function of invertebrate and vertebrate endocrine systems.

GCD 4143. Human Genetics. (3.0 cr.; prereq 3022 or Biol 4003 or #; spring, every year) Principles of human genetics at the molecular, cellular, individual, and populations levels. Chromosomal and biochemical disorders; gene mapping; mutation and natural selection; variation in intelligence and behavior; genetic screening, counseling, and therapy.

GCD 4151. Molecular Biology of Cancer. (3.0 cr.; A-F or Audit; prereq Biol 4003; spring, offered periodically) Regulatory pathways involved in directing normal development of complex eukaryotic organisms, how disruptions of these pathways can lead to abnormal cell growth/cancer. Causes, detection, treatment, prevention of cancer.


GCD 4171. Stem Cells in Biology and Medicine. (3.0 cr.; A-F only; [=SCB 8181]; prereq BIOL 4003, [BIOL 4004 or &BIOL 4004 or #; spring, every year]) Contemporary stem cell biology with emphasis on mechanisms/applications. Embryonic, tissue-specific, and induced pluripotent stem cells and potential uses in human disease.

GCD 4793W. Directed Studies: Writing Intensive. (1.0-7.0 cr.; S-N or Audit; prereq #, %; fall, summer, every year) Individual study on selected topics or problems. Emphasizes selected readings, use of scientific literature. Written report.

GCD 4794W. Directed Research: Writing Intensive. (1.0-6.0 cr.; max 24.0 cr.; S-N or Audit; prereq #, %; fall, summer, every year) Laboratory or field investigation of selected areas of research including written report.

GCD 4993. Directed Studies. (1.0-7.0 cr.; S-N or Audit; prereq #, %; fall, spring, summer, every year) Individual study on selected topics or problems. Emphasizes selected readings and use of scientific literature.

GCD 4994. Directed Research. (1.0-6.0 cr.; max 42.0 cr.; S-N or Audit; prereq #, %; fall, spring, summer, every year) Laboratory or field investigation of selected areas of research.

GCD 5001. Computer Programming for Cell Biology. (3.0 cr.; prereq [BIOL 4003, BIOL 4004 (4004 may be taken concurrently or may be waived with #)]; biological statistics, one semester of calculus; fall, every year) Computer programming skills with applications in biology. Design/build new computer programs for applications in cell/developmental biology, including modeling of biological processes, advanced data analysis, automated image analysis.

GCD 5036. Molecular Cell Biology. (3.0 cr.; prereq Biol 4004 or #; [sr or grad student] recommended; fall, every year) Modern, integrative approaches combining cell/molecular biology, biochemistry, and genetics to investigate cell organization/function. Membranes, signaling, extracellular matrix, secretion, endocytosis, cytoskeleton, nucleus. Analysis of scientific papers to illustrate new concepts in and experimental approaches to cell organization/function.

GID 5530. GIS Internship. (1.0-3.0 cr. [max 6.0 cr.]; S-N only; prereq #, strong GIS/mapping skills; fall, spring, every year) Practical hands-on experience using GIS to solve problems in a real-world work environment.

GID 5555. Basic Spatial Analysis. (3.0 cr.; prereq [STAT 3001 or equiv, MGIS student] or #; fall, every year) How to use spatial data to answer questions on a wide array of social, natural, and information science issues. Exploratory data analysis/visualization. Spatial autocorrelation analysis/regression.

GID 5571. ArcGIS I. (3.0 cr.; prereq [GEOG 5561 or equiv, status in MGIS program, familiarity with computer operating systems] or #; fall, every year) First of a two-course series focusing on ArcGIS Desktop. Overview of ArcGIS system and its use for spatial data processing. Data capture, editing, geometric transformations, map projections, topology, Python scripting, and map production.

GID 5572. ArcGIS II. (3.0 cr.; prereq [5571, [GEOG 5561 or equiv], in MGIS program] or #; spring, every year) Continues GIS 5571. Raster analysis, dynamic segmentation, geometric networks, geocoding, Python scripting, and data interoperability. Substantial projects include map and poster design and production.

GID 5573. Introduction to Digital Mapping: ArcGIS Basics. (1.5 cr.; prereq [GEOG 5561 or equiv, in MGIS program] or #; fall, every year) Desktop mapping functions using ArcGIS software. Application of systems to display/analysis of geographical data.

GID 5574. Web GIS and Services. (3.0 cr.; prereq [GEOG 5561 or equiv, in MGIS program] or #; fall, every year) Plan, design, develop, publish web-based GIS solution. Build websites, prepare data for web. Commercial software, Open Source software, volunteer geographic information, open GIS standards/developing web GIS application. Hands-on experience with variety of web GIS technologies/software.

GID 5575. Practical Surveying for GIS. (2.0 cr.; prereq GEOG 5561 or equiv in MGIS program or #; spring, every year) Surveying techniques/relationship of GPS to GIS professionals. Geodesy, data adjustment, datums, ellipsoids, coordinate systems, transformations.

GID 5577. Spatial Database Design and Administration. (3.0 cr.; prereq MGIS student or #; spring, every year) Spatial database design, development planning/management, maintenance, security, access/distribution, and documentation.

GID 5578. GIS Programming. (3.0 cr.; prereq MGIS student or #; spring, every year) Programming techniques using Python and other languages specifically relating to GIS technologies.
**Geography (GEOG)**

**College of Liberal Arts**

**GEOG 1301W. Our Globalizing World.** (3.0 cr.; = [GEOG 1301V]; fall, spring, summer, every year)
Introduction to geographical understandings of globalization and of connections/differences between places.

**GEOG 1372. Geography of Global Cities.** (3.0 cr.; = [GLOS 1672]; fall, every year)

**GEOG 1402. Biogeography of the Global Garden.** (4.0 cr.; = [GEOG 1403H]; fall, spring, every year)
The geography of biodiversity and productivity, from conspicuous species to those that cause human disease and economic hardship. The roles played by evolution and extinction, fluxes of energy, water, biochemicals, and dispersal. Experiments demonstrating interactions of managed and unmanaged biotic with the hydrologic cycle, energy budgets, nutrient cycles, the carbon budget, and soil processes.

**GEOG 1403H. Honors: Biogeography of the Global Garden.** (4.0 cr.; A-F only; = [GEOG 1403]; prereq Honors; fall, spring, every year)
The geography of biodiversity and productivity, from conspicuous species to those that cause human disease and economic hardship. The roles played by evolution and extinction, fluxes of energy, water, biochemicals, and dispersal. Experiments demonstrating interactions of managed and unmanaged biotic with the hydrologic cycle, energy budgets, nutrient cycles, the carbon budget, and soil processes.

**GEOG 1425. Introduction to Meteorology.** (4.0 cr.; = [ESPM 1425]; prereq High school algebra; fall, spring, every year)

**GEOG 1502. Mapping Our World.** (3.0 cr.; fall, spring, every year)
Fundamental issues related to acquisition, storage, manipulation, analysis, display, and interpretation of spatially-referenced data. Emphasizes mathematical analysis of data, interpretation of cultural/physical patterns critical to development of geographical reasoning.

**GEOG 1901. Freshman Seminar.** (3.0 cr.; A-F only; prereq Fr; fall, spring, offered periodically)
Topics specified in Class Schedule.

**GEOG 1904. Freshman Seminar.** (3.0 cr.; prereq freshman; fall, every year)
Topics specified in Course Guide.

**GEOG 1905. Freshman Seminar.** (3.0 cr.; prereq Fr; fall, every year)
Topics specified in Class Schedule.

**GEOG 1906W. Freshman Seminar.** (3.0 cr.; A-F or Audit; prereq freshman; spring, every year)
Topics specified in Class Schedule.

**GEOG 1910W. Freshman Seminar.** (3.0 cr.; A-F or Audit; prereq Fr; fall, every year)
Topics specified in Class Schedule.

**GEOG 1973. Geography of the Twin Cities.** (3.0 cr.; = [GEOG 3973]; fall, spring, every year)
Social and physical characteristics of the Twin Cities. Their place in the urban network of the United States.

**GEOG 3101. Geography of the United States and Canada.** (4.0 cr.; = [GEOG 3102]; fall, spring, every year)
Analysis of the ways in which the aspirations and abilities of diverse groups of people interact with the complexities of the natural environment to produce the contemporary pluralistic cultures and regional differentiation of the United States and Canada.

**GEOG 3111. Geography of Minnesota.** (3.0 cr.; spring, summer, every year)
The evolution of Minnesota and its current geographical characteristics. The state is a unique political entity that possesses similarities with other states because of the homogenizing influence of the federal government.

**GEOG 3141. Africa.** (3.0 cr.; = [AFRO 3141]; fall, every year)
Regional differentiation of human groups and environments; culture contact and problems of underdeveloped countries south of the Sahara.

**GEOG 3145. The Islamic World.** (3.0 cr.; = [RELS 3171, GLOS 3645]; fall, every year)

**GEOG 3161. Europe: A Geographic Perspective.** (3.0 cr.; = [GLOS 3921]; fall, even years)
Comparative analysis and explanation of Europe's physical, demographic, ethnic/cultural, economic, political, and urban landscapes. European integration--the European Union. Transformation of Eastern Europe.

**GEOG 3212. Producing India.** (3.0 cr.; fall, spring, offered periodically)

**GEOG 3311. Geography of the World Economy.** (3.0 cr.; fall, spring, summer, every year)
Geographical distribution of resources affecting development; location of agriculture, industry, services; geography of communications; agglomeration of economic activities, urbanization, regional growth; international trade; changing global development inequalities; impact of globalization production and finance on the welfare of nations, regions, cities.

**GEOG 3361W. Geography and Public Policy.** (3.0 cr.; = [BSE 3361W]; fall, every year)
Nature/effects of federal policy in the United States. How documents produced as policy are crafted/implemented. Policies relating to food/agriculture, forestry, wildlife, and transportation.

**GEOG 3371V. Honors: Introduction to Urban Geography.** (4.0 cr.; prereq Honors; )
Character, distribution, development of cities in present-day world. Internal/external locational relationships.

**GEOG 3371W. Cities, Citizens, and Communities.** (4.0 cr.; fall, spring, summer, every year)
Introduction to cities and suburbs as unique crossroads of cultural, social, and political processes. Competing/conflicting visions of city life, cultural diversity, and justice. Focuses on the American city.

**GEOG 3373. Changing Form of the City.** (3.0 cr.; spring, every year)
Urban origins, ancient cultures/cities, the medieval city, rediscovery of planning, colonial cities. Industrialization and urban expansion. Speculative cities, utopian cities, planning triumphs/disasters. Cities as reflections of society, culture, the past.

**GEOG 3374V. Honors: The City in Film.** (4.0 cr.;) = [GEOG 3374W, GEOG 3374V]; prereq honors; spring, every year)
Cinematic portrayal of changes in 20th-century cities worldwide. Social/cultural conflict, political/economic processes, changing gender relationships, rural versus urban areas, population/development issues (especially as they affect women/children). Additional weekly meeting discusses films, readings. Project on a topic selected in consultation with instructor.

**GEOG 3374W. The City in Film.** (4.0 cr.; = [GEOG 5374W, GEOG 3374W]; spring, every year)
Cinematic portrayal of changes in 20th-century cities worldwide including social and cultural conflict, political and economic processes, changing gender relationships, rural versus urban areas, and population and development issues (especially as they affect women and children).

**GEOG 3376. Political Ecology of North America.** (3.0 cr.; fall, every year)
Social production of nature in North America related to questions of social/environmental justice. Economic, political, cultural, ecological relations that shape specific urban/rural environments, social movements that have
arisen in response to environmental change. Importance of culture/identity in struggles over resources/environments.

GEOG 3377. Music in the City. (3.0 cr.; A-F or Audit; spring, every year) Geographical conceptions of place, space, embodiment, identity. Case studies of music.

GEOG 3379. Environment and Development in the Third World. (3.0 cr.; A-F or Audit; =[GEOG 3303]; prereq Soph or jr or sr; spring, every year) Concepts for analyzing relations between capitalist development and environment in Third World. Historical geography of capitalist development. Case studies. Likelihood of social/environmental sustainability.

GEOG 3381W. Population in an Interacting World. (4.0 cr.; fall, spring, summer, every year) Comparative analysis and explanation of trends in fertility, mortality, internal and international migration in different parts of the world; world population problems; population policies; theories of population growth; impact of population growth on food supply and the environment.

GEOG 3388. Going Places: Geographies of Travel and Tourism. (3.0 cr.; A-F only; spring, every year) Global flows of tourism from perspective of debates about consumption, development, identity, and the environment. Close reading, field trips, discussion of films, research paper.

GEOG 3401. Geography of Environmental Systems and Global Change. (4.0 cr.; A-F or Audit; =GEOG 5401]; spring, every year) Geographic patterns, dynamics, and interactions of atmospheric, hydrospheric, geomorphic, pedologic, and biologic systems as context for human population, development, and resource use patterns.

GEOG 3401H. Honors: Geography of Environmental Systems and Global Change. (4.0 cr.; A-F or Audit; prereq Honors;) Geographic patterns, dynamics, and interactions of atmospheric, hydrospheric, geomorphic, pedologic, biologic systems as context for human population, development, resource use patterns.

GEOG 3411W. Geography of Health and Health Care. (4.0 cr.; =GEOG 5411]; fall, every year) Application of human ecology, spatial analysis, political economy, and other geographical approaches to analyze problems of health and health care. Topics include distribution and diffusion of disease; impact of environmental, demographic, and social change on health; distribution, accessibility, and utilization of health practitioners and facilities.

GEOG 3431. Plant and Animal Geography. (3.0 cr.; =GEOG 5431]; fall, spring, offered periodically) Introduction to biogeography. Focuses on patterns of plant/animal distributions at different scales over time/space. Evolutionary, ecological, and applied biogeography.

Paleobiogeography, vegetation-environment relationships, vegetation dynamics/disturbance ecology, human impact on plants/animals, nature conservation. Discussions, group/individual projects, local field trips.

GEOG 3511. Principles of Cartography. (4.0 cr.; prereq 3 cr in geog or #; spring, offered periodically) History and development of U.S. academic cartography, coordinate systems and map projections, data classification and map generalization, methods of thematic symbolization, and cartographic design. A series of computer-based lab exercises will apply conceptual lecture material to the creation of thematic maps.

GEOG 3521. Digital Planet: Understanding Your World in the Information Age. (3.0 cr.; fall, every year) Mobile geospatial information technologies— from cell phone tracking/vehicle navigation to virtual globe mapping. Potentials, limits, and concerns about their use and ongoing developments. Use GPS and video to produce a GeoDiary. Surveillance, cyberspace, and more common geospatial applications, especially those relying on mobile devices.


GEOG 3531. Numerical Spatial Analysis. (4.0 cr.; =GEOG 5531]; fall, summer, every year) Introduction to theoretical and applied aspects of geographical quantitative methods with a focus on spatial analysis. Emphasis placed on the analysis of geographical data for spatial problem solving in both the human and physical areas of the discipline.

GEOG 3561. Principles of Geographic Information Science. (4.0 cr.; prereq Jr or sr; fall, spring, every year) Introduction to study of geographic information systems (GIS) for geography and non-geography students. Topics include GIS application domains, data models and sources, analysis methods and output techniques. Lectures, readings and hands-on experience with GIS software.

GEOG 3561H. Honors: Principles of Geographic Information Science. (4.0 cr.; prereq Honors, [jr or sr]; ) Introduction to study of geographic information systems (GIS). GIS application domains, data models/sources, analysis methods, output techniques. Lectures, readings, hands-on experience with GIS software.

GEOG 3839. Introduction to Dendrochronology. (3.0 cr.; prereq [1403, [BIOL 1001 or BIOL 1009 or equiv]] or #; fall, every year) Historical development, operational techniques, biological background, and principles of tree ring analysis. Applications of tree-ring data to investigate environmental change and past cultures.

GEOG 3900. Topics in Geography. (3.0 cr. [max 9.0 cr.]; fall, spring, offered periodically) Special topics/regions covered by visiting professors in their research fields.

GEOG 3973. Geography of the Twin Cities. (3.0 cr.; =GEOG 1973]; fall, spring, every year) Social/physical characteristics of Twin Cities. Their place in U.S. urban network.

GEOG 3985V. Honors Senior Project Seminar. (4.0 cr.; prereq Honors, #; fall, spring, every year) Completion of research/writing of senior project.

GEOG 3985W. Senior Project Seminar. (4.0 cr.; prereq jr or sr, #; fall, spring, summer, every year) Complete the research/writing of senior project.

GEOG 3992. Directed Reading. (1.0-8.0 cr. [max 12.0 cr.]; fall, spring, every year) Guided individual reading. Prereq-instr consent, dept consent, college consent.

GEOG 3992H. Honors: Directed Reading. (1.0-8.0 cr. [max 12.0 cr.]; fall, spring, offered periodically) Guided individual reading. Prereq-Honors, instr consent, college consent, dept consent.

GEOG 3993. Directed Studies. (1.0-8.0 cr. [max 12.0 cr.]; fall, spring, every year) Guided individual study. Prereq-instr consent, dept consent, college consent.

GEOG 3993H. Honors: Directed Studies. (1.0-8.0 cr. [max 12.0 cr.]; spring, every year) Guided individual study. Prereq honors, instr consent, dept consent, college consent.

GEOG 3994. Directed Research. (1.0-8.0 cr. [max 12.0 cr.]; fall, spring, summer, every year) Individual guided research. Prereq instr consent, dept consent, college consensus.

GEOG 3994H. Honors: Directed Research. (1.0-8.0 cr. [max 12.0 cr.]; fall, spring, every year) Individual guided research. Prereq honors, instr consent, dept consent, college consensus.

GEOG 3995. Community Service Learning supplemental credit. (1.0-4.0 cr. [max 8.0 cr.]; prereq &3xxx or &5xxx geography course with structured community service learning component, #; fall, offered periodically) Community service learning component added to course.

GEOG 3996. Senior Project Directed Research. (3.0-4.0 cr. [max 8.0 cr.]; A-F only; =GEOG 3996H]; fall, spring, summer, every year) Individual guided research course taken in fulfillment of the senior project requirement. Prereq instr consent,dept consent,college consent.

GEOG 3996H. Honors: Senior Project Directed Research. (3.0-4.0 cr. ; A-F only;
Courses listed in this catalog are current as of December 12, 2014. For up-to-date information, visit www.catalogs.umn.edu
prereq 3561 or 5561 or FR 4131 or LA 5573 or one intro GIS course or grad student or #; spring, offered periodically)

Applications of geographic information systems and other spatial analysis tools to analysis of environmental systems patterns, dynamics, and interactions. Focuses on global to landscape databases developed to analyze atmospheric, hydrosperic, geomorphic, pedologic, biologic, and human landuse systems.

GEOG 5839. Introduction to Dendrochronology. (3.0 cr.; prereq [1403, [BIOL 1001 or BIOL 1009 or equiv]] or #; fall, every year)

Historical development, operational techniques, biological background, and principles of tree ring analysis. Applications of tree-ring data to investigate environmental change and past cultures.

Geological Engineering (GEOE)
College of Science and Engineering

GEOE 3301. Soil Mechanics I. (3.0 cr.; A-F or Audit; prereq AEM 3031, CSE student; fall, spring, every year)


GEOE 4000H. Honors Research Seminar. (1.0 cr. [max 2.0 cr.]; A-F only; [CE 4000H]; prereq Upper div CE; fall, spring, every year)

Research seminars in civil and geological engineering given by faculty members and visiting scholars.

GEOE 4011. Special Topics. (1.0-4.0 cr. [max 12.0 cr.]; A-F only; prereq Upper Div CSE; fall, spring, summer, every year)

Topics, credits vary.

GEOE 4092H. Honors Selected Reading. (1.0 cr. [max 2.0 cr.]; A-F only; [CE 4092H]; prereq Upper Div CE; fall, spring, every year)

Selected readings, student presentations.

GEOE 4094H. Senior Honors Thesis. (2.0 cr.; A-F only; [CE 4094H]; prereq Upper Div CE; fall, every year)

Writing thesis under direction of CE faculty member.

GEOE 4194H. Senior Honors Thesis. (2.0 cr.; A-F only; [CE 4194H]; prereq Upper Div CE; spring, every year)

Writing thesis under direction of CE faculty member.

GEOE 4301. Soil Mechanics II. (3.0 cr.; A-F or Audit; [CE 4301]; prereq [[3301 or CE 3301], upper div CSE] or #; fall, spring, every year)


GEOE 4311. Rock Mechanics. (4.0 cr.; A-F or Audit; prereq [[3301 or CE 3301], upper div or grad student in CSE] or #; spring, every year)


GEOE 4341. Engineering Geostatistics. (3.0 cr.; A-F or Audit; [CE 4341]; prereq GeoE, CE, or Geo upper div or grad student, Stat 3021 or #; )

Problem solving and decision making in civil and geological engineering using applied statistics. Emphasizes on spatially correlated data, e.g. geologic site characterization, and spatial sampling design.

GEOE 4351. Groundwater Mechanics. (3.0 cr.; A-F or Audit; [CE 4351]; prereq [CE 3502, [CSE upper div or grad student]] or #; fall, every year)


GEOE 4352. Groundwater Modeling. (3.0 cr.; A-F or Audit; [CE 4352]; prereq [4351, [CSE upper div or grad student]] or #; spring, offered periodically)


GEOE 5321. Geomechanics. (3.0 cr.; A-F or Audit; prereq CSE upper division or grad student, 4301, CE 4301 or #; summer, offered periodically)


GEOE 5331. Geomechanics Modeling. (3.0 cr.; A-F or Audit; prereq CSE upper division or grad student, 4301 or CE 4301; summer, offered periodically)

Soil and rock response in triaxial testing; drained and undrained behavior; elastic and plastic properties. Modeling stresses, strains, and failure in geomechanics problems.

GEOE 5341. Wave Methods for Nondestructive Testing. (4.0 cr.; A-F or Audit; prereq [AEM 2021, AEM 3031] or #; )

Introduction to contemporary methods for nondestructive characterization of objects of civil infrastructure (e.g., highways, bridges, geotechnical site). Imaging technologies based on propagation of elastic waves; ultrasonic and resonant frequency methods, seismic surveys, acoustic emission monitoring. Lecture, lab.

German (GER)
College of Liberal Arts

GER 222. Reading German. (0.0 cr.; A-F or Audit; fall, summer, every year)

Teaches only a reading knowledge of German. Enables graduate students to satisfy departmental requirements for an advanced degree. Intensive reading of German scholarly texts. Emphasizes reading, grammar, some listening, discipline-specific vocabulary.

GER 1001. Beginning German. (5.0 cr.; fall, spring, summer, every year)

Emphasis on working toward novice-intermediate low proficiency in all four language modalities (listening, reading, speaking, writing). Topics include everyday subjects (shopping, directions, family, food, housing, etc.).

GER 1002. Beginning German. (5.0 cr.; prereq 1001; fall, spring, summer, every year)

Listening, reading, speaking, writing. Emphasizes proficiency. Topics include free-time activities, careers, and culture of German-speaking areas.

GER 1003. Intermediate German. (5.0 cr.; prereq 1002 or Entrance Proficiency Test; fall, spring, every year)


GER 1004. Intermediate German. (5.0 cr.; prereq 1003 or completion of Entrance Proficiency Test at 1004 level; fall, spring, every year)


GER 1022. Beginning German Review. (5.0 cr.; prereq Placement above 1001; fall, spring, every year)

Intended for students with previous experience in German, primarily those who have studied German in high school or at community colleges, or who are transfer students. Intensive review of all four language modalities
GER 1601. Fleeing Hitler: German and Austrian Filmmakers Between Europe and Hollywood. (3.0 cr.); = [GER 1601H, JWST 3601]; fall, odd years
German/American films by famous directors who left Europe in Nazi period. Analysis of films by Fritz Lang, Max Ophuls, Robert Siodmak, Otto Preminger, Billy Wilder, Douglas Sirk, and others. Films as art works and as cultural products of particular social, political, and historical moments.

GER 1900. Freshman Seminar. (3.0 cr.; max 6.0 cr.); A-F or Audit; prereq Fr; fall, spring, offered periodically
Topics specified in Class Schedule.

GER 1905. Freshman Seminar. (3.0 cr.; max 6.0 cr.); A-F or Audit; prereq Fr; fall, offered periodically
Topics specified in Class Schedule.

GER 1905H. Honors Freshman Seminar. (3.0 cr.; prereq Fr or fewer than 30 cr; fall, every year)
Topics specified in Class Schedule.

GER 1909W. Freshman Seminar. (3.0 cr.; A-F or Audit; prereq freshman; fall, spring, offered periodically)
Topics specified in Class Schedule.

GER 1910. Freshman Seminar. (3.0 cr.; = [GER 1601H, JWST 3601]; prereq no knowledge of German required; cr toward major or minor requires reading in German; fall, spring, offered periodically)
An introduction to the study of German cinema, with a focus on the relation between German film and German history, literature, culture, and politics.

GER 3010. Topics in German Studies. (3.0 cr.; = [CSCL 3631, JWST 3631]; prereq no knowledge of German required; cr toward major or minor requires reading in German; fall, spring, offered periodically)
Literary/cultural modes of writing used by Jewish writers in Germany, Austria, and America to deal with problems of identity, anti-Semitism, and assimilation. Focus on 20th century. All readings (novels, poetry, stories) in English.

GER 3011. Conversation and Composition. (4.0 cr.; prereq 1004; fall, spring, summer, every year)
Achieving proficiency in professional or academic German. Refinement of oral/written expression. Review of important communicative modes of language. Wide range of topics to develop advanced level of proficiency.

GER 3011W. Conversation and Composition. (3.0 cr.; prereq 3011; fall, spring, offered periodically)
Prepares students for upper-level language and content courses in German. Continues the same focus and approach as 3011 with the addition of a larger reading component.

GER 3014. German Media. (3.0 cr.; prereq 3011; spring, every year)

GER 3016. Techniques of Translation. (3.0 cr.; prereq 3011; spring, offered periodically)
Theory/practice of translation from/to German in various genres. Idiomatics, stylistics, and cross-cultural aspects of translation.

GER 3021. Business German. (3.0 cr.; prereq 3011 or equiv; fall, spring, offered periodically)
German economy, business culture. Practice of language used in business. Reading/discussion of German business documents. Preparation of formal letters and reports.

GER 3104W. Reading and Analysis of German Literature. (3.0 cr.; prereq 3011; fall, spring, summer, every year)
Introduction to literary analysis. Readings from drama, prose, and lyric poetry, from 18th century to present.

GER 3410. German Literature Before 1750. (3.0 cr.; max 9.0 cr.; prereq 3011; fall, spring, offered periodically)
Representative literary texts of German High Middle Ages, Renaissance, Reformation, and the Baroque, in cultural/historical context. Readings in modern German translation or English.

GER 3421. 18th-Century German Literature. (3.0 cr.; prereq 3011; fall, spring, offered periodically)
German literature, 1720-1810, Enlightenment/Weimar classicism in historical/cultural context. Reading/discussion of literary/philosophical works, aesthetic criticism.

GER 3431. 19th-Century Literature. (3.0 cr.; prereq 3011; fall, offered periodically)
Literary/cultural exploration of 19th-century German literature through an investigation of romanticism, realism, and naturalism. Reading/discussion of literary/critical texts.

GER 3441. 20th-Century Literature. (3.0 cr.; prereq 3011; fall, offered periodically)
German literature, from 1890 to present, in historical, political, social, and cultural context.

GER 3501. Contemporary Germany. (3.0 cr.; prereq 3011; fall, spring, offered periodically)
Social, political, and cultural developments in Germany, from 1945 to present.

GER 3510. Topics in German Studies. (3.0 cr.; max 9.0 cr.; prereq 3011; spring, every year)
One topic in depth dealing with culture or civilization of German-speaking countries.

GER 3520. Topics in Austrian and Central European Culture. (3.0 cr.; max 9.0 cr.; prereq 3011; fall, spring, offered periodically)
Cultural, political, and economy in Austria and Central Europe. Comparative analysis of cultural/political developments. Topics vary.

GER 3531. Selected Readings in German Intellectual History. (3.0 cr.; prereq 3011; fall, spring, offered periodically)
Philosophical writings on culture, history, and art. Authors include Lessing, Schiller, Kant, Hegel, Marx, Nietzsche, and Freud.

GER 3593. Directed Studies: German-Speaking Countries. (4.0 cr.; max 12.0 cr.; prereq 3011, %; fall, spring, every year)
Preparation for research abroad during semester before departure. Written/oral reports upon return.

GER 3601. German Medieval Literature. (3.0 cr.; prereq knowledge of German required; fall, spring, odd years)
Literary investigation of the greatest works of medieval German poetry. Readings in English. Majors will be required to write a paper with use of secondary sources in English and German.

GER 3604W. Introduction to German Cinema. (3.0 cr.; fall, spring, even years)
An introduction to the study of German cinema, with a focus on the relation between German film and German history, literature, culture, and politics.

GER 3610. German Literature in Translation. (3.0 cr.; max 9.0 cr.; prereq no knowledge of German required; cr toward major or minor requires reading in German; fall, spring, offered periodically)
In-depth study of authors or topics from various periods in German literature.

GER 3631. Jewish Writers and Rebels in German, Austrian, and American Culture. (3.0 cr.; = [CSCL 3631, JWST 3631]; prereq no knowledge of German required; cr toward major or minor requires reading in German; fall, offered periodically)
Literary/cultural modes of writing used by Jewish writers in Germany, Austria, and America to deal with problems of identity, anti-Semitism, and assimilation. Focus on 20th century. All readings (novels, poetry, stories) in English.

GER 3641. German Folklore. (3.0 cr.; prereq no knowledge of German required; cr for major or minor by arrangement with instructor; fall, spring, even years)
Literary and cultural investigation of the main folklore genres: charms, legends, folktales, and ballads; their composition, origin, and role in society with a strong emphasis on their international character. Readings in English. Majors required to write a paper with use of secondary sources in English and German.

GER 3651. Thinking Environment: Green Culture, German Literature and Global Debates. (3.0 cr.; fall, spring, odd years)
How environmental thinking became social-political force through German literature/culture, with comparisons to global or U.S. developments. Authors include Goethe, Christa Wolf, Enzensberger.

GER 3701. History of the German Language. (3.0 cr.; prereq 1004; change in grammar and lexicon, 750 A.D. to present.

GER 3702. Beginning Middle High German. (3.0 cr.; prereq 1004; Middle High German grammar. Selected literary texts.

GER 3704. German Dialects. (3.0 cr.; prereq 1004; Contemporary regional dialects recorded on tape and written in texts. Synchronic and diachronic analysis.

GER 3993. Directed Studies. (1.0-4.0 cr.; max 12.0 cr.; fall, spring, summer, every year)
Guided individual reading or study. Prereq instr consent, dept consent, college consent.

GER 4001. Beginning German. (2.0 cr.; prereq Grad student; fall, spring, summer, every year)
Meets concurrently with 1001. See 1001 for course description.

GER 4002. Beginning German. (2.0 cr.; prereq Grad student; fall, spring, summer, every year) Meets concurrently with 1002; see Ger 1002 for course description.

GER 4003. Intermediate German. (2.0 cr.; prereq Grad student; fall, spring, summer, every year) Meets concurrently with 1003. See 1003 for course description.

GER 4004. Intermediate German. (2.0 cr.; prereq Grad student; fall, spring, summer, every year) Meets concurrently with 1004. See 1004 for course description.

GER 4040. German Play: Oral Interpretation and Performance of German. (1.0-3.0 cr. [max 9.0 cr.]; fall, spring, offered periodically) Dramatic reading of German play for pronunciation; preparation and rehearsal for production and performance of German play.

GER 5011. Advanced Conversation and Composition. (3.0 cr.; prereq 3012, [grad student or adv undergrad]; fall, odd years) Achieving high proficiency in writing/speaking professional/academic German.

GER 5510. Topics in Contemporary German Culture. (3.0 cr. [max 9.0 cr.]; prereq 3011; fall, spring, offered periodically) A topic of contemporary German culture explored in depth.

GER 5610. German Literature in Translation. (3.0 cr. [max 9.0 cr.]; prereq No knowledge of German required; cr toward major or minor requires reading in German; fall, spring, offered periodically) Study in depth of authors or topics from various periods in German literature. Requires no knowledge of German.

GER 5630. Topics in German Cinema. (3.0 cr. [max 9.0 cr.]; prereq 3xxx film course or #; spring, offered periodically) Topics chosen may focus on specific directors, genres, film production or reception, and/or other formal, theoretical, historical, or political issues.

GER 5711. History of the German Language I. (3.0 cr.; prereq 3011; fall, even years) Historical development of German, from beginnings to 1450.

GER 5712. History of the German Language II. (3.0 cr.; prereq 5711; spring, even years) Historical development of German from 1450 to 2000.

GER 5721. Introduction to Middle High German. (3.0 cr.; fall, odd years) Introduction to Middle High German language and literature. Study of grammar through formal description of Middle High German phonology, morphology, and syntax. Normalized MHG texts read.

GER 5722. Middle High German: Advanced Readings. (3.0 cr.; prereq 5721; spring, odd years) Acquisition of fluency in reading Middle High German normalized as well as non-normalized texts, both poetry and prose.

GER 5734. Old Saxon. (3.0 cr.; fall, offered periodically) Study of the poetry of Old Saxon. Detailed investigation of Old Saxon in comparison with the other Old Germanic languages.

GER 5740. Topics in Germanic Medieval Studies. (3.0 cr. [max 9.0 cr.]; spring, offered periodically) Topics specified in Class Schedule.

GER 5993. Directed Studies. (1.0-4.0 cr. [max 12.0 cr.]; fall, spring, summer, every year) Guided individual reading or study. Prereg insr consent, dept consent, college consent.

GERMAN, SCANDINAVIAN, AND DUTCH (GSD) College of Liberal Arts

GSD 3451V. Honors Major Project Seminar. (3.0 cr.; A-F or Audit; =[GSD 3451W]; prereq Honors student; fall, every year) Major project under supervision of faculty member. Oral exam based on project.

GSD 3451W. Major Project Seminar. (3.0 cr.; A-F or Audit; =GSD 3451V; fall, every year) Students prepare major project under supervision of faculty member.

GSD 3511W. Vikings, Knights, and Reformers: German and European Culture and Controversies to 1700. (3.0 cr.; fall, every year) Survey of representative cultural-historical events in Europe (German-speaking countries, Scandinavian, the Netherlands) from early Germanic times to 1700.

GSD 3512W. Imagined Communities: German and European Culture and Controversies, 1700 to Present. (3.0 cr.; spring, every year) Survey of representative cultural-historical events in Europe (German-speaking countries, Scandinavian, the Netherlands) from 1700 to present.

GSD 5103. Teaching of Germanic Languages. (3.0 cr.; fall, every year) Second language acquisition theory, methods, testing, and technology applicable to teaching of modern Germanic languages.

GERONTOLOGY (GERO) School of Public Health

GER 5100. Topics in Gerontology. (0.5-4.0 cr. [max 10.0 cr.]; fall, spring, summer, offered periodically) Timely topics related to the biology, sociology, and psychology of aging and applied aging services.

GER 5101. Milestones in the Biology of Aging. (1.0 cr.; prereq NIA training grant Functional Proteomics of Aging [grad student or postdoc fellow] or biology research grad student, #; spring, every year) Biological research in aging. Original literature, including seminal, historical background papers. Progress in field of biogerontology research.


GERO 5110. Biology of Aging. (3.0 cr.; spring, every year) Biological changes that occur with aging. Methods for studying aging, descriptions of population aging, theorey on how/why we age. Process of aging in each body system, variation between individuals/populations. Clinical implications of biological changes with age. Guest lecturers from different disciplines.

GERO 5111. Studying Aging and Chronic Illness. (2.0 cr.; prereq Introductory course in epidemiology or #; fall, every year) Methodological issues unique to studies of older populations. Focuses on measurement of epidemiological characteristics. Health conditions/disorders of older Americans.

GERO 5115. Introduction to Geriatrics. (2.0 cr.; S-N only; fall, spring, summer, every year) Online course. Major topics in geriatrics. How to diagnose/treat conditions common in caring for older people.

GERO 5125. Gerontology Service Learning. (3.0 cr.; fall, spring, summer, every year) At least 100 hours of service to seniors or organizations serving seniors required. Longitudinal one-on-one relationship with at least two seniors. Service activities may include: friendly visiting, escorting seniors to medical appointments, chore services, teaching health education to groups of seniors and staff, participating in social or recreational activities with seniors, assisting with immunization and screening programs, assisting seniors with selection of health plans, or providing volunteer home health aide or nursing assistant services or emergency non-medical response under the supervision of a nurse. Students may use up to 25 percent of their service time for project that benefits the campus as a whole. Reading, monthly class discussions, a term paper and weekly self-reflection.

GERO 5191. Independent Study: Gerontology. (1.0-4.0 cr. [max 16.0 cr.]; Student Option No Audit; prereq Approval of [advisor, DGS] for gerontology minor; fall, spring, summer, offered periodically) Independent study: gerontology.

GLOBAL STUDIES (GLOS) College of Liberal Arts

GLOS 1015W. Globalization: Issues and Challenges. (4.0 cr.; [HIST 1015W, HIST 1019, GLOS 1015V, HIST 1015V]; fall, spring, every year)
Increased global interconnections over past 50 years. Impact of information revolution on human rights, economic inequality, ecological challenges, and decolonization. Comparative cases from Asia, Africa, Latin America, or Middle East.

GLOS 1112. Globalization and Social Justice. (3.0 cr.; A-F only; fall, offered periodically) How and why did the term "globalization" become commonplace, what it describes. Uses questions of social justice to explore portrayals of globalization in popular media and culture.

GLOS 1660. Topics in Global Studies. (3.0 cr.; [max 9.0 cr.]; spring, offered periodically) Topics vary every semester. See Class Schedule.


GLOS 1902. Freshman Seminar. (3.0 cr.; A-F or Audit; prereq freshman; fall, odd years) Topics specified in Class Schedule.

GLOS 1904. Freshman Seminar. (3.0 cr.; A-F or Audit; prereq freshman; spring, every year) Topics specified in Class Schedule.

GLOS 1905. Freshman Seminar. (3.0 cr.; A-F or Audit; prereq freshman; fall, spring, offered periodically) Topics specified in Class Schedule.

GLOS 1909W. Topics: Freshman Seminar. (3.0 cr.; A-F or Audit; prereq Fr; fall, spring, offered periodically) Topics specified in Class Schedule.

GLOS 1910W. Topics: Freshman Seminar. (3.0 cr. [max 6.0 cr.]; A-F or Audit; prereq Fr; fall, spring, offered periodically) Topics specified in Class Schedule.

GLOS 3143. Living in the Global. (3.0 cr.; A-F only; fall, spring, every year) Contemporary condition of global connectedness. Ways our habits, tastes, and experiences involve a stream of encounters with the global. Terrains of interconnection, including tourism, music, the Internet, and mass culture.

GLOS 3144. Knowledge, Power, and the Politics of Representation in Global Studies. (4.0 cr.; [=GLOS 3144H]; prereq 6 cr. of approved preparatory coursework [recommended GLOS 1015W or 1112]; fall, every year) Introduction to theoretical issues. Power/production of knowledge about world regions. Knowledge, power, politics in contemporary world. Colonialism, nationalism, modernity in shaping academic disciplines.

GLOS 3144H. Honors: Knowledge, Power, and the Politics of Representation in Global Studies. (4.0 cr.; A-F only; [=GLOS 3144]; prereq 6 cr. of approved preparatory coursework (recommended GLOS 1015W or GLOS 1112), Honors; fall, every year) Introduction to theoretical issues. Power, production of knowledge about world regions. Knowledge, power, politics in contemporary world. Colonialism, nationalism, modernity in shaping academic disciplines.

GLOS 3145. Theoretical Approaches to Global Studies. (4.0 cr.; A-F or Audit; [=GLOS 3145H]; prereq 6 cr in social sciences including 1015W or GEOG 1301 or HIST 1012 or HIST 1018 or POL 1025 or #; spring, every year) Social, political, economic, cultural, historical processes shaping contemporary global phenomena. Topics may include nationalism, colonialism, cultural production, environmental sustainability, globalization of economy, migration/diasporas, global conflict/cooperation.

GLOS 3145H. Theoretical Approaches to Global Studies. (4.0 cr.; A-F or Audit; [=GLOS 3145]; prereq [6 cr in social sciences including at least one of the following [1015W or GEOG 1301 or HIST 1012 or HIST 1018 or POL 1025], Honors student] or #; fall, spring, every year) Theoretically informed introduction to social, political, economic, cultural, historical processes shaping global phenomena. Topics may include nationalism, colonialism, cultural production, environmental sustainability, globalization of economy, migration/diasporas, global conflict/cooperation.


GLOS 3278. Tigers and Dragons: The Rise of the East Asian Economies, 1930-Present. (3.0 cr.; [=HIST 5478; HIST 3478]; spring, even years) Rise of East Asian Economies, 1930-Present.


GLOS 3302. Debating "Development": Contested Visions. (3.0 cr.; A-F or Audit; prereq [3101, 3144] or #) Radical critiques of idea/practice of development? Debates over development. Vocabularies (Marxist, feminist, poststructuralist, ecological) that drive the debates.

GLOS 3303. Environment and Development in the Third World. (3.0 cr.; A-F or Audit; [=GEOG 3379]; prereq Soph or jr or sr; spring, every year) Concepts for analyzing relations between capitalist development and environment in Third World. Historical geography of capitalist development. Case studies. Likelihood of social/environmental sustainability.

GLOS 3350. Life for Sale: Global Debates on Environment, Science, and Society. (3.0 cr.; A-F only; prereq At least soph; spring, even years) Biopiracy, vaccine trials, use/abuse of genetics, genetically modified organisms. Who determines direction of scientific/medical research. Impact on social thinking/practices and on globalization of science. Global economies of science.


GLOS 3401. International Human Rights Law. (3.0 cr.; A-F or Audit; prereq [3101, 3144] or #; ) Issues, procedures, advocacy strategies regarding promotion/protection of international human rights. Students analyze recent cases and conduct independent research on human rights violations in light of evolving laws, enforcement mechanisms.


GLOS 3422. 20th-Century Europe From the End of World War II to the End of the Cold War: 1945-91. (3.0 cr.; [=HIST 3722]; fall, spring, summer, every year) Social, economic, political, and cultural impacts of WWII. Division of Europe, communist regimes in Eastern Europe, cooperation in Western Europe, impacts of modernization. End of Cold War.

GLOS 3550V. Honors Course: Supervised Research Paper. (4.0 cr.; A-F only; prereq %; fall, spring, every year)
Supervised research paper.

GLOS 3602. Other Worlds: Globalization and Culture. (3.0 cr.; A-F or Audit; prereq [3101, 3144] or #: fall, spring, every year) Globalization produces complex, sometimes volatile, local responses. Course explores interconnectedness of the world, considering not one world, but many. Topics include colonialism, consumption, diasporic conditions, global media, nationalism, supra-national governance. Examines how globality is experienced and contested locally and specifically.


GLOS 3613V. Honors: Stuffed and Starved: The Politics of Eating. (3.0 cr.; A-F only; =—[GLOS 3613W, SOC 3613V, SOC 3613W]; fall, every year) Food issues from sociological perspective. Cross-cultural differences in how groups/societies think about/relate to food.

GLOS 3613W. Stuffed and Starved: The Politics of Eating. (3.0 cr.; A-F only; =—[GLOS 3613V, SOC 3613W, GLOS 3613V]; fall, every year) Food issues from a sociological perspective. Cross-cultural differences in how groups/ societies think about and relate to food.

GLOS 3620. Foreign Language News Coverage of International Events. (1.0 cr.; prereq Completion of college language requirement in language used for course; fall, offered periodically) Compares coverage of current news in selected foreign language newspapers with coverage in a U.S. paper such as The New York Times.

GLOS 3643. Islam and the West. (3.0 cr.; =—[CAS 3533, HIST 3546, RELS 3714]; ) Cultural/intellectual trends that have defined fundamental differences between Islam and the West. Development of historical, philosophical, and intellectual mindset of both spheres. Factors that have contributed and continue to contribute to tension, anxiety, and hatred between the Muslim world and Europe and the United States.


GLOS 3681. Gender and the Family in the Islamic World. (3.0 cr.; A-F only; =—[SOC 3681, RELS 3716; GWS 3681]; prereq At least soph; SOC 1001 recommended; spring, offered periodically) Experiences of Muslim women/families from historical/comparative perspective. Gender/family power relations in colonial representations, sexual politics, family, education/health, paid work, human rights, and Islamic feminism.

GLOS 3701W. Population in an Interacting World. (4.0 cr.; fall, spring, summer, every year) Comparative analysis/explanation of trends in fertility, mortality, internal and international migration in different parts of the world; world population problems; population policies; theories of population growth; impact of population growth on food supply and the environment.

GLOS 3705. Transnational Migration. (3.0 cr.; =—[SOC 3505]; prereq Soph, jr, or sr; fall, spring, even years) Current debates on transnationalism. Globalization.

GLOS 3900. Topics in Global Studies. (1.0-5.0 cr. [max 15.0 cr.]; fall, spring, every year) Topics vary each semester. See Class Schedule.

GLOS 3910. Topics in East Asian Studies. (1.0-3.0 cr. [max 6.0 cr.]; fall, spring, offered periodically) Selected topics in East Asian Studies not covered in regular courses. Topics reflect instructor interests.

GLOS 3920. Topics in European Studies. (3.0 cr. [max 9.0 cr.]; fall, spring, every year) Topics vary. See Class Schedule.

GLOS 3921. Europe: A Geographic Perspective. (3.0 cr.; =—[GEOG 3161]; fall, offered periodically) Comparative analysis/explanation of Europe's physical, demographic, ethnic/cultural, economic, political, and urban landscapes. European integration: European Union, transformation of Eastern Europe.

GLOS 3930. Topics in Latin American Studies. (3.0 cr. [max 9.0 cr.]; fall, spring, summer, every year) Topics vary. See Class Schedule.

GLOS 3934. Women and Gender in Latin American History. (3.0 cr.; =—[GWS 3413, HIST 3424]; spring, even years) Changing gender norms in Latin America as compared with lives of women/men of diverse classes/ethnic groups. How women responded to their position in society, on continuum from accommodation to resistance.

GLOS 3940. Topics in Middle Eastern Studies. (4.0 cr. [max 12.0 cr.]; fall, spring, every year) Description varies with topic title.


GLOS 3950. Topics in Russian Area Studies. (3.0 cr.; ) Description varies with topic title.

GLOS 3960. Topics in South Asian Studies. (3.0 cr.; fall, spring, offered periodically) Topics vary. See Class Schedule.

GLOS 3961. Culture and Society of India. (3.0 cr.; =—[ANTH 3023, ALL 3676]; spring, odd years) Contemporary society and culture in South Asia from an anthropological perspective with reference to nationalism; postcolonial identities; media and public culture; gender, kinship and politics; religion; ethnicity; and the Indian diaspora.

GLOS 3969. 20th Century India. (3.0 cr.; A-F or Audit; =—[HIST 3489]; spring, offered periodically) India under British hegemony in 1914 through Mahatma Gandhi/nationalist movement. World War II. British departure, creation of India/Pakistan. Nehru, Indira, Rajiv Gandhi.

GLOS 3970. Topics in African Area Studies. (3.0 cr. [max 9.0 cr.]; fall, spring, offered periodically) Topics vary. See Class Schedule.

GLOS 3981W. Major Project Seminar. (3.0 cr.; A-F or Audit; prereq %; fall, spring, summer, every year) Students formulate research questions, select topic, and develop/produce 25-30 page paper.

GLOS 3993. Directed Study. (1.0-5.0 cr. [max 12.0 cr.]; fall, spring, summer, every year) Guided individual reading or study. Prereq instr consent, dept consent, college consent.

GLOS 4104. Crime and Human Rights. (3.0 cr.; =—[SOC 4104H, GLOS 4104H, SOC 4104]; prereq SOC 1001, at least one 3xxx SOC or GLOS course recommended; fall, spring, offered periodically) Serious violations of humanitarian/human rights law. Criminalization. Impact of interventions on memories/future of cycles of violence. Case studies on Holocaust, Balkan wars, Darfur, My Lai massacre, etc. Criminal justice, truth commissions, vetting, compensation programs.

GLOS 4104H. Honors: Crime & Human Rights. (3.0 cr.; A-F only; =—[SOC 4104H, GLOS 4104, SOC 4104]; prereq At least one
GLOS 4221. Globalize This! Understanding Globalization Through Sociology. (3.0 cr.; A-F or Audit; [SOC 4321]; fall, offered periodically) Globalization of organizations, political relations, and culture. Dependency, world systems theories. Growth of international nongovernmental organizations, their impact on state policies and civil society. Expansion of international norms. Globalization of popular culture.


GLOS 4311. Race, Class, and the Politics of Nature. (3.0 cr.; A-F only; [SOC 4311]; spring, offered periodically) Global debates over how nature is produced, consumed, degraded, sustained, and defended. Analytics of race/class. Politics of North-South relations.

GLOS 4344. Europe and its Margins. (3.0 cr.; A-F only; [ANTH 4344]; prereq One course in [ANTH or GLOS]; fall, every year) Europe and its margins, an anthropological/ethnic/narrative perspective. Key topics in the study of Europe and European Societies. Ethnography, fiction, film.

GLOS 4406. Sociology of International Law. (3.0 cr.; A-F or Audit; [SOC 4170]; prereq SOC 1001 or SOC 3101 or SOC 3102 or SOC 3111 or #; spring, every year) Cultural values/practices in a globalized world. Role of international law. Immigration, terrorism, Americanization, structure of international legal system.

GLOS 4900H. Honors: Senior Seminar in Global Studies. (3.0 cr.; A-F or Audit; [GLOS 4900H]; prereq [3144 or 3145 or global studies major] or #; fall, spring, offered periodically) Globalization, nationalism, colonialism, cultural production, environmental sustainability, globalization of economy, migration, diasporas, global conflict/cooperation, human rights. Students examine theoretical debates and cutting edge scholarship and develop their own research projects. Capstone course.

GLOS 4910. Topics in Global Studies. (1.0-4.0 cr. [max 12.0 cr.]; fall, spring, every year) Topics vary every semester. See Class Schedule.

GLOS 4960. Advanced Topics in South Asian Studies. (3.0 cr.; prereq Jr or sr or grad or #;) Topics vary. See Class Schedule.

GLOS 5301. Environment & Empire. (3.0 cr.; A-F or Audit; [GLOS 3101, 3144] or #;) Key issues in environmental history. Emphasizes global/colonial processes that have made modern environment. Global spread of diseases, modern remaking of world's flora/fauna, idea of nature. New technologies and the environment. Conservationist ideology.


GLOS 5602. Other Worlds: Globality and Culture. (3.0 cr.; A-F or Audit; prereq [3101, 3144, grad student] or #) Interconnectedness of world. Considering not one world, but many. Colonialism, consumption, diasporic conditions, global media, nationalism, supra-national governance. How globalization is experienced/contested locally/specifically.

GLOS 5900. Topics in Global Studies. (1.0-4.0 cr. [max 12.0 cr.]; prereq Jr or sr or grad student; fall, spring, summer, every year) Proseminar. Selected issues in global studies. Topics specified in Class Schedule.

GLOS 5910. Topics in East Asian Studies. (1.0-3.0 cr.; fall, spring, offered periodically) Description varies with topic title.

GLOS 5920. Topics in European Studies. (3.0 cr.;) Description varies with topic title.

GLOS 5930. Topics in Latin American Studies. (3.0 cr.; fall, spring, offered periodically) Description varies with topic title.

GLOS 5940. Topics in Middle Eastern Studies. (3.0 cr.;) Description varies with topic title.

GLOS 5950. Topics in Russian Area Studies. (3.0 cr.;) Description varies with topic title.

GLOS 5960. Topics in South Asian Studies. (3.0 cr. [max 4.0 cr.]; fall, spring, every year) Description varies with topic title.

GLOS 5993. Directed Studies. (1.0-4.0 cr. [max 12.0 cr.]; prereq #; fall, spring, every year) Guided individual reading or study. Open to qualified students for one or more semesters.

GLOS 5994. Directed Research. (1.0-4.0 cr. [max 12.0 cr.]; fall, spring, every year) Qualified students work on a tutorial basis. Prereq instr consent, dept consent, college consent.

Graduate School (GRAD)
Graduate School

GRAD 999. Graduate School Active Status. (0.0 cr.; No Grade Associated; prereq Grad student; fall, spring, summer, every year) Graduate School active status.

GRAD 5102. Preparation for University Teaching for Nonnative English Speakers. (2.0 cr.; S-N only; prereq English Language Proficiency Rating of 4, current or anticipated TA assignment; #; fall, spring, every year) Theory/practice of teaching in higher education in the United States. Emphasizes awareness of cross-cultural communication issues. Students practice in a simulated instructional setting.

GRAD 5105. Practicum in University Teaching for Nonnative English Speakers. (2.0 cr.; S-N or Audit; prereq [5102 or English Language Proficiency Rating of 2 or 3], current or anticipated TA assignment; fall, spring, every year) Theory, advanced practice in teaching in higher education for nonnative speakers of English. Emphasizes interactive teaching strategies, oral presentation skills, legal/policy issues.

Graphic Design (GDES)
College of Design

GDES 1311. Foundations: Drawing and Design in Two and Three Dimensions. (4.0 cr.; A-F or Audit; prereq [Apparel design or graphic design or interior design] pre-major; fall, spring, every year) Design elements/principles in context of observational drawing. Integrative approach to two-dimensional design, three-dimensional design, and drawing. Broad conceptual framework for design exploration. Emphasizes perceptual aspects of visual forms.

GDES 1312. Foundations: Color and Design in Two and Three Dimensions. (4.0 cr.; A-F or Audit; prereq [Apparel design or graphic design or interior design] pre-major; fall, spring, every year) Color theory, its application in two/three-dimensional design. Emphasizes effective use of color by studying traditional color systems, perception, and interaction. Lectures, demonstrations, extensive studio work, critiques.

GDES 1315. Foundations: The Graphic Studio. (4.0 cr.; A-F or Audit; prereq Graphic design premajor design minor or #; fall, spring, every year) Graphic design process of problem-solving. Visual communication of ideas and information.
Use of design software to compose with words, images, and forms.

**GDES 2196. Work Experience in Graphic Design.** (1.0-4.0 cr. [max 8.0 cr.]; S-N only; prereq Plan submitted/approved by [adviser, internship supervisor], written approval of supervisor, #; fall, spring, summer, every year) Supervised work experience in business, industry, or government, related to student's area of study. Integrative paper or project.

**GDES 2342. Web Design.** (3.0 cr.; A-F or Audit; prereq 1311, 1312, 1315, [[GDES major or pre-major], semester of portfolio review] or design minor); fall, spring, every year) Design graphic elements/principles applied to website design. HTML, CSS. Working with interactive media and file formats.

**GDES 2345. Typography.** (4.0 cr.; A-F or Audit; prereq 1311, 1312, 1315, DES 1101, [graphic design major or premajor or design minor]; fall, spring, every year) History of typographic forms, principles of composition, expressive potential of type. Design process from problem-solving through exploration, experimentation, selection, critique, and refinement. Readings, research, exercises, design production.

**GDES 2350. Design Material Topics.** (1.0-4.0 cr. [max 8.0 cr.]; A-F or Audit; spring, every year) Letterpress, screen, and relief printing, or bookmaking. Defined but varying range of media expression. Graphic design communication through group/individualized projects in a cohort and under supervision of faculty.

**GDES 2361. Design Process: Photography.** (3.0 cr.; A-F or Audit; prereq [1311 or DHA 1311], [1312 or DHA 1312], [graphic design major or grad student or design minor or #]; fall, spring, every year) History of typographic forms, principles of composition, expressive potential of type. Design process from problem-solving through exploration, experimentation, selection, critique, and refinement. Readings, research, exercises, design production.


**GDES 3100. Topics in Graphic Design.** (1.0-4.0 cr. [max 30.0 cr.]; A-F or Audit; fall, spring, every year) In-depth investigation of specific topic.

**GDES 3196. Field Study: National or International.** (1.0-4.0 cr. [max 10.0 cr.]; A-F or Audit; fall, spring, summer, every year) Faculty-directed field study in national or international setting.

**GDES 3311. Illustration.** (3.0 cr.; A-F only; prereq GDES 1311 or ArtS 1101 or PDES 3702 or LA 1301 or Arch 3250 or Arch 2301 or instructor permission; spring, every year) Two aspects of illustration for contemporary graphic designer. Image making, by hand or digitally, for use in design projects. Design development. Mapping ideas/expressing thoughts visually. Not observational drawing course.

**GDES 3312. Color and Form in Surface Design.** (4.0 cr.; A-F or Audit; prereq [1311 or DHA 1311], [1312 or DHA 1312], [graphic design major or apparel design or design minor or #]; fall, spring, every year) Use of color/form representation in two-dimensional surface applications. Historical use of color and of spatial representation in visual communication.

**GDES 3351. Text and Image.** (3.0 cr.; A-F or Audit; prereq [2345 or DHA 2345], graphic design major, pass portfolio review; fall, spring, every year) Composition of visual information using grid structures to integrate text/image. Informational/expressive aspects of graphic design, hierarchical relationships of visual elements. Methods of text layout that enhance communication.

**GDES 3352. Identity and Symbols.** (3.0 cr.; A-F or Audit; prereq [2345 or DHA 2345], graphic design major, pass portfolio review; fall, spring, every year) Representation of abstract ideas through symbols. Development of visual identity systems.

**GDES 3353. Packaging and Display.** (3.0 cr.; A-F or Audit; prereq [2345 or DHA 2345], graphic design major, pass portfolio review; fall, spring, every year) Application of graphic design principles to three-dimensional projects. Principles of three-dimensional design/space applied to labeling, packaging, and display.

**GDES 4131W. History of Graphic Design.** (4.0 cr.; A-F or Audit; prereq Intro history or art history course; fall, spring, every year) Historical analysis of visual communication. Technological, cultural, and aesthetic influences. How historical events are communicated/perceived through graphic presentation/imagery.

**GDES 4160H. Honors Capstone Project.** (2.0 cr. [max 4.0 cr.]; A-F only; prereq Graphic design honors; fall, spring, every year) Individualizes honors experience by connecting aspects of major program with special academic interests.

**GDES 4193. Directed Study in Graphic Design.** (1.0-4.0 cr. [max 8.0 cr.]; A-F or Audit; prereq Undergrad; #; fall, spring, summer, every year) Independent study in Graphic Design under tutorial guidance.

**GDES 4196. Internship in Graphic Design.** (1.0-3.0 cr.; S-N or Audit; =ADES 4196, HSG 4196; prereq Completion of at least one-half of professional sequence, plan submitted/approved in advance by [adviser, internship supervisor], written consent of faculty supervisor; #; fall, spring, summer, every year) Supervised work experience relating activity in business, industry, or government to the student's area of study. Integrative paper or project may be required.

**GDES 4330. Surface Fabric Design Workshop.** (4.0 cr. [max 8.0 cr.]; A-F or Audit; spring, every year) Studio experience in the development and production of surface design. Screen printing, batik, resist dying, shibori, cyanotypes, and dye transfers are included.

**GDES 4343. Data Visualization I: Mapping Information.** (3.0 cr.; A-F only; prereq 2345, 3351, [Design minors required to take 2345]; fall, every year) Visual articulation of data. Expansive research, meticulous gathering of data, analysis. Develop cohesive graphical narratives/build solid foundation in craft of presenting data.

**GDES 4345. Advanced Typography.** (4.0 cr.; A-F or Audit; prereq [2345 or DHA 2345], 3351, [graphic design major or grad student or design grad student or #; fall, spring, summer, every year] Expressive visual communication of words. Fundamental legibility of "invisible art," overt expression through type. Students complete extended typographic project.

**GDES 4350. Advanced Design Material Topics.** (1.0-4.0 cr. [max 8.0 cr.]; A-F or Audit; spring, every year) Letterpress, screen, and relief printing, or bookmaking. Defined but varying range of media expression. Graphic design communication through group/individualized projects in a cohort, under supervision of faculty.

**GDES 4352. Design Process: Bookmaking.** (3.0 cr.; A-F or Audit; prereq Graphic design major or grad student or design minor or #; fall, every year) Construction of traditional/non-traditional book forms. Emphasizes material aspects of handmade books.

**GDES 4354. Graphic Design IV: Integrative Campaign.** (4.0 cr.; A-F or Audit; prereq [3353 or DHA 3353], graphic design major; fall, spring, every year) Multi-faceted graphic communication campaign project involving substantial investigation and concept development. Project supports unified concept for identified client and is aimed at specific market/interest group.

**GDES 4361W. Thesis Studio and Writing.** (3.0 cr. [max 4.0 cr.]; A-F only; prereq [Graphic design major, 2399W, 3352, 3353] or #; fall, spring, every year) Research/design of comprehensive graphic design thesis project.

**GDES 4362. Senior Thesis and Exhibition.** (3.0 cr. [max 4.0 cr.]; A-F only; prereq 4361W, graphic design major, or standing; fall, spring, every year) Design, production, and exhibition of comprehensive graphic design thesis project.

**GDES 4363. Graphic Design Portfolio.** (3.0 cr.; S-N only; prereq 4361W, graphic design major; fall, spring, every year)

GDES 4399W. Theory of Electronic Design. (3.0 cr.; A-F or Audit; prereq Graphic design major or #; spring, offered periodically) Theories, methodologies, histories of electronic design, its impact on visual communications. Digital artifacts, processes, paradigms.

GDES 5170. Topics in Graphic Design. (1.0-4.0 cr.; max 32.0 cr.; A-F or Audit; prereq Jr or sr or grad student; fall, spring, summer, every year) In-depth investigation of specific topic, announced in advance.

GDES 5193. Directed Study in Graphic Design. (1.0-4.0 cr.; max 8.0 cr.; A-F or Audit; prereq Jr or sr or grad student; fall, spring, summer, every year) Independent study in graphic design under tutorial guidance.

GDES 5196. Field Study: National/International. (1.0-10.0 cr.; A-F or Audit; =[APST 5196, HSG 5196, DES 5196]; prereq #; fall, spring, summer, every year) Faculty-directed field study in national or international setting.

GDES 5311. Illustration. (3.0 cr.; A-F only; prereq 1311 or ArtS 1101 or PDes 3702 or LA 1301 or Arch 3250 or Arch 2301 or #; spring, every year) Image making by hand or digitally for use in design projects. Design development. Mapping out ideas/expressing thoughts visually. Not observational drawing course.

GDES 5341. Interactive Design. (3.0 cr.; A-F or Audit; prereq [2334 or 2342], design minor) or graphic design major or grad student or #; fall, spring, every year) Design of interactive multimedia projects. Interactive presentations and electronic publishing. Software includes hypermedia, scripting, digital output.

GDES 5342. Web and Interface Design. (3.0 cr.; A-F or Audit; prereq [2334 or 2342], design minor) or graphic design major or grad student or #; spring, every year) Internet-based design. Static Web pages, embedded media, cascading style sheets. Design/usability of interface between humans and technology. Evaluation of visual elements that control/organize dealings with computers to direct work. Students develop designs, do usability testing.

GDES 5343. Data Visualization II: Interactive Information. (3.0 cr.; A-F only; prereq [2342, 4343] or #; spring, every year) Skills/tools necessary to process large quantities of information/present them through interactive mediums. Create data visualizations for web utilizing Javascript libraries. Linear/non-linear data-driven narratives.

GDES 5383. Digital Illustration and Animation. (3.0 cr.; A-F or Audit; prereq [2334 or 2342], design minor) or [4384 or DHA 4384 or 5341 or DHA 5341], [graphic design major or [grad student, experience with computer illustration]] or #; fall, spring, offered periodically) Advanced computer design. Integration of design knowledge with Macintosh computer applications. Students use software to create digital illustration and animations. Adobe Illustrator, After Effects, Flash.

GDES 5386. Fundamentals of Game Design. (3.0 cr.; A-F or Audit; prereq [(2334 or 2342), design minor] or [(4384 or DHA 4384 or 5341 or DHA 5341), [graphic design major or sr or grad student]] or #; fall, spring, offered periodically) Games of all kinds. Theoretical/practical aspects of making games. Investigation of design process. Rules, strategies, methodologies. Interactivity, choice, action, outcome, rules in game design. Social interaction, story telling, meaning/ideology, semiotics. Signs, cultural meaning.

GDES 5388. Graphic Design Research. (3.0 cr.; A-F or Audit; prereq Graphic design major or grad student or #; spring, offered periodically) Experience in Graphic Design research strategies and methods. Applied, theoretical, and human-centered aspects directed at project development. Design prototyping, testing, analysis.

GDES 5399. Theory of Electronic Design. (3.0 cr.; A-F or Audit; prereq Graphic design major or grad student or #; spring, even years) Theories, methodologies, histories of electronic design, its impact on visual communications. Digital artifacts, processes, paradigms.

Greek (GRK) College of Liberal Arts

GRK 1001. Beginning Classical Greek I. (5.0 cr.; fall, every year) Introduction to grammar/vocabulary of classical Greek as written in Athens in 5th/4th centuries BCE. Forms/simple constructions. Some reading of simple, heavily adapted passages from ancient texts.

GRK 1002. Beginning Classical Greek II. (5.0 cr.; prereq Grade of at least C- or S in 1001 or #; spring, every year) Continuation of Greek 1001. More complex constructions, including participles, clauses, indirect discourse. Some reading of adapted passages from ancient texts.

GRK 3003. Intermediate Greek Prose. (4.0 cr.; =[GRK 5003]; prereq Grade of at least C- or S in 1002 or 5001 or #; fall, every year) Introduction to Athenian prose authors of 5th/4th centuries BCE. Readings of continuous passages of adapted Greek texts (history, speeches). Review of grammar/vocabulary. Some discussion of major themes/issues in Greek culture as illustrated by texts.

GRK 3004. Intermediate Greek Poetry: Homer. (4.0 cr.; =[GRK 5004]; prereq [Grade of at least C- or S in 3003, 3113] or #; spring, every year) Introduction to Greek epic poetry. Readings of selections from Homer's Iliad/Odyssey. Quantitative meter/poetic devices. Discussion of major themes/issues as developed in Homer's poetry.

GRK 3993. Directed Studies. (1.0-4.0 cr.; prereq #; fall, spring, summer, every year) Guided individual reading or study.

GRK 4951W. Major Project. (4.0 cr.; A-F only; prereq Greek major, three 3xxx Greek courses, #, %; fall, spring, every year) Research project using documents/other sources from ancient world. Students select project in consultation with faculty member, who directs the research/writing.

GRK 5003. Intermediate Greek Prose: Graduate Student Enrollment. (3.0 cr.; =[GRK 3003]; prereq Grade of at least C- or S in [1002 or 5001] or [#; grad student]; fall, every year) Readings in Classical Greek prose texts by one or more authors (e.g., Plato, Lysias, Xenophon, Herodotus). Review of grammar/morphology. Meets with 3003.

GRK 5004. Intermediate Greek Poetry: Graduate Student Enrollment. (3.0 cr.; =[GRK 3004]; prereq [5003 or equiv], grad student or %, spring, every year) Greek poetry. Readings from Iliad or Odyssey. Nature of Homeric epic. Homeric diction, Greek meter. Meets with 3004.

GRK 5100. Advanced Reading. (3.0 cr.; max 18.0 cr.; prereq [GRK 3004 or equiv], at least two yrs of college level Greek. Must contact Classical and Near Eastern Studies department for permission to register.; fall, spring, every year) Reading in Greek texts/authors. Texts/authors vary.

GRK 5200. Biblical Greek. (3.0 cr.; max 6.0 cr.; prereq [GRK 3004 or equiv], at least two yrs of college level Greek. Must contact Classical and Near Eastern Studies department for permission to register.; fall, every years) Readings from Gospels, epistles of Paul, related literature. Emphasizes proficiency in reading Greek New Testament. Selections vary.

GRK 5701. Prose Composition. (3.0 cr.; prereq Grad student or #; spring, even years) Moving step by step through Ancient Greek grammar, starting with simple sentences and progressing to complex ones. Course ends with students translating short passages of modern English prose into Greek.

GRK 5702. Text Criticism. (3.0 cr.; prereq Grad student or #; fall, spring, offered periodically) Theory/practice. Elements of paleography and manuscript study. Tools for analyzing textual apparatus; constructing a critical edition of a literary text.

GRK 5704. Greek Paleography. (3.0 cr.; prereq Grad student or #; fall, spring, offered periodically) Analysis of various hands used in Greek manuscripts with attention to date/provenance. History of transmission of Greek literature.
GRK 5705. Introduction to the Historical-Comparative Grammar of Greek and Latin. (3.0 cr.; =LAT 5705; prereq Grad student or #; fall, spring, offered periodically) Historical/comparative grammar of Greek/Latin, from their Proto-Indo-European origins to classical norms.

GRK 5800. Sight Reading for Graduate Students. (1.0 cr. [max 6.0 cr.]; S-N only; prereq Enrollment in a grad program in Department of Classical/Near Eastern Studies; fall, spring, every year) Practice in reading Greek texts at sight.

GRK 5993. Directed Studies. (1.0-4.0 cr. [max 18.0 cr.]; fall, spring, summer, every year) Guided individual reading or study. Prereq Grad student or instr consent.

GRK 5994. Directed Research. (1.0-12.0 cr. [max 18.0 cr.]; fall, spring, every year) Supervised original research on topic chosen by student. Prereq Grad student or instr consent.

GRK 5996. Directed Instruction. (1.0-12.0 cr. [max 20.0 cr.]; fall, spring, every year) Supervised teaching internship. Prereq Grad student or instr consent.

Health Informatics (HINF) Academic Health Center Shared

HINF 5115. Interprofessional Healthcare Informatics. (3.0 cr.; prereq Grad student or professional student or #; fall, spring, summer, every year) Implications of informatics for practice, including nursing, public health, and healthcare in general. Electronic health record issues. Relates ethical, legislative and political issues informatics. Global and future informatics issues.

HINF 5430. Health Informatics I. (3.0 cr.; A-F or Audit; prereq Junior or senior or grad student or professional student or #; fall, every year) Introductory survey of health informatics, focusing on foundational concepts. Conceptualizations of data, information, knowledge. Current terminologies, coding, classification systems for medical information. Ethics, privacy, security. Systems analysis, process/data modeling. Human-computer interaction/data visualization.

HINF 5431. Health Informatics II. (3.0 cr.; A-F or Audit; prereq Junior or senior or grad student or professional student or #; spring, every year) Introductory survey of health informatics, focusing on applications of informatics concepts/technologies. Health informatics research, literature, evaluation. Decision models. Computerized decision support systems. Data mining, natural language processing, other emerging technologies. Security for health care information handling.

HINF 5436. AHC Informatics Grand Rounds. (1.0 cr. [max 10.0 cr.]; S-N or Audit; fall, spring, every year) Presentation/discussion of research problems, current literature/topics of interest in Health Informatics.

HINF 5496. Internship in Health Informatics. (1.0-6.0 cr. [max 18.0 cr.]; S-N or Audit; prereq HINF student or #; fall, spring, summer, every year) Practical industrial experience not directly related to student's normal academic experience.

HINF 5499. Capstone Project for the Masters of Health Informatics. (3.0 cr.; A-F only; prereq second semester MHI student or #; fall, spring, summer, every year) Final opportunity to apply newly acquired knowledge/skills to project involving practical problem in health informatics. Submit written project report in lieu of final examination.

HINF 5501. US Health Care System: Information Challenges in Clinical Care. (1.0 cr.; S-N or Audit; prereq Junior or senior or professional student or grad student or #; fall, spring, every year) Health care system/its unique interaction between key health system stakeholders. Relationship between patients, providers, payers, regulatory bodies. Role of information management/challenges of information standardization/exchange.

HINF 5502. Programming Essentials Python 3. (1.0 cr. [max 2.0 cr.]; S-N or Audit; prereq Junior or senior or grad student or professional student or #; fall, spring, every year) Computer programming essentials for health sciences/health care applications using Python 3. Intended for students with limited programming background, or students wishing to obtain proficiency in Python programming language.

HINF 5510. Applied Health Care Databases: Database Principles and Data Evaluation. (3.0 cr.; A-F or Audit; prereq Junior or senior or grad student or professional student or #; fall, every year) Principles of database theory, modeling, design, manipulation of databases. Taught with healthcare applications emphasis. Using relational database management system (RDBMS). Database manipulation. Structured Query Language (SQL) to compose/execute queries.

HINF 5520. Clinical Informatics and Patient Safety. (2.0 cr.; A-F or Audit; prereq Junior or senior or grad student or professional student or #; fall, spring, every year) Application/operation of clinical information systems, electronic health records, decision support/application in health care system. Use of clinical information systems/association with health care delivery, payment, quality, outcomes.

HINF 5530. Health Care Software Management. (2.0 cr.; A-F or Audit; prereq HINF student or #; spring, every year) Health care software and unique interaction between key stakeholders in health care software development and implementation. Systems analysis, software development, and software life cycle management for health care applications.

HINF 5531. Health Data Analytics and Data Science. (2.0 cr.; A-F or Audit; prereq Junior or senior or professional student or grad student or #; spring, every year) Data science methods/techniques for extraction, preparation, use of health data in decision-making.

HINF 5540. Interprofessional Health Informatics. (2.0 cr.; A-F only; spring, every year) Informatics applications in various healthcare professions. Clinical specialties. Informatics tools to improve healthcare services/outcomes through lectures/presentations.

Health Services Management (HSM) College of Continuing Education

HSM 3521. Health Care Delivery Systems. (3.0 cr.; A-F or Audit; prereq 30 cr; fall, every year) Health care (HC) delivery systems, health economics, third-party/public reimbursement, current trends in HC organizations/management/administration. Regulations, standards, quality assurance, accreditation, current ethical issues. Implications for HC providers/professionals, patients/families, communities, international health.

HSM 4541. Health Care Finance. (3.0 cr.; A-F or Audit; spring, every year) General principles of financial management for health care industry. Operational knowledge of financial management theory, esp., how hospitals and their departments develop/balance operating/capital budget for business growth/development. Governmental policies, procedures, and ethical issues controlling the health care industry.

HSM 4561. Health Care Administration and Management. (3.0 cr.; A-F or Audit; prereq 45 cr; fall, every year) Background/skills in business/administrative aspects of health care. Applications of business theory to medical settings. Organization models, reimbursement methodologies, information systems, staff scheduling, employee evaluation, accreditation agencies, productivity management, budget planning, group leadership.

HSM 4571. Introduction to Grant Writing for Health Care and Nonprofit Organizations. (3.0 cr.; A-F or Audit; prereq 45 credits; fall, spring, every year) Research/write grants. Identify potential funding sources, respond to Request for Proposal by creating needs assessment, goal statement, budget/grant funding plans. Trends in public/private health care/social services funding.

Hebrew (HEBR) College of Liberal Arts

HEBR 1001. Beginning Hebrew I. (5.0 cr.; =HEBR 4001; fall, every year) For beginners whose goal is biblical or post-biblical Jewish studies, or modern Israeli Hebrew. Leads to speaking, listening comprehension, and reading/writing Hebrew.
HEBR 1002. Beginning Hebrew II. (5.0 cr.; [HEBR 4002]; prereq Grade of at least [C- or S] in [1001 or 4101] or #; fall, spring, every year)
Continuation of 1001. Leads to speaking, listening comprehension, reading, and writing Hebrew. Emphasizes communication proficiency. Cultural materials.

HEBR 1101. Biblical Hebrew I. (5.0 cr.; [HEBR 4104];)
Basic grammar/syntax preparatory to reading simple narrative texts in Bible. Multiple approaches to problems/issues in biblical scholarship.

HEBR 1102. Beginning Biblical Hebrew II. (5.0 cr.; [HEBR 4105]; prereq Grade of at least [C- or S] in [1001 or 4101] or #; spring, odd years)
Progression to more sophisticated reading of narrative, prophetic, and legal texts. Presentation/discussion of multiple approaches to problems/issues in biblical scholarship.

HEBR 3101. Intermediate Biblical Hebrew I. (5.0 cr.; [HEBR 4101]; prereq Grade of at least [C- or S] in [1001 or 4101] or #; fall, every year)

HEBR 3102. Intermediate Biblical Hebrew II. (5.0 cr.; [HEBR 4102]; prereq Grade of at least [C- or S] in in 3011 or #; fall, spring, every year)

HEBR 3090. Advanced Modern Hebrew. (3.0 cr. [max 18.0 cr.]; prereq 3012 or #; fall, every year)
Preparation to read various kinds of authentic Hebrew texts and to develop higher levels of comprehension/speaking. Conducted entirely in Hebrew. Emphasizes Modern Israeli Hebrew. Introduction to earlier genres. Grammar, widening vocabulary. Contemporary short fiction, essays, articles on cultural topics, films, Hebrew Internet sites, TV.

HEBR 3101. Intermediate Biblical Hebrew I. (4.0 cr.; [HEBR 4101]; prereq Grade of at least [C- or S] in [1102 or 4102] or #; fall, odd years)
Text of Hebrew Bible. Basic research tools/comments. Close reading of narrative biblical texts. Reading fluency, methods of research in biblical studies.

HEBR 3951W. Major Project. (4.0 cr.; prereq [Hebr major, three 3xxx Hebrew courses], #, %; fall, spring, every year)
Research project using primary and secondary sources. Students select project in consultation with a faculty member, who directs the research/writing.

HEBR 3980. Directed Instruction. (1.0-4.0 cr.; fall, spring, every year)
Students observe/discuss classes. Gradually increased participation in preparing/presenting instructional materials to a beginning Hebrew class. Evaluation of materials, teaching techniques. Seminars on language teaching issues. Prerequisites: college consent.

HEBR 3993. Directed Studies. (1.0-4.0 cr.; prereq #; fall, spring, every year)
Guided individual reading or study.

HEBR 4001. Beginning Hebrew I. (3.0 cr.; [HEBR 1001]; prereq grad student; fall, every year)
Leads to speaking, listening comprehension, reading/writing Hebrew. Emphasizes communication proficiency. Cultural materials are incorporated. Meets concurrently with 1001.

HEBR 4002. Beginning Hebrew II. (3.0 cr.; [HEBR 1002]; prereq Grade of at least [C- or S] in [1001 or 4101] or #; spring, every year)

HEBR 4011. Intermediate Hebrew I. (3.0 cr.; [HEBR 1101]; prereq Grade of at least [C- or S] in [1002 or 4002] or #; fall, every year)

HEBR 4012. Intermediate Hebrew II. (3.0 cr.; [HEBR 1102]; prereq Grade of at least [C- or S] in in 3011 or #; spring, every year)

HEBR 4104. Basics of Biblical Hebrew I. (3.0 cr.; [HEBR 1101]; prereq grad student; fall, even years)
Basic grammar/syntax preparatory to reading simple narrative texts in Bible. Multiple approaches to problems/issues in biblical scholarship. Meets with 1104.

HEBR 4105. Basics of Biblical Hebrew II. (3.0 cr.; [HEBR 1102]; prereq Grade of at least [C- or S] in [1101 or 4104] or #; spring, offered periodically)
Progression to more sophisticated reading of narrative, prophetic, and legal texts. Presentation/discussion of multiple approaches to problems/issues in biblical scholarship. Meets with 1105.

HEBR 4106. Intermediate Biblical Hebrew I. (3.0 cr.; [HEBR 3101]; prereq Grade of at least [C- or S] in [1102 or 4102] or [#; grad student]; fall, every year)
Text of Hebrew Bible. Basic research tools/comments. Close reading of narrative biblical texts. Reading fluency, methods of research in biblical studies. Meets with 3101.

HEBR 4107. Intermediate Biblical Hebrew II. (3.0 cr.; prereq Grade of at least [C- or S] in 3101 or #; spring, every year)
Text of Hebrew Bible, basic research tools/comments. Close reading of narrative biblical texts. Reading fluency, methods of research in biblical studies. Meets with 3102.

HEBR 5090. Advanced Modern Hebrew. (3.0 cr. [max 18.0 cr.]; prereq 3012 or #; fall, every year)

HNR 3021. Intermediate Hindi-Urdu I. (5.0 cr.; [HNR 4002]; prereq 1011 or #; spring, every year)
Reading, writing, speaking, listening. Taught primarily in Hindi-Urdu. Preparation to read various kinds of authentic Hindi-Urdu texts and to develop higher levels of comprehension/speaking. Conducted entirely in Hindi-Urdu. Emphasizes Modern Hindi-Urdu. Introduction to earlier genres. Grammar, widening vocabulary. Contemporary short fiction, essays, articles on cultural topics, films, Hindi-Urdu (HNR) 4002.

HNR 3022. Intermediate Hindi-Urdu II. (5.0 cr.; [HNR 4004]; prereq 3021 or #; spring, every year)
Instruction in pronunciation, vocabulary, sentence structure, sentence formation. Preparation to read various kinds of authentic Hindi-Urdu texts and to develop higher levels of comprehension/speaking. Conducted entirely in Hindi-Urdu. Emphasizes Modern Hindi-Urdu. Introduction to earlier genres. Grammar, widening vocabulary. Contemporary short fiction, essays, articles on cultural topics, films, Hindi-Urdu (HNR) 4004.
Reading, writing, speaking, listening skills. Grammar review, basic compositions, oral presentations.

HNUR 3031. Advanced Hindi-Urdu I. (4.0 cr.; =HNUR 4005); prereq 3022 or #; fall, every year)
Continued emphasis on development of communication skills, ability to comprehend both written/spoken texts. Speak, read, write in Hindi/Urdu beyond intermediate level.

HNUR 3032. Advanced Hindi-Urdu II. (4.0 cr.; =HNUR 4006); prereq 3031 or #; spring, every year)
Continued emphasis on development of communication skills, ability to comprehend both written/spoken texts. Speak, read, write in Hindi/Urdu beyond intermediate level.

HNUR 3290. Hindi-Urdu Language Teaching Tutorial. (1.0 cr. [max 2.0 cr.]; S-N only; prereq Grade of A in HNDI 4162; fall, spring, every year)
Students tutor beginning students of Hindi-Urdu and are part of department's Hindi-Urdu language team.

HNUR 4001. Beginning Hindi-Urdu I. (3.0 cr.; =HNUR 1011); fall, every year)
Listening, speaking, reading, writing. Development of communicative competence.

HNUR 4002. Beginning Hindi-Urdu II. (3.0 cr.; =HNUR 1012); prereq Grad student, [4001 or #]; spring, every year)
Listening, speaking, reading, writing. Development of communicative competence.

HNUR 4003. Intermediate Hindi-Urdu I. (3.0 cr.; =HNUR 3021); prereq Grad student, [4002 or #]; fall, every year)
Reading, writing, speaking, listening skills. Grammar review, basic compositions, oral presentations.

HNUR 4004. Intermediate Hindi-Urdu II. (3.0 cr.; =HNUR 3022); prereq Grad student, [4003 or #]; spring, every year)
Reading, writing, speaking, listening skills. Grammar review, basic compositions, oral presentations.

HNUR 4005. Advanced Hindi-Urdu I. (3.0 cr.; =HNUR 3031); prereq Grad student, [4004 or #]; fall, every year)
Continued emphasis on development of communication skills, ability to comprehend both written/spoken texts. speak, read, write in Hindi/Urdu beyond intermediate level.

HNUR 4006. Advanced Hindi-Urdu II. (3.0 cr.; =HNUR 3032); prereq Grad student, [4005 or #]; spring, every year)
Continued emphasis on development of communication skills, ability to comprehend both written/spoken texts. Speak, read, write in Hindi/Urdu beyond intermediate level.

HNUR 5993. Directed Readings. (1.0-5.0 cr. [max 15.0 cr.]; fall, spring, every year)
Guided individual reading or study of modern Hindi-Urdu texts. Prereq instr consent, dept consent, college consent.

HIST 1000W. Visions of the Past: Thematic Approaches to Understanding History. (4.0 cr. [max 8.0 cr.]; prereq Fr or soph or fewer than 60 cr; fall, spring, every year)
Innovative thematic approaches to human past. Historical sources, methods, and concepts. Topics such as environmental history, faith/religion in history, war/society, the family in world history, technology as a motor of history.

HIST 1011W. Civilization and the Environment: World History to 1500. (4.0 cr.; =HIST 1011V, HIST 1017); prereq Fr or soph or non-hist major; fall, spring, summer, every year)
Sweep of history, from first prehistoric societies to dawn of modern world circa 1500. Forces that pushed humans to continually explore new environments and develop higher levels of social organization and cross-cultural interaction.

HIST 1012W. The Age of Global Contact. (4.0 cr.; prereq Fr or soph or non-hist major; fall, spring, summer, every year)
Five centuries of globalization. How the modern, interconnected world came into being. Changing material life (food, clothes, petroleum) and ideologies/beliefs. Analysis of primary documents to show how historical knowledge is produced.

HIST 1015W. Globalization: Issues and Challenges. (4.0 cr.; =GLOS 1015W, HIST 1016, GLOS 1015V, HIST 1015V); prereq Fr or soph or non-hist major; fall, spring, every year)
Increased global interconnections over past 50 years. Impact of information revolution on human rights, economic inequality, ecological challenges, and decolonization. Cases in Asia, Africa, Latin America, or Middle East.

HIST 1026. Europe and the World: Expansion, Encounter, and Exchange to 1500. (3.0 cr.; =HIST 1031V); fall, spring, offered periodically)
Europe in the making, from Hammurabi to Columbus. Heyday of ancient Near East, Late Middle Ages. Culture, European interactions with wider world through religion, conquest, and trade. Beginning of the age of discoveries.

HIST 1027. Europe and the World: Expansion, Encounter, and Exchange from 1500 to Present. (3.0 cr.; =HIST 1032V); fall, spring, summer, offered periodically)
Emergence of a Europe of nations/empires. Transformations through revolutions, wars, and encounters with world regions.

HIST 1031W. Europe and the World: Expansion, Encounter, and Exchange to 1500. (4.0 cr.; prereq Fr or soph or non-hist major; fall, every year)
Europe, from Hammurabi to Columbus. Heyday of ancient Near East, Late Middle Ages. Culture, European interactions with wider world through religion, conquest, and trade. Beginning of the age of discoveries.

HIST 1032W. Europe and the World: Expansion, Encounter, and Exchange from 1500 to Present. (4.0 cr.; prereq Fr or soph or non-hist major; spring, every year)
Emergence of a Europe of nations/empires. Transformations through revolutions, wars, and encounters with world regions.

HIST 1102. Medieval Tales and their Modern Echoes. (3.0 cr.; =MEST 3002, HIST 3102, MEST 1002); spring, every year)
Knights of Round Table, dragon-slayers, magic djinn, pilgrims in Hell. How stories have been retold in modern fiction, film, arts. Texts from Europe/other regions of globe.

HIST 1301W. Authority and Rebellion: American History to 1865. (4.0 cr.; =HIST 1301W, HIST 1301V); fall, spring, offered periodically)
Conflict/change, from colonial era through Civil War. colonization/resistance, slavery, nation-building, westward expansion, gender roles, religion, reform, race/ethnicity, immigration, industrialization, class relations. Students use primary sources, historical scholarship.

HIST 1302W. Global America: U.S. History Since 1865. (4.0 cr.; =HIST 1302, HIST 1302V); prereq Fr or soph or non-hist major; fall, spring, every year)

HIST 1307. Authority and Rebellion: American History to 1865. (3.0 cr.; =HIST 1301W, HIST 1301V); fall, spring, offered periodically)
Conflict/change, from colonial era through Civil War. colonization/resistance, slavery, nation-building, westward expansion, gender roles, religion, reform, race/ethnicity, immigration, industrialization, class relations. Students use primary sources, historical scholarship.

HIST 1308. Global America: U.S. History Since 1865. (3.0 cr.; =HIST 1302W, HIST 1302V); fall, spring, summer, offered periodically)

HIST 1411W. The Family from 10,000 BCE to the Present. (4.0 cr.; =HIST 3411W; prereq Fr or soph or fewer than 60 cr; fall, even years)
How family life, has played and continues to play a major role in world history. Lectures, labs, assignments.

HIST 1534. Introduction to Jewish History and Civilization. (3.0 cr.; =RELS 1034, HIST 3534, JWST 1034, RELS 3034, JWST 3034); fall, every year)
Jewish history, society, culture from Second Temple period (5th century BCE) to modern era as illuminated by literature, philosophy, art, film, music, religious law/custom, artifacts of daily life. Emphasizes political, social, cultural
contexts that shaped development of Jewish ideas, practices, institutions.


HIST 1902. Freshman Seminar. (3.0 cr.; A-F or Audit; prereq freshman, spring, every year) Topics specified in Class Schedule.

HIST 1903. Freshman Seminar. (3.0 cr.; A-F or Audit; prereq Freshman; fall, spring, offered periodically) Topics specified in Class Schedule.

HIST 1904. Freshman Seminar. (3.0 cr. [max 6.0 cr.]; A-F or Audit; prereq freshman; fall, offered periodically) Topics specified in Class Schedule.

HIST 1907W. Freshman Seminar. (3.0 cr.; A-F or Audit; prereq freshman; fall, every year) Topics specified in Class Schedule.

HIST 1908W. Freshman Seminar. (3.0 cr.; A-F or Audit; prereq freshman; fall, spring, offered periodically) Topics specified in Class Schedule.

HIST 1909W. Freshman Seminar. (3.0 cr. [max 6.0 cr.]; A-F only; prereq freshman; fall, spring, offered periodically) Topics specified in Class Schedule.

HIST 3000W. Visions of the Past: Thematic Approaches to Understanding History. (4.0 cr. [max 8.0 cr.]; prereq Jr or sr or at least 60 cr; fall, spring, every year) Innovative thematic approaches to human past. Historical sources, methods, and concepts. Topics such as environmental history, faith/religion in history, war/society, the family in world history, technology as a motor of history.

HIST 3001. Public History. (4.0 cr.; A-F or Audit; = [AMST 3003, CLA 3003]; prereq Soph or jr or sr or #; fall, spring, offered periodically) Interpretations of collective past as produced in public venues, including museum exhibitions, films, theme parks, websites. Intellectual/political issues in history produced for public audiences. Career opportunities.

HIST 3011. Measuring the Past: Quantitative Methods for Historical Research. (4.0 cr.; = [HIST 5011]; fall, spring, offered periodically) Basics of quantitative historical data collection, measurement, analysis.

HIST 3051. Ancient Civilization: Near East and Egypt. (3.0 cr.; fall, every year) A broad survey of ancient Near Eastern and Egyptian history and culture from the prehistoric to the rise of Persia around 550 B.C.

HIST 3052. Ancient Civilization: Greece. (3.0 cr.; fall, spring, summer, every year) A broad survey of ancient Greek culture and history from the third millennium B.C. to the death of Alexander the Great in 323 B.C.

HIST 3053. Ancient Civilization: Rome. (3.0 cr.; spring, summer, every year) A broad survey of the culture and history of Rome from its origins to the decline and fall of the Roman Empire in the third and fourth centuries A.D.

HIST 3054. Egypt of the Pharaohs. (3.0 cr.; fall, even years) History/culture of ancient Egypt from prehistoric times to the conquest of Egypt by Persians in late 6th century B.C. Emphasizes Old/New Kingdom periods.

HIST 3061. "Bread and Circuses": Spectacles and Mass Culture in Antiquity. (3.0 cr.; fall, spring, odd years) Development of large-scale public entertainments in ancient Mediterranean world, from athletic contests of Olympia and dramatic festivals of Athens to chariot races and gladiatorial games of Roman Empire. Wider significance of these spectacles in their impact on political, social, and economic life of the societies that supported them.

HIST 3066. Rise of Civilization. (3.0 cr.; = [ANTH 3009]; spring, every year) How archeologists/historians analyze/interpret artifacts of complex societies, from early hunter-gatherer groups, through settled agricultural villages to rise of towns, cities, civilizations.

HIST 3067W. Archaeology of Prehistoric Europe. (3.0 cr.; = [ANTH 3027W, ANTH 5027W]; fall, every year) How archeologists analyze/interpret artifacts to develop knowledge about formation of European society, from earliest evidence of human occupation to Roman period.

HIST 3101. Introduction to Medieval History. (3.0 cr.; fall, spring, summer, every year) Europe from decline of Rome to early Renaissance. Politics, institutions, society, economy, and culture of Middle Ages.

HIST 3102. Medieval Tales and their Modern Echoes. (3.0 cr.; = [MEST 3002, HIST 1102, MEST 1002]; spring, every year) Knights of Round Table, dragon-slayers, magic djinn, pilgrims in Hell. How stories have been retold in modern fiction, film, arts. Texts from Europe/other regions of globe.

HIST 3151W. British History to the 17th Century. (4.0 cr.; fall, every year) The making of the English nation: Anglo-Saxons and Normans; development of English law and Parliament; Reform and constitutional crisis; early Wales, Scotland, and Ireland.

HIST 3152. British History From the Seventeenth Century. (4.0 cr.; spring, every year) Civil War, Revolution, and constitutional settlement. Industrialization and growth of democracy. Rise/decline of British Empire.

HIST 3211. History of Sexuality in Europe. (3.0 cr.; A-F or Audit; = [GLBT 3211]; fall, spring, offered periodically) History of sexuality in Europe, from ancient Greece to present. Plato's philosophy of love, St. Augustine's conception of sin, prostitution in 15th century, sexual science of Enlightenment. Industrial revolution and homosexual subcultures. Rape scares and imperialism. Eugenics and Nazi Germany.

HIST 3212. Dissident Sexualities in U.S. History. (3.0 cr.; A-F or Audit; = [AMST 3212, GLBT 3212]; fall, every year) History of sexuality in United States. Emphasizes sexualities that have challenged dominant social/cultural norms. Development of transgender, bisexual, lesbian, gay identities/communities. Politics of sex across lines of race/ethnicity. Historical debates over controversial practices, including sex work.

HIST 3244. History of Eastern Europe. (3.0 cr.; spring, even years) History of the peoples of the region from their origins to modern times, culture and society in the Middle Ages; Golden Age of Eastern Europe; loss of independence; nationalism and formation of national states; fascism and World War II, Jews in Eastern Europe; communist and post-communist periods.

HIST 3264. Imperial Russia: Formation and Expansion of the Russian Empire in the 18th and 19th Centuries. (3.0 cr.; = [HIST 5264]; fall, every year) History of the peoples of the region from their origins to modern times, culture and society in the Middle Ages; Golden Age of Eastern Europe; loss of independence; nationalism and formation of national states; fascism and World War II, Jews in Eastern Europe; communist and post-communist periods.

HIST 3265. 20th-Century Russia: The Collapse of Imperial Russia, the Revolutions, and the Soviet Regime. (3.0 cr.; = [HIST 5265]; spring, every year) Analysis of factors that led to collapse of tsarist regime. 1917 revolution. Evolution of Soviet regime/collapse of Soviet communism. Emphasis on role of nationalities/rise of Commonwealth of independent states.

HIST 3271. The Viking World: Story, History, and Archaeology. (3.0 cr.; = [HIST 5271]; fall, every year) Viking society and expansion of Viking influence abroad. Viking impact on Western Europe; interactions with Slavic lands; settlement of North Atlantic islands; Western Europe’s impact on Scandinavian lands. Analyzes archaeological, historical, linguistic, and numismatic evidence.

HIST 3281. European Intellectual History: The Early Modern Period, Antiquity to 1750. (3.0 cr.; = [CSCL 5281, HIST 5281, CSCL 3281]; fall, offered periodically) First of a two-semester course. European thought in its historical/cultural context. Emphasizes development of philosophical/scientific thought, its relation to thinking about
the individual and the community. Readings from original sources.

HIST 3282. European Intellectual History: The Modern Period, 1750-Present. (3.0 cr.; [CSCL 3282; HIST 5282; CSCL 5282]; spring, offered periodically)
Second of a two-semester course. European thought in its historical/cultural context. Emphasizes development of philosophical/scientific thought. Its relation to thinking about the individual and the community. Readings are from original sources.

HIST 3283. Marx, Capital, and History: An Introduction to Marxist Theory and History. (3.0 cr.; spring, odd years)
Explore Marx's understanding of capitalism/its history. Marx's argument regarding historical specificity of capitalism as economic/social condition.

HIST 3347. Women in Early America: 1600-1890. (3.0 cr.; = [GWSS 3407]; fall, every year)
Varied experiences of American women 1600-1900. Topics include women's involvement in dispossession of native peoples, westward expansion, slavery, industrialization, reform, revolution, transformations in family life/sexuality.

HIST 3348. Women in Modern America. (3.0-4.0 cr.; = [GWSS 3408]; spring, every year)
History of women in the United States from 1890 to the present. Explores women's changing roles in politics, the labor force, the family, and popular culture.

HIST 3349. U.S. Women's Legal History. (3.0 cr.; A-F or Audit; prereq Soph or jr or sr; fall, odd years)

HIST 3351. Women and Diasporas in Modern History. (3.0 cr.; fall, odd years)
Persistence of racial and ethnic identities as markers of diasporic consciousness. Comparing diasporas across time using social/cultural analysis. Gendering of lives/identities of people whose identities have been shaped by forced/free migrations of past 500 years.

HIST 3401W. Early Latin America to 1825. (4.0 cr.; A-F or Audit; = [LAS 3401W]; fall, spring, every year)
Societies of Americas, Spain, and Portugal before contact. Interactions among Native Americans, African slaves, and Europeans, from colonization through independence. Religion, resistance, labor, gender, race. Primary sources, historical scholarship.

HIST 3402W. Modern Latin America 1825 to Present. (4.0 cr.; = [LAS 3402W]; fall, spring, summer, every year)
National and contemporary period 1825 to present, with emphasis on social, cultural, political, and economic change.

HIST 3411W. The Family from 10,000 BCE to the Present. (4.0 cr.; = [HIST 1411W]; prereq Jr or sr or at least 60 cr; fall, even years)
How family life has played and continues to play a major role in world history. Lectures, labs, assignments.

HIST 3412. Soccer: Around the World with the Beautiful Game. (3.0 cr.; A-F only; spring, even years)
Global history/exploration of relationship between football (soccer)/culture around world.

HIST 3414. Missionary Encounters: Evangelism and Empire in the Early Modern World. (3.0 cr.; spring, even years)
Christian evangelism functioned as major justification for European expansion/imperialism. How interactions between missionaries/non-European "converts" wrought social, political, religious transformations in early modern world.

HIST 3415. Migrations in Modern Global History. (3.0 cr.; fall, every year)
Today's debates about immigration in historical/comparative perspective. Major migrations into, within, and out of Americas over 500 years. Lives/identities of U.S. immigrants compared with foreigners living/working in Latin America, Europe, and Asia. Words/voices of migrants.

HIST 3416. Imperialism and its Critics: Ethical Issues, Literary Representations. (3.0 cr.; A-F only; fall, even years)
Significant episodes of several imperial nations to underscore themes of ethics/literature.

HIST 3417. Food in History. (3.0 cr.; fall, spring, odd years)
Significance of food in society, from earliest times to present. Why we eat what we eat. How foods have been "globalized." Dietary effects of industrial modernity. Material culture, social beliefs. Examples from around world.

HIST 3418. Drink in History. (3.0 cr.; fall, spring, even years)
Significance of alcohol and stimulating beverages. Interdisciplinary study of alcohol/prohibition regimes throughout history.

HIST 3419. History of Capitalism: Uneven Development Since 1500. (3.0 cr.; = [GLOS 3219]; fall, odd years)

HIST 3423. Central American Revolutions. (3.0 cr.; = [CHIC 3423]; fall, offered periodically)
Social, political and economic issues that have shaped Central American history for nearly two centuries. Focuses on influences of colonial histories, capitalist development, ethnic/racial conflict, foreign intervention, Catholic Church, civil war throughout region. Readings cover events in Guatemala, Honduras, El Salvador, Nicaragua, Costa Rica, Panama.

HIST 3424. Women and Gender in Latin American History. (3.0 cr.; = [GWSS 3413, GLOS 3934]; spring, even years)
Changing gender norms in Latin America over time as compared with lives of women and men of diverse classes and ethnic groups.

How women responded to their position in society, on a continuum from accommodation to resistance.

HIST 3425. History of Modern Mexico. (3.0 cr.; = [CHIC 3425]; fall, summer, every year)
Mexican from independence to the present: struggles for land, liberty, and equality; ethnicity, gender, and class; economic growth, nationalism, and globalization; urbanization, immigration, demographic transition.

HIST 3426. Pirates of the Caribbean. (3.0 cr.; spring, even years)
History of early modern globalization through one of its most cosmopolitan actors, the pirate. Geographical focus in the Caribbean basin. Networks of capitalism, migration, empire, and nascent nationalism. Global phenomena through marginalized participants--pirates, maroons, rebels, criminals, paupers, and privateers. Alternate historical narratives on emergence of the modern world.

HIST 3429. Latin American History in Film and Text. (3.0 cr.; = [LAS 3429]; fall, spring, summer, offered periodically)
Cinematic representations of Latin America in context of other historical/literary narratives. Experiences of Latinos in Hollywood. U.S. films compared with those produced in Latin America. Themes vary (e.g., women, revolution, colonialism).

HIST 3431. Early Africa and Its Global Connections. (3.0-4.0 cr.; = [AFRO 3431]; fall, spring, every year)
Survey of African history from earliest times to 1800. Focuses on socioeconomic, political, and cultural development in pre-colonial Africa from ancient Egypt through the era of the trans-Atlantic slave trade.

HIST 3432. Modern Africa in a Changing World. (3.0-4.0 cr.; = [AFRO 3432]; fall, spring, summer, every year)
Survey of modern African history from early 19th century to present. Focuses on socioeconomic, political, and cultural development in Africa, from abolition of trans-Atlantic slave trade through postcolonial era.

HIST 3435. History of South Africa from 1910. (3.0 cr.; = [AFRO 3205]; fall, offered periodically)
History of South Africa from union to present. Focuses on issues such as African/Afrikaner nationalism, structures of apartheid, forced population removals, divestment/sanctions, and post-apartheid era.

HIST 3436. Contemporary African Conflicts: From Somalia to South Africa. (3.0 cr.; = [AFRO 3436]; fall, offered periodically)
Historical contexts in which specific contemporary political conflicts developed. SIate trade, colonial conquest, indirect rule, forced labor, discretionary justice, other historical issues. Patterns of human rights violations/ social-political conflict. Cases studies might include Somalia, Democratic Republic of Congo, Rwanda.

HIST 3444. Chicana and Chicano History: 1821-1945. (3.0 cr.; = [HIST 3441, CHIC 3444]; fall, every year)
Experiences of people of Mexican descent in the United States. Important eras in histories of Mexico, the United States, and Mexican Americans. Central role of Chicana/os in U.S. history, culture, and politics.

HIST 3445. Immigration and the U.S. Latina/o Experience: Diaspora, Identity, and Community. (3.0 cr.; =CHIC 3888; fall, every year) Experiences of people from Latin America to United States in 20th/21st century. Migrant engagements with U.S. society. Pre-existing Latina/o/other ethnic communities' experiences within political, economic, social aspects of life at local/global level.

HIST 3446. Chicana/o History II: WWII, El Movimiento, and the New Millennium. (3.0 cr.; =CHIC 3446; spring, every year) Experiences of people of Mexican descent in U.S. Notions of citizenship from WWII. Chicana civil rights movement. Impact of immigration patterns/legislation. Cultural wars, demographics. Social, economic, political changes. Meaning of racialized "Mexican" identity. How different groups of Mexicans have understood their relationships to other Americans/other Latino groups.

HIST 3452. African Conservation Histories. (3.0 cr.; spring, every year) Historical roots of conservation in Africa in 19th/20th centuries. Historical context of contemporary laments about Africa's environmental degradation, older efforts to exploit/control African people/resources. Focuses on how Africans have interacted with and managed their lands/resources.

HIST 3454. West African History: Early Times to 1800. (3.0 cr.; =AFRO 3001; fall, every year) West Africa from late early times to establishment/histories of states. Relations with North African, Mediterranean, Asian, American worlds. Non-centralized political authority.

HIST 3455. West African History: 1800 to Present. (3.0 cr.; =AFRO 3002; spring, every year) West African history from late-18th century to present. Themes include study of continuities with past. Profound changes including new 19th century state formation, European colonialism, post-colonial issues.


HIST 3461. Introduction to East Asia I: The Imperial Age. (3.0-4.0 cr.; =EAS 3461; fall, every year) Comparative survey of early history of China, Japan, Korea, and Vietnam. Early Chinese thought. Diffusion of Confucianism, Buddhism, and other values throughout East Asia. Political and social history of region to 1600.

HIST 3462. From Subjects to Citizens: The History of East Asia from 1500 to the Present. (3.0-4.0 cr.; =HIST 3462H, EAS 3462H, EAS 4342; spring, every year) How Asian states, societies, economies, and cultures linked with one another and with European powers. How period's historical effects still resonate. Covers India, China, Japan, Korea, and Indochina.

HIST 3462H. Honors: From Subjects to Citizens: The History of East Asia from 1500 to the Present. (3.0-4.0 cr.; =HIST 3462, EAS 4342H, EAS 4362; spring, every year) How Asian states, societies, economies, cultures linked with one another/European powers. Historical effects. Covers India, China, Japan, Korea, Indochina.


HIST 3476. War and Peace in Japan Through Popular Culture. (4.0 cr.; =AF or Audit; =ALL 4547; fall, spring, offered periodically) War-related issues in Japan. Animation films, comics from 1940s to 1990s. Mobilization of culture for WWII. Conflict between constitutional pacifism and national security. Japan's role in cold war and post-cold war worlds.

HIST 3477. Samurai, Geisha, and How They Became Japanese. (3.0 cr.; =AF or Audit; spring, offered periodically) How samurai, geisha, and Zen Buddhism came to be considered as the quintessential Japanese tradition in 20th century. Modernity, nationalism, orientalism, international politics, globalization.

HIST 3478. Tigers and Dragons: The Rise of the East Asian Economies, 1930-Present. (3.0 cr.; =HIST 3478, GLOS 3278; spring, even years) Rise of East Asian Economies, 1930-Present.

HIST 3479. History of Chinese Cities and Urban Life. (3.0-4.0 cr.; =AF or Audit; =EAS 3479, ALL 3371, HIST 5479; fall, spring, offered periodically) Introduction to traditional Chinese cities, their modern transformation. Ideal city plan in Confucian classics compared with physical layout of some major cities. Models about Chinese cities, influence of the models on our understanding of Chinese history/society.

HIST 3483. Hmong History Across the Globe. (3.0 cr.; fall, spring, odd years) Hmong interaction with lowland Southeast Asian states (Laos, Vietnam) and Western colonial powers (French, American) since 19th century. Changes to religious, social, political, and gender institutions. Aspirations for political autonomy.

HIST 3485. History of Southeast Asia. (3.0 cr.; =AF or Audit; fall, spring, every year) Origins of civilization/indigenous states. Impact of world religions and Western colonialism on gender, social, political, and economic structures. Nationalism. Establishment of Vietnam, Thailand, Indonesia, and the Philippines.

HIST 3486. Hmong Refugees from the Secret War: Becoming Americans. (3.0 cr.; =EAS 3466; spring, even years) Socio-economic, political, gender, cultural/religious changes in Hmong American community during last three decades. How Hmong are racialized in American society. Impact to first/second generations.


HIST 3489. 20th Century India. (3.0 cr.; =AF or Audit; =GLOS 3969) India under British hegemony in 1914 through Mahatma Gandhi and his nationalistic movement; World War II; the British departure; creation of India and Pakistan; Nehru; Indira and Rajiv Gandhi.
HIST 3492. Hinduism. (3.0 cr.; =[ALL 3671, RELS 3671, RELS 3671, ALL 3671]; fall, spring, offered periodically)
Development of Hinduism focusing on sectarian trends, modern religious practices, myths/rituals, pilgrimage patterns/religious festivals. Interrelationship between Indian social structure/Hinduism.

HIST 3493. Islam: Religion and Culture. (3.0 cr.; = [ARAB 3036, ALL 3711, RELS 3712]; prereq Soph or jr or sr; fall, every year)

HIST 3502. Ancient Israel: From Conquest to Exile. (3.0 cr.; = [CNES 5502, JWST 3502, RELS 3502, CNES 3502]; fall, offered periodically)
Israeli/Islamic history in context of what is known from Egyptian, Canaanite, and Mesopotamian sources. Focuses on issues raised by archaeological data related to Israeli/Islamic conquest of Canaan.

HIST 3503. Ancient Iran. (3.0 cr.; = [CAS 3511, RELS 3709, MELC 3511]; fall, spring, offered periodically)
Development of ancient Iranian culture under Achaemenians and Sassanians. Impact of Zoroastrian religion on Iranians, on Hellenism, and on domains such as Bactria. Iran's contribution to cultures of Silk Road.

HIST 3504. The Cultures of the Silk Road. (3.0 cr.; = [ALL 3872, RELS 3708]; fall, spring, every year)
Past/present state of the cultures that flourished in Central Asia (present-day CA republics, Iran, Afghanistan) after Alexander the Great and declined with opening of sea routes.

HIST 3505. Survey of the Modern Middle East. (3.0 cr.; = [ARAB 3505, ALL 3876, MELC 3505, ARAB 5505]; fall, spring, every year)

HIST 3506. Modern Iran: Nationalism, Religion, and the Struggle to Create Modern Iran. (3.0 cr.; = [REL 3713]; spring, even years)
Iranian history from the fall of the Sassanids (7th C. CE) to the present. Shi'ite Islam in a world context. Iranian dynasties. Iran's entrance into modern world politics.

HIST 3507. History of Modern Egypt. (3.0 cr.; A-F only; fall, spring, odd years)
Main political events. Underlying social, economic, and intellectual issues. Impact of Egypt on region. Developments in Egypt compared with those of other leading Arab states.

HIST 3509. Approaches to the Study of the Middle East. (3.0 cr.; A-F or Audit; fall, spring, offered periodically)
Intensive reading/discussion course. Ways in which historians/social scientists have studied Middle East. Problems they have encountered. Paradigms, issues, and debates in Middle Eastern Studies.

HIST 3511. Muslims and Jews: Conflict and Co-existence in the Middle East and North Africa since 1700. (3.0 cr.; = [JWST 3511, RELS 3709]; fall, odd years)
Diversity of social/cultural interactions between Muslims and Jews and between Islam and Judaism since 1700. What enabled the two religious communities to peacefully coexist? What were causes of conflict? Why is history of Muslim/Jewish relations such a contested issue?

HIST 3512. History of Modern Israel/ Palestine: Society, Culture, and Politics. (3.0 cr.; = [JWST 3512, GLOS 3942]; fall, odd years)

HIST 3513. North Africa since 1500: Islam, Colonialism, and Independence. (3.0 cr.; spring, even years)
History of Maghrib (Morocco, Algeria, Tunisia, Libya, disputed territories of Western Sahara) from time of Ottoman expansion/Shanfaran dynasties (Sa'dian/Alawid) in 16th/17th centuries to end of 20th century. Focus on encounter of Islamic cultures/societies of Maghrib with Africa/Europe.

HIST 3534. Introduction to Jewish History and Civilization. (3.0 cr.; = [REL 1034, JWST 1034, RELS 3034, JWST 3034, JWST 1534]; fall, every year)
Jewish history, society, culture from Second Temple period (5th century BCE) to modern era as illumined by literature, philosophy, art, film, music, religious law/custom, artifacts of daily life. Emphasizes political, social, cultural contexts that shaped development of Jewish ideas, practices, institutions.

HIST 3546. Islam and the West. (3.0 cr.; = [CAS 3533, GLOS 3643, RELS 3714]; fall, spring, offered periodically)
Cultural/intellectual trends that have defined fundamental differences between Islam and the West. Development of historical, philosophical, and intellectual mindset of both spheres. Factors in tension, anxiety, and hatred between Muslim world and Europe and the United States.

HIST 3547. The Ottoman Empire. (3.0 cr.; = [ARAB 3547, ALL 3883]; fall, spring, every year)
Survey of Islam's most successful empire, from its founding circa 1300 to its demise in 1923. Lands, institutions, peoples, historical legacy.

HIST 3600. The Renaissance. (3.0 cr.; = [ARTH 3600, CLA 3600, MEST 3600, FRIT 3600]; spring, offered periodically)
Relationships between the visual arts, literature, science, philosophy, and politics in Europe from about 1300-1600. Works of artists, writers, and intellectuals (e.g., Michelangelo Buonarotti, Niccolo Machiavelli, Michel de Montaigne), different artistic and literary forms (e.g., portrait, sonnet, essay), and broad thematic issues that include the individual, antiquity, state, and discovery. Team taught.

HIST 3606. Christians, Muslims, and Jews in the Middle Ages. (3.0 cr.; = [JWST 3606, RELS 3717]; fall, spring, even years)
Violent dimensions of these relations: Muslim/Christian expansion, jihad/crusade, anti-Jewish violence/persecution. Peaceful dimensions: trade, intellectual exchange, religious dialogue.

HIST 3608W. History of the Catholic Church in the Middle Ages. (3.0 cr.; prereq Intro course in European history before 1500 recommended; fall, spring, offered periodically)
Religious beliefs of Latin Christianity as officially taught and as received by ordinary folk; organization of the church and its implantation in lay society; relations between Latin Christendom and its neighbors, Orthodoxy and Islam.

HIST 3609. Military History of Medieval Western Europe. (3.0 cr.; fall, spring, offered periodically)
Concept and conduct of war in Western Europe in the Middle Ages and the relation between the military and society.

HIST 3611. Medieval Cities of Europe: 500-1500. (3.0 cr.; fall, spring, every year)
Evolution of Western European cities from the late Roman town to the early Renaissance city-state.

HIST 3613. History of the Crusades. (3.0 cr.; = [REL 3715]; fall, spring, summer, every year)

HIST 3615W. Women in European History: 1500 to the Present. (3.0 cr.; = [GWSS 3615W]; spring, even years)
History of women in Western Europe from early modern period to present. Changes crucial to women's lives. Family/kinship structure, control over property, organization of work, religious ideas/practices, education, politics, beliefs/attitudes about female body.

HIST 3616. France in the Middle Ages. (3.0 cr.; fall, offered periodically)
Politics, society and culture in medieval France from the end of the Carolingians to the end of the Hundred Years War.

HIST 3618. The Dark Ages Illumined: Medieval Europe to 1050. (3.0 cr.; )
Origins of medieval Europe, Germanic and Viking invasions, feudalism, manorialism, Islam, the papacy, monarchies, intellectual developments.

HIST 3619. Chivalry, Crisis, and Revival: Medieval History 1050-1500. (3.0 cr.; spring, offered periodically)
Chivalry and courtly love, crusades, revival of towns and trade, monarchies, religious developments, Black Death, famine, and wars
HIST 3621. Creating the Modern World in Medieval Europe: The Renaissance, 1200-1600. (3.0 cr.; prereq Intro course in European history before 1500 recommended; fall, offered periodically) Political/cultural history of city-states of northern/central Italy, 1200-1550. Emphasizes Florence/Venice. Readings include Dante, Machiavelli.

HIST 3632. History of Germany; Reformation to Unification: 1500-1871. (3.0 cr.) The Reformation era; warfare and demographic catastrophe of the early 1600s; life in town and country; absolutism; Baroque culture; family life and its transformation; economic crisis; Revolution of 1848; the military path to unification.


HIST 3637. Modern Russia: From Peter the Great to the Present. (3.0 cr.; fall, every year) Political, social, and cultural forces which have shaped modern Russia. Emphasis will be on modernization, attempts at reforms in the imperial and Soviet period, and the dissolution of empires.

HIST 3652. Early Modern Britain. (3.0 cr.; fall, spring, offered periodically) British society/culture during early modern era, especially 16th and 17th centuries. May include themes related to political developments, economy/social structure, gender, religion, literature, or interaction with other world regions.

HIST 3681. Irish History. (3.0 cr.; fall, every year) History of Ireland, primarily modern, with emphasis on politics and Anglo-Irish relations.

HIST 3691W. The British Empire. (3.0 cr.; A-F or Audit) Gain/loss of colonies in America, India, Africa. Development of racism, multicultural composition of British society, debates about economic motives for empire, resistance of colonized peoples to conquest/dominion.

HIST 3704W. Daily Life in Europe: 1300-1800. (3.0 cr.; fall, spring, even years) Living conditions and daily life in Europe before the Industrial Revolution. Topics include marriage and family, life at court, nobles, peasants, disease, farming, livestock-raising, urban life, the middle classes, manufacturing, trade, piracy, witchcraft, war, crime, and social deviance.

HIST 3705. From Printing Press to Internet: Media, Communications, and History. (3.0 cr.; A-F or Audit; [GLOS 3605]) Print public sphere in 17th, early 18th century. Political conflicts over freedom of press in 18th, 19th century. Emergence of advertising, public relations industries in 20th century. Significance of broadcast, computer network technologies for democratic political systems.


HIST 3708. The Age of Curiosity: Art and Knowledge in Europe, 1500-1800. (3.0 cr.; [ARTH 3315]; fall, spring, every year) Ways in which making of art and scientific knowledge intersected. Connections between scientific curiosity and visual arts in major artists. Artfulness of scientific imagery/ diagrams, geographical maps, cabinets of curiosities, and new visual technologies.


HIST 3721. Studies in 20th-Century Europe From the Turn of the Century to the End of World War II: 1900-45. (3.0 cr.; [HIST 5721]; fall, summer, every year) Social, political, and cultural changes/conflicts. Background to WWII, its impact. Revolution, failure of intervener stability. Fascism, WWII, its consequences.

HIST 3722. Studies in 20th-Century Europe From the End of World War II to the End of the Cold War: 1945-91. (3.0 cr.; [GLOS 3422]; fall, spring, summer, every year) Social, economic, political, and cultural impacts of WWII upon Europe. Division of Europe. Communist regimes in Eastern Europe, cooperation in Western Europe. Impacts of modernization. End of Cold War.

HIST 3724. Women, Revolution, and War in 20th Century Europe. (3.0 cr.; fall, offered periodically) From WWI through break-up of Yugoslavia, involvement/reactions of European women to situations of war/revolution. Ways in which women contributed, resisted, or submitted. Impact of conflicts on women's lives. Gender, ideological gendering. Lecture, but emphasizes readings, presentations, and discussions.


HIST 3728. Human Rights and Crimes Against Humanity. (3.0 cr.; A-F or Audit; spring, even years) Meaning of the term "genocide." Particular cases, such as Armenians in the late Ottoman Empire, Jews in the Third Reich, and Muslims in the former Yugoslavia.

HIST 3729. Nazi Germany and Hitler's Europe. (3.0 cr.; [JWST 3729]; fall, spring, offered periodically) Comprehensive exploration of Third Reich. Students will examine how the Nazis came to power, transformations of 1930s, imposition of racial politics against Jews/others, nature of total war. Students read historical accounts, memoirs, state documents, view films.

HIST 3731. Modern France and Its Empire: Identity, Citizenship and the State 1780 to the Present. (3.0 cr.; fall, spring, every years) History of citizen/state in France from French Revolution to present.

HIST 3767. Eastern Orthodoxy: History and Culture. (3.0 cr.; [RELS 3611]; ) Development of the orthodox church in Byzantium, the Islamic Near East, the Slavic world and in the diaspora; impact of orthodoxy on political and cultural institutions, interaction with other Christian and non-Christian communities; orthodox spirituality and aesthetics.

HIST 3775. History of Jews in Europe and the Atlantic World, from 1700 to Present. (3.0 cr.; [JWST 3775]; fall, spring, offered periodically) Social, cultural, and political experience of Jews in Europe and the Americas. Emancipation, social/economic development, assimilation, migration, political anti-Semitism, Zionism, the Holocaust, transformations after 1945.


HIST 3797. History of Population. (3.0 cr.; spring, every year) History of births, deaths, migration, population size, and population characteristics. Evidence...
from Europe, the United States, and Latin America with comparative material from Africa and Asia. Methods of historical population analysis and research of historical population data.

HIST 3801. The People of Early America: 16th to 18th Centuries. (3.0 cr.; fall, spring, offered periodically) Multicultural approach to early American history focusing on the interactions of Africans, Europeans, and American Indians who came together to create a new world in North America during the 16th, 17th, and 18th centuries.


HIST 3803. Radicalism in Early America. (3.0 cr.; A-F or Audit; prereq: Soph or jr or sr or #; fall, spring, even years) Radicalism to 1850s. Challenge to traditional structures of family/property; relations of gender, race, and class; notions of self/self-governance; and ideas about the divine. Visionaries, reformers. Radicalism and violence.


HIST 3812. The Civil War and Reconstruction. (3.0 cr.; fall, spring, summer, every year) United States from 1848 to 1877. Causes of sectional crisis; Southern secession; Lincoln and emancipation; military history; impact of war North and South; Reconstruction efforts to change the Southern life and transform the status of African Americans.

HIST 3821. United States in the 20th Century to 1945. (3.0 cr.; fall, spring, summer, every year) American politics and society in the progressive era, the 1920’s, the Great Depression and World War II. Economic reform at home, the challenges of world war abroad, and social change affecting the status of women and racial minorities.

HIST 3822. United States in the 20th Century Since 1945. (3.0 cr.; fall, spring, summer, every year) American politics and society in the postwar era, the diplomacy of the Cold War, the civil rights movement, the Vietnam War, cultural clashes in the 1960’s, Watergate, the conservative resurgence, and the end of the Cold War.


HIST 3837. Minnesota History. (3.0 cr.; =AMST 3837; fall, spring, offered periodically) Topics in political/social history of Minnesota and its region in nineteenth/twentieth centuries.

HIST 3838. Family History in America. (3.0 cr.; A-F only; spring, every year) How historians study families to explore race/class. Techniques for researching genealogy/family history. Research/write on history of family.


HIST 3842. The Digital Revolution: Computers in the Making of the Contemporary World. (3.0 cr.; A-F or Audit; =HIST 1842; fall, spring, offered periodically) Historical examination of birth of computer. Global transformations after 1945. History of technology/how culture shapes technological change. United States history integrated with global history to show how technology, capitalism, politics, culture, environment conspired to make computer agent of revolutionary change.


HIST 3862. African American History. 1619-1865. (3.0-4.0 cr.; A-F or Audit; =AFRO 3864; fall, spring, every year) Importance of dynamics of class, gender, region, and political ideology. Changing nature of race/racism.

HIST 3865. African American History, 1865 to Present. (3.0-4.0 cr.; A-F or Audit; =AFRO 3865; fall, spring, summer, every year) Integral migrations, industrialization, unionization, Great Depression, world wars, large-scale movements for social/political change.

HIST 3868W. Race, War, and Race Wars in American History. (3.0 cr.; A-F only; =AFRO 3868W; fall, odd years) Role that race has played in American war history. Impact that wars have had on race and race relations in the U.S. and the world. Literature, film.


HIST 3871. American Indian History: Pre-Contact to 1830. (3.0 cr.; =AMIN 3871; fall, spring, every year)
Introduction to American Indian history from ancient native America to the removal era. Focuses on the social, cultural, political, and economic diversity of Native American peoples and Native American experiences with European colonialism.

HIST 3872. American Indian History: 1830 to the Present. (3.0 cr.; [AMIN 3872]; fall, spring, every year) Focus on the impact of federal Indian policy on American Indian cultures and societies, and on American Indian culture change.

HIST 3875W. Comparative Race and Ethnicity in US History. (4.0 cr.; A-F or Audit; fall, spring, every year) America through its cultural diversity. Changing notions of "American national identity"/citizenship from nineteenth century to present. Historical experiences of Native Americans, African Americans, Hispanic Americans, European immigrants, and Asian Americans: How these groups were defined in relation to each other and in relation to the nation.

HIST 3877. Asian American History, 1850-Present. (3.0 cr.; [AAS 3877]; fall, spring, every year) Asian American history and contemporary issues, from 1850 to the present. Immigration, labor, anti-Asian movements, women/families, impact of World War Two, new immigrant/refugee communities, civil rights, Asian American culture/identity.


HIST 3882. U.S. and the World. (3.0 cr.; fall, spring, summer, offered periodically) History of U.S. involvement in world affairs. Political, economic, social, cultural relations by individuals, groups, governmental, non-governmental agencies. Nation building, imperialism, hemispheric hegemony, cultural expansion, national security, wars.

HIST 3900. Topics in Medieval and Modern European History. (1.0-4.0 cr.; max 16.0 cr.; prereq Jr or Sr or #; fall, spring, summer, every year) Selected topics in medieval and modern European history not covered in regular courses. To be taught as staffing and demand exist.

HIST 3939H. Honors: How to Do History. (3.0 cr.; A-F only; prereq History major or %; fall, spring, every year) Skills/research experience to complete senior paper. How to answer questions such as, "What is history?" How to locate/use historical sources, develop thesis, and turn rough idea into full research proposal.

HIST 3959H. Honors: How to Do History. (3.0 cr.; A-F only; prereq History major or %; fall, spring, every year) Skills/research experience to complete senior paper. How to answer questions such as, "What is history?" How to locate/use historical sources, develop thesis, and turn rough idea into full research proposal.

HIST 3960. Topics in History. (1.0-4.0 cr.; max 16.0 cr.; prereq Soph or Jr or Sr or #; fall, spring, summer, every year) Selected topics in history not covered in regular courses.

HIST 3980W. Supplemental Writing in History. (1.0 cr.; max 4.0 cr.; prereq #; must take a 3-cr 3xxx or 5xxx course taken concurrently; fall, spring, every year) May be attached, by agreement of instructor and students, to any 3xx or 5xx course to make a writing-intensive experience.

HIST 3990. Historical Internship. (1.0-4.0 cr.; max 8.0 cr.; prereq #; fall, spring, summer, every year) Internship with a historical society, government, or community historical organization. Arranged through and supervised by department.

HIST 3993. Directed Study. (1.0-16.0 cr.; A-F or Audit; fall, spring, summer, every year) Guided individual reading or study. Open to qualified students for one or more semesters. Prereq instr consent, dept consent, college consent.

HIST 3994. Directed Research. (1.0-16.0 cr.; A-F or Audit; prereq #, %. @; fall, spring, summer, every year) Qualified students work on a tutorial basis. Prereq instr consent, dept consent, college consent.

HIST 4010V. Honors: Research Seminar. (4.0 cr.; max 16.0 cr.; [A-F or Audit; prereq Jr or Sr history major or #; fall, spring, every year) Work closely with professors on in-depth investigations of historical topics. Guided instruction in issues, methods, sources. Topics vary.

HIST 4010W. Research Seminar. (4.0 cr.; max 16.0 cr.; A-F or Audit; prereq Jr or Sr history major or #; fall, spring, every year) Work closely with professors on in-depth investigations of historical topics. Guided instruction in issues, methods, sources. Topics vary.

HIST 4071. History of Rome to 78 B.C.. (3.0 cr.; prereq An appropriate introductory course is recommended.) Intensively examine the political, institutional, and socioeconomic history of Rome from its origins to the death of Sulla in 78 B.C. The institutional strengths and weaknesses that led to the rise and fall of the Republic are the primary theme.

HIST 4072. History of Rome to 78 B.C.. (3.0 cr.; prereq An appropriate introductory course is recommended; spring, offered periodically) Intensively examine the political, institutional, and socioeconomic history of Rome from the death of Trajan in A.D. 117 to the death of Theodosius in A.D. 395. Explores one historical question—the decline and fall of the Roman Empire.

HIST 4960. Topics in History. (1.0-4.0 cr.; max 16.0 cr.; prereq Jr or Sr or grad or #; fall, spring, every year) Selected topics in history not covered in regular courses. Taught as staffing permits.

HIST 4961V. Honors: Major Paper. (4.0 cr.; A-F only; prereq %, #; sign up in Undergraduate Studies Office two sem in advance; fall, spring, summer, every year) Research paper on topic of student's choice. Work largely with primary sources. Faculty guidance.

HIST 4961W. Major Paper. (4.0 cr.; A-F or Audit; prereq %, #; sign up in Undergraduate Studies Office two sem in advance; fall, spring, summer, every year) Research paper on topic of student's choice. Work largely with primary sources. Faculty guidance.

HIST 4962H. Undergraduate Honors Proseminar. (3.0 cr.; [max 9.0 cr.; A-F only; prereq Jr or Sr], honors; spring, every year) Themes vary depending on the instructor. Reading/discussion of historiography/methodology, research.

HIST 4970. Historical Internship. (1.0-12.0 cr.; max 24.0 cr.; fall, spring, summer, every year) Internship with a historical society, government, or community historical organization. Arranged through and supervised by department.

HIST 5011. Measuring the Past: Quantitative Methods for Historical Research. (4.0 cr.; [HIST 3011]; prereq Primarily for 1st-yr grad students; fall, spring, offered periodically) Basics of quantitative historical data collection, measurement, analysis.

HIST 5051. Before Herodotus: History and Historiography of Mesopotamia and the Ancient Near East. (3.0 cr.; A-F or Audit; [CINES 5051]; prereq Prev coursework in ancient Near Eastern history recommended; fall, spring, offered periodically) Historical method/sources for ancient Near Eastern history. Historical traditions. Historiographic texts of Mesopotamia and neighboring regions of the ancient Near East, secondary emphasis on their relationship to works of classical historians such as Herodotus. Use of these sources in modern historiography of ancient Near East.

HIST 5053. Doing Roman History: Sources, Methods, and Trends. (3.0 cr.; prereq Grad student or #; fall, spring, even years) Survey of major scholarship in field of Roman history since Mommsen. Political, cultural, social, military, and economic history. Focuses on methodological problems posed by evidence. Ways in which these issues shape research.

HIST 5111. Proseminar in the History of Medieval Europe. (3.0 cr.; A-F or Audit; prereq Advanced undergrads of exceptional ability or grads, #; fall, spring, offered periodically)
Examination of basic scholarly bibliography for medieval Western European history. Aim is to help students to prepare for M.A. and Ph.D. examinations.

HIST 5115. Medieval Latin Historians. (3.0 cr.; prereq Reading knowledge of Latin; fall, spring, offered periodically) Writing of history in Western Europe during the Middle Ages. Focus on idea of history, philosophy of various historians, techniques of research by medieval historians and chroniclers, history as literature, and value of medieval histories to modern research scholars. Latin texts only.

HIST 5264. Imperial Russia: Formation and Expansion of the Russian Empire in the 18th and 19th Centuries. (3.0 cr.; [max 4.0 cr.;] =HIST 3264; fall, spring, every year) Interaction with Europe and Asia; attempts at modernization and reform; emancipation of the serfs and rise of revolutionary movements.

HIST 5265. 20th-Century Russia: The Collapse of Imperial Russia, the Revolutions, and the Soviet Regime. (3.0 cr.; =HIST 3265; spring, every year) Analysis of the factors that led to the collapse of the tsarist regime; discussion of the 1917 revolution, the evolution of the Soviet regime and the collapse of Soviet communism. Emphasis on the role of nationalities and the rise of the Commonwealth of independent states.

HIST 5271. The Viking World: Story, History, and Archaeology. (3.0 cr.; A-F or Audit; =HIST 3271; fall, spring, offered periodically) Viking society and expansion of Viking influence abroad. Viking impact on Western Europe, interactions with Slavic lands, settlement of North Atlantic islands, Western Europe's impact on Scandinavian lands. Analyzes archaeological, historical, linguistic, and numismatic evidence.

HIST 5281. European Intellectual History: The Early Modern Period, Antiquity to 1750. (3.0 cr.; A-F or Audit; =CSCL 5281, HIST 3281, CSCL 3281; prereq Grad student or #; fall, offered periodically) First of a two-semester course. European thought in its historical/cultural context. Emphasizes development of philosophical/scientific thought, its relation to thinking about the individual and the community. Readings from original sources.

HIST 5282. European Intellectual History: The Modern Period, 1750-Present. (3.0 cr.; A-F or Audit; =CSCL 5282, CSCL 5282, HIST 3282; prereq Grad student or #; spring, offered periodically) Second of a two-semester course. European thought in its historical/cultural context. Emphasizes development of philosophical/scientific thought, its relation to thinking about the individual and the community. Readings from original sources.

HIST 5295. Social History of Russia and Eastern Europe From the Late 19th Century to the Present. (3.0 cr.; fall, spring, offered periodically) Social movements (revolutionary, nationalistic, women's); communist and post-communist societies.

HIST 5379. Problems in Early American History. (3.0 cr.; fall, spring, offered periodically) Intensive consideration of topics in early American history. Topics may include readings in race, class, and gender; comparative colonialism; slavery; demography; economic history; religion; and regions in the colonial world.

HIST 5381. Minnesota History Workshop. (3.0-4.0 cr. [max 8.0 cr.;] =HIST 1301, 1302; fall, spring, offered periodically) A case study and seminar approach to historical research and interpretation. It offers teachers and other scholars a chance to survey a particular topic in Minnesota history and to write their own historical narrative based on primary source research.


HIST 5468. Social Change in Modern China. (3.0 cr.; =EAS 3468, HIST 3468; spring, offered periodically) Opium War and opening of Treaty Ports in 19th century; missionary activity and cultural influence; changes in education system; women's movement; early industrialization; socialism and collectivization after 1949; industrialization of Taiwan; PRC's entry into the world trading system.

HIST 5469. Historiographies of China, 1000-1700. (3.0 cr.; A-F or Audit; prereq Grad student or #; fall, spring, offered periodically) Important recent English-language work on Chinese culture during the Song, Yuan, and Ming dynasties. Topics include religion, gender, family structures, ethnic identity, commerce/economics, and political structures/events.


HIST 5540. Topics in Mediterranean Studies. (1.0-4.0 cr. [max 15.0 cr.]; A-F or Audit; prereq Grad student or advanced undergrad with #; fall, spring, every year) Mediterranean history, from Middle Ages to present. Taught as staffing permits.

HIST 5547. Empire and Nations in the Middle East. (3.0 cr.; prereq Grad student or #; fall, spring, offered periodically) Modernity in non-Western imperial context. Identity, ideology, economy, environment, language.

HIST 5611. New Directions in the Middle Ages, ca. 1000-1100. (3.0 cr.; A-F or Audit; prereq Grad student or #; fall, spring, offered periodically) Basic scholarly bibliography for medieval Western European history during early Middle Ages. Foundation for teaching courses in medieval history, preparing for general doctoral exam.

HIST 5612. New Directions in the Middle Ages, ca. 1100-1500. (3.0 cr.; A-F or Audit; prereq [5611, grad student] or #; fall, spring, offered periodically) Basic scholarly bibliography for medieval Western European history during central/later Middle Ages. Foundation for teaching courses in medieval history, preparing for general doctoral exam.

HIST 5614. The Medieval Church. (3.0 cr.; prereq Grad student or #; fall, spring, offered periodically) Introduction to history of western church in Middle Ages. Emphasizes church teachings and institutional structures, beliefs/practices of lay people, medieval Christian encounter with non-Christian world.

HIST 5633. Socio-Economic History of China. (3.0 cr.; A-F or Audit; prereq Grad student or [adv undergrad, #;]) Nature of Chinese socio-political formations and economic development in Qing and Republican eras, 1644-1937. Establishment/methods of state rule, merchants, agrarian social structure, domestic industry, demographic regimes, capitalism, and imperialism. Comparisons using theoretical and case studies of economic development.

HIST 5640. Topics in Legal History. (3.0 cr.; A-F or Audit; fall, spring, offered periodically) Comparative approaches to, methodologies of, and theoretical debates in legal history. Topics from ancient world to present, such as citizenship/statebuilding, religion and the law, women's legal history.

HIST 5642. U.S. Legal History. (3.0 cr.; A-F or Audit; fall, spring, offered periodically) Topics in history of American law, legal thought, legal institutions, and legal profession. Proceeds thematically, Primary/secondary sources.

HIST 5648. Development of the Western European Legal Tradition. (3.0 cr.; A-F or Audit; fall, spring, offered periodically) Evolution of and interaction among Roman and civil law, customary/feudal law, canon law, and English common law. Primary/secondary sources in English.

HIST 5715. Readings in European Women's History. 1450-1750. (3.0 cr.; A-F or Audit; fall, spring, offered periodically) Introduction to current historical research on European women's history, 1450-1750. Topics include gender roles and form of family structure, women's participation in religious movements, legal status of women.

HIST 5720. Society/Politics: Modern Europe. (3.0 cr. [max 6.0 cr.;] A-F or Audit; prereq Grad or #; fall, spring, every year)
Introduction to literature in English on problems of modern European social, cultural, political history. Thematic/geographic focus varies year to year. Topics include historical approaches to class/gender relations, state formation as social/political process, family history, evolution of public life, popular culture.


HIST 5777. Proseminar in Habsburg Central Europe. (3.0 cr.; A-F or Audit; prereq #; fall, spring, offered periodically) Central Europe under Habsburg rule from the reforms of Maria Theresa to imperial collapse. Continuity and change in society; economic and political modernization; the rise of national consciousness and anti-Semitism; politics and culture in the Fin de Siecle; the Empire and World War I.

HIST 5797. Methods of Population History. (3.0 cr.; A-F or Audit; fall, spring, offered periodically) Standard methods of population analysis. Focuses on methods widely used for historical population research.

HIST 5801. Seminar in Early American History. (3.0 cr.; A-F or Audit; =HIST 8801; fall, spring, offered periodically) Introduction to literature of early American history. Readings selected from some of best scholarship in field. Questions of colonial historians. Theories, methods, sources used in pursuit of those questions.

HIST 5802. Readings in American History, 1848-Present. (3.0 cr.; A-F or Audit; =HIST 8802; fall, spring, every year) Readings-intensive course. U.S. history from Mexican-American War to present.


HIST 5871. Readings in U.S. Intellectual History: 19th-20th Centuries. (3.0 cr.; A-F or Audit; prereq #; fall, spring, offered periodically) Definitions of American national identity from 1789 to the present as expressed in politics, religion, literature, painting, music, architecture, and history.

HIST 5881. American Foreign Relations to 1895. (3.0 cr.; A-F or Audit; prereq #; fall, spring, offered periodically) Intensive readings in the historiography of American foreign relations with emphasis on American imperialism, domestic courses of foreign policy, and international political, economic, and cultural relations.

HIST 5890. Problems in American Indian History. (3.0 cr.; A-F or Audit; =AMIN 5890; prereq Advanced undergrad with # or grad student; fall, spring, offered periodically) Intensive consideration of topics in American Indian history. Topics may include social history, history of particular regions, political systems, education, American Indian policy.

HIST 5900. Topics in European/Medieval History. (1.0-4.0 cr. [max 16.0 cr.]; A-F only; prereq Grad or [advanced undergrad with #]; fall, spring, every year) Selected topics in European or medieval history not covered in regular courses; taught as staffing permits.

HIST 5901. Latin America Proseminar: Colonial. (3.0 cr.; A-F or Audit; prereq #; fall, spring, offered periodically) Introduces beginning graduate and advanced undergraduate students to major historical writings on various Latin American themes.

HIST 5902. Latin America Proseminar: Modern. (3.0 cr.; A-F or Audit; prereq #; fall, spring, offered periodically) Introduces beginning graduate and advanced undergraduate students to major historical writings on various Latin American themes.

HIST 5905. Topics in European Medieval History. (1.0-4.0 cr. [max 16.0 cr.]; prereq Grad or [advanced undergrad with #]; fall, spring, every year) Selected topics in Medieval European history, up to 1500ce.

HIST 5910. Topics in U.S. History. (1.0-4.0 cr. [max 16.0 cr.]; prereq Grad or advanced undergrad student with #; fall, spring, every year) Selected topics in U.S. history not covered in regular courses. Taught as staffing permits.

HIST 5920. Topics in African History. (3.0 cr.; A-F or Audit; max 15.0 cr.; prereq Grad or #; fall, spring, offered periodically) Topics not covered in regular courses.

HIST 5930. Topics in Ancient History. (1.0-4.0 cr. [max 16.0 cr.]; A-F or Audit; prereq Grad or #; fall, spring, offered periodically) Selected topics in ancient history not covered in regular courses. To be taught as staffing permits and as enrollment warrants.

HIST 5932. The Production of Knowledge, Negotiating the Past, and the Writing of African Histories. (3.0 cr.; A-F or Audit; =AFRO 5932; fall, spring, offered periodically) Recent scholarship on social history of Africa. Focuses on new literature on daily lives of ordinary people in their workplaces, communities, households.

HIST 5940. Topics in Asian History. (1.0-4.0 cr. [max 16.0 cr.]; prereq Grad student or [advanced undergrad, #]; fall, spring, every year) Topics not covered in regular courses.

HIST 5941. Readings in Chinese Documents. (3.0 cr.; A-F or Audit; prereq Reading knowledge of Chinese; fall, spring, offered periodically) Readings in Chinese on a topic to be selected by the instructor. Depending on the topic and the time period, readings may involve a mixture of modern and classical Chinese or may be entirely in modern Chinese. Consult instructor for more information.

HIST 5950. Topics in Latin American History. (1.0-4.0 cr. [max 15.0 cr.]; A-F or Audit; prereq Grad or [advanced undergrad with #]; fall, spring, every year) Selected topics in Latin American history not covered in regular courses. Taught as staffing permits.

HIST 5960. Topics in History. (1.0-4.0 cr. [max 16.0 cr.]; prereq Grad or [advanced undergrad with #]; fall, spring, every year) Selected topics in history not covered in regular courses. Taught as staffing permits.


HIST 5964. Comparative Economic History. (3.0 cr.; A-F or Audit; prereq #; fall, spring, offered periodically) Theoretical approaches guide cross-cultural examinations of major issues in the economic history of East Asia, Europe, and the New World. Agrarian structures in economic development, markets, the state and economic development, and the industrial revolution.

HIST 5970. Advanced Research in Quantitative History. (4.0 cr. [max 16.0 cr.]; A-F or Audit; fall, spring, offered periodically) Students will carry out publishable-quality research on a quantitative historical topic.


HIST 5990. Readings in Comparative History. (3.0 cr.; max 9.0 cr.; A-F only; prereq #; spring, every year) Students read/discuss historical works that focus on common theme or employ similar methods in different geographic areas. Issues of cross-area comparison. Topics vary (e.g., peasant societies, race/ethnicity, states/nationalism).

HIST 5993. Directed Study. (1.0-16.0 cr. [max 20.0 cr.]; fall, spring, summer; offered periodically) Guided individual reading or study. Prereq [Grad student or sr], instr consent, dept consent, college consent.

HIST 5994. Directed Research. (1.0-16.0 cr.; fall, spring, summer; every year)
Work on a tutorial basis. Prereq [Grad student or sr], instr consent, dept consent, college consent.

**History of Medicine (HMED)**

**HMED 3001V. Health, Disease, and Healing I.** (4.0 cr.; A-F; only: =HMED 3001W; fall, every year)
Introduction to intellectual/social history of European/american medicine, health care from classical antiquity through 18th century. Meets with 3001W. Prereq Honors.

**HMED 3001W. Health, Disease, and Healing I.** (4.0 cr.; =HMED 3001V; fall, every year)
Introduction to intellectual/social history of European/american medicine, health care from classical antiquity through 18th century.

**HMED 3002W. Health Care in History II.** (3.0 cr.; spring, every year)
Introduction to intellectual/social history of European/american medicine, health care in 19th/20th centuries.

**HMED 3040. Human Health, Disease, and the Environment in History.** (3.0 cr.; spring, summer, every year)
Introduction to historical relationship of human health and the environment. How natural/human-induced environmental changes have, over time, altered our experiences with disease and our prospects for health.

**HMED 3055. Women, Health, and History.** (3.0 cr.; fall, spring, offered periodically)
Women's historical roles as healers, patients, research subjects, health activists. Biological determinism, reproduction, mental health, nursing, women physicians, public health reformers, alternative practitioners. Gender disparities in diagnosis, treatment, research, careers. Assignments allow students to explore individual interests.

**HMED 3065. Body, Soul, and Spirit in Medieval and Renaissance European Medicine.** (3.0 cr.; A-F or Audit; spring, every year)

**HMED 3075. Technology and Medicine in Modern America.** (3.0-5.0 cr.; fall, spring, every year)
How technology came to medicine's center-stage. Impact on production of medical knowledge, professionalization, development of institutions/industry, health policy, and gender/race disparities in health care.

**HMED 3600. Directed Study.** (1.0-4.0 cr. [max 12.0 cr.;]: prereq #: fall, spring, summer, every year)

**HMED 4960. Senior Research Topics in Medical History.** (3.0-4.0 cr.; A-F only; prereq Sr, #:; spring, every year)
Seminars. Reading/discussion, individual directed research project with oral presentation. Students meet in peer groups and with instructor.

**HMED 5002. Public Health Issues in Historical Perspective.** (3.0 cr.; fall, spring, offered periodically)
Introduction to the evolution of major recurring problems and issues in public health including environment and health, food customs and nutrition, control of alcohol and drugs, venereal diseases and public policy, human resources regulation, and relationship of science to promotion of health.

**HMED 5035. The Germ Theory and Modern Medicine.** (3.0 cr.; fall, spring, offered periodically)
Analysis of the formulation of the germ theory of disease and of its consequences for medical procedures (therapeutics, surgery, management of hospitals), public health programs, and the structure and prestige of the medical profession.

**HMED 5045. Modern Medical Profession.** (3.0 cr.; fall, spring, offered periodically)
Historical analysis of American medical profession in 19th/20th centuries. Role of institutions, influence of social/moral values. Consequences of specialization, scientific innovation.

**HMED 5055. Women, Health, and History.** (3.0 cr.; prereq Grad student or [jr or sr] with prev coursework in hist or #:; fall, offered periodically)
Women's historical roles as healers, patients, research subjects, health activists. Biological determinism, reproduction, mental health, nursing, women physicians, public health reformers, alternative practitioners. Gender disparities in diagnosis, treatment, research, careers. Assignments allow students to explore individual interests.

**HMED 5075. Technology and Medicine in Modern America.** (3.0 cr.; A-F or Audit; prereq #:; fall, spring, odd years)
How technology came to medicine's center-stage. Impact on medical practice, institutions, consumers, production of medical knowledge, professionalization, health policy, gender/race disparities in health care.

**HMED 5200. Early History of Medicine to 1700.** (3.0 cr.; A-F or Audit; fall, every year)
An introductory survey of the history of medicine in Europe and America.

**HMED 5201. History of Medicine from 1700 to 1900.** (3.0 cr.; prereq 5200; spring, every year)
An introductory survey of the history of medicine in Europe and America.

**HMED 5210. Seminar: Theories and Methods in Medical History.** (3.0 cr.; A-F or Audit; prereq 5210; spring, every year)
Use of archives, primary sources. Supervised research project.

**HMED 5600. Directed Study.** (0.0-4.0 cr. [max 16.0 cr.;]; prereq #:; fall, spring, summer, every year)
Directed Study

**HMED 5940. Topics in the History of Medicine.** (3.0-4.0 cr. [max 16.0 cr.;]; fall, spring, offered periodically)
Seminar on the historical relations between medicine and the State from the 18th to 20th centuries.

**History of Science and Technology (HSCI)**

**HSCI 1212. Life on Earth: Perspectives on Biology.** (4.0 cr.; =HSCI 1214W; fall, spring, every year)
How humans have developed theories/observations over 400 years about life on earth. Applying historical methods to Holocene extinction, ENSO and famines, human population growth, the Dust Bowl and soil conservation, DDT and falcon repatriation, and disease and responses to pandemics. Environmental debates across national boundaries. Origins of life on earth. Evolution, natural theology. Ecosystems.

**HSCI 1214W. Life on Earth: Perspectives on Biology.** (4.0 cr.; =HSCI 1212; fall, spring, every year)
How humans have developed theories/observations over 400 years about life on earth. Applying historical methods to Holocene extinction, ENSO and famines, human population growth, the Dust Bowl and soil conservation, DDT and falcon repatriation, and disease and responses to pandemics. Environmental debates across national boundaries. Origins of life on earth. Evolution, natural theology. Ecosystems.

**HSCI 1714. Technology and Civilization: Stone Tools to Steam Engines.** (3.0-4.0 cr.; =HSCI 3714; fall, spring, every year)
History of technology in its cultural context from earliest times to the Industrial Revolution. Neolithic Revolution, Bronze and Iron Ages, ancient civilizations, Greece, Rome, Middle Ages, and Renaissance.

**HSCI 1715. Technology and Civilization: Waterwheels to the Web.** (3.0-4.0 cr.; =HSCI 3715; fall, spring, every year)
Relations of technology to culture since Industrial Revolution. Diffusion of Industrial Revolution, modes of adaptation by different cultures, social impact.

**HSCI 1814. Revolutions in Science: The Babylonians to Newton.** (3.0-4.0 cr.; =HSCI 3814; fall, spring, every year)
Development and changing nature of sciences in their cultural context. Babylonian/Greek science. Decline/transmission of Greek
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HSCI 1815. Revolutions in Science: Lavoisier, Darwin, and Einstein. (3.0-4.0 cr.; =HSCI 3815; fall, spring, every year)


HSCI 3211. Biology and Culture in the 19th and 20th Centuries. (3.0 cr.; =HSCI 5211; fall, spring, every year)

Changing conceptions of life and aims and methods of biology; changing relationships between biology and the physical and social sciences; broader intellectual and cultural dimensions of developments in biology.

HSCI 3242. The Darwinian Revolution. (3.0 cr.; =HSCI 5242; fall, spring, every year)


HSCI 3244. History of Ecology and Environmentalism. (3.0 cr.; =HSCI 5244; fall, spring, every year)

Histories of ecological ideas; ecology as a scientific discipline; environmental ideas and movements in the United States and in the western world. Modern period (post-1650). European roots of ideas about relationships between plants, animals, humans, and their environments. United States and establishment of ecology as a scientific discipline, as well as its connection with efforts to protect and conserve natural resources. Efforts to place humans under the lens of ecology, critiques of the impact of humans on nature, and growth of the environmental movement in response to those critiques.

HSCI 3331. Technology and American Culture. (3.0 cr.; =HSCI 3331; fall, spring, every year)

American culture(s) and technology, pre-Columbian times to present. Artisanal, biological, chemical, communications, energy, environment, electronic, industrial, military, space and transportation technologies explained in terms of economic, social, political and scientific causes/effects.

HSCI 3332. Science and American Culture. (3.0 cr.; =HSCI 3332; fall, spring, every year)

American science since 1600, including transfer of science to America; development of indigenous traditions for pursuit of science; infrastructure for education and research; public response to scientific development.

HSCI 3333V. Honors Course: Issues in American Science and Technology in the Past Century. (3.0 cr.; A-F only; fall, every year)

Historical approach to understanding science and technology. Emphasizes intellectual, political, and social contexts. Decision-making by practitioners on issues of importance to the profession and the community. Topics relating to popular science, science, and warfare.

HSCI 3333W. Issues in American Science and Technology in the Past Century. (3.0 cr.; summer, offered periodically)

Historical approach to understanding science and technology. Intellectual, political, and social contexts. Decision-making by practitioners on issues of importance to the profession and the community. Topics relating to popular science, science, and warfare.

HSCI 3401. Ethics in Science and Technology. (3.0 cr.; =HSCI 5401; fall, spring, every year)

Historical issues involve research ethics including utilitarian, social Darwinian, and other ethical systems developed in science. Ethical problems posed by modern science and technology, including nuclear energy, chemical industry, and information technologies.

HSCI 3421. Engineering Ethics. (3.0 cr.; =HSCI 5421; fall, spring, every year)

Ethical issues in engineering research and engineers' public responsibility/practice, using historical cases; historical development of engineering as a vocation/profession; ethical implications of advanced engineering systems such as nuclear weaponry and networked communications.

HSCI 3611. Enlightenment, Revolution, and the Rise of Modern Science. (3.0 cr.; =HSCI 5611; spring, every year)


HSCI 3714. Technology and Civilization: Stone Tools to Steam Engines. (3.0-4.0 cr.; =HSCI 1714; fall, spring, every year)

History of technology in its cultural context from earliest times to the Industrial Revolution. Neolithic Revolution, Bronze/Iron Ages, ancient civilizations, Greece, Rome, Middle Ages, Renaissance.

HSCI 3715. Technology and Civilization: Waterwheels to the Web. (3.0-4.0 cr.; =HSCI 1715; fall, spring, every year)

Relationships of technology to culture since Industrial Revolution. Diffusion of Industrial Revolution, modes of adaptation by different cultures, social impact.

HSCI 3814. Revolutions in Science: The Babylonians to Newton. (3.0-4.0 cr.; =HSCI 1814; fall, spring, every year)

Development and changing nature of sciences in their cultural context. Babylonian/Greek science. Decline/transmission of Greek science. Scientific Revolution (1500-1700) from Copernicus to Newton.

HSCI 3815. Revolutions in Science: Lavoisier, Darwin, and Einstein. (3.0-4.0 cr.; =HSCI 1815; fall, spring, every year)


HSCI 4321. History of Computing. (3.0 cr.; =CSCI 4921; fall, spring, even years)

Development in the last 150 years; evolution of hardware and software; growth of computer and semiconductor industries and their relation to other business areas; changing relationships resulting from new data-gathering and analysis techniques; automation; social and ethical issues.

HSCI 4455. Women, Gender, and Science. (3.0 cr.; fall, spring, every year)

Three intersecting themes analyzed from 1700s to the present: women in science, sexual and gendered concepts in modern sciences, and impact of science on conceptions of sexuality and gender in society.

HSCI 5211. Biology and Culture in the 19th and 20th Centuries. (3.0 cr.; =HSCI 3211; fall, spring, every year)

Changing conceptions of life and aims and methods of biology; changing relationships between biology and the physical and social sciences; broader intellectual and cultural dimensions of developments in biology.

HSCI 5242. The Darwinian Revolution. (3.0 cr.; =HSCI 3242; fall, spring, offered periodically)


HSCI 5244. History of Ecology and Environmentalism. (3.0 cr.; =HSCI 3244; )

Development of ecological thought from 18th century natural theology to contemporary ecology and conservation biology; changing views of "balance" and the "economy" of nature; conceptual and methodological developments in ecosystems ecology; connections between ecology and conservation, population and environmental politics.

HSCI 5331. Technology and American Culture. (3.0 cr.; =HSCI 3331; fall, spring, offered periodically)


HSCI 5332. Science and American Culture. (2.0-3.0 cr.; =HSCI 3332; fall, spring, offered periodically)
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HSCI 5401. Ethics in Science and Technology. (3.0 cr.; =HSCI 3401); fall, spring, offered periodically
Historical issues involving ethics in science. Ethical problems posed by modern science/technology, including nuclear energy, chemical industry, and information technologies.

HSCI 5421. Engineering Ethics. (3.0 cr.; =HSCI 3421); fall, spring, every year)
Engineering ethics in historical context, including the rise of professional engineering societies; ethical problems in engineering research and engineers’ public responsibility; ethical implications of advanced engineering systems such as the production of nuclear weapons; development of codes of ethics in engineering.

HSCI 5611. Enlightenment, Revolution, and the Rise of Modern Science. (3.0 cr.; =HSCI 3611); spring, every year)

HSCI 5993. Directed Studies. (1.0-15.0 cr.; prereq #; fall, spring, summer, every year)
Guided individual reading or study.

HSCI 5994. Directed Research. (1.0-15.0 cr.; prereq #; fall, spring, every year)

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Hmong (HMNG)
College of Liberal Arts

HMNG 1001. Introduction to Hmong Language. (5.0 cr.; =HMNG 4101); fall, every year)

HMNG 1002. Introduction to Hmong Language. (5.0 cr.; =HMNG 4102); prereq 1001 or 1011; spring, every year)

HMNG 1011. Beginning Hmong I. (5.0 cr.; =HMNG 4001); fall, every year)
Listening, speaking, reading, writing skills. Emphasizes development of communicative competence.

HMNG 1012. Beginning Hmong II. (5.0 cr.; =HMNG 4002); prereq 1001 or 1011 or #; spring, every year)
Continuation of 1011. Listening, speaking, reading, writing skills. Development of communicative competence.

HMNG 1015. Accelerated Beginning Hmong. (5.0 cr.; =HMNG 4005); prereq Ability in basic spoken Hmong; fall, spring, every year)
Continuation of HMNG 4101. Listening, speaking, reading, writing skills. Development of communicative competence. Meets with 1012.

HMNG 4003. Intermediate Hmong I. (3.0 cr.; =HMNG 3021); prereq 4002, grad student; fall, every year)

HMNG 4004. Intermediate Hmong II. (3.0 cr.; =HMNG 3022); prereq 4003, grad student; spring, every year)

HMNG 4005. Accelerated Beginning Hmong. (3.0 cr.; =HMNG 1015); prereq basic spoken Hmong, graduate or professional student; fall, every year)
Continuation of 4001. Listening, speaking, reading, writing skills. Development of communicative competence. Meets with 1012.

HMNG 4006. Accelerated Intermediate Hmong. (3.0 cr.; =HMNG 1016); prereq 4005, basic spoken Hmong, grad student; spring, every year)

HMNG 4007. Advanced Hmong I. (3.0 cr.; =HMNG 3031); prereq 4004 or equiv or #; fall, every year)

HMNG 4008. Advanced Hmong II. (3.0 cr.; =HMNG 3032); prereq 4007 or equiv or #; spring, every year)

HMNG 3290. Hmong Language Teaching Tutorial. (1.0 cr.; max 2.0 cr.; S-N only; prereq Grade of A in 3022; fall, spring, every year)
Students tutor beginning students of Hmong and are part of department’s Hmong language team.

HMNG 3993. Directed Studies. (1.0-5.0 cr.; max 15.0 cr.; Student Option No Audit; prereq #, %, @; fall, spring, offered periodically)
Guided individual study of Hmong language or linguistics.

HMNG 4001. Beginning Hmong I. (3.0 cr.; =HMNG 1011); prereq Grad student; fall, every year)
Continuation of 1011. Listening, speaking, reading, writing skills. Emphasizes development of communicative competence. Meets with 1011.

HMNG 4002. Beginning Hmong II. (3.0 cr.; =HMNG 1012); prereq 4001, grad student; spring, every year)
Continuation of 4001. Listening, speaking, reading, writing skills. Development of communicative competence. Meets with 1012.
HSEM 2005H. Honors Seminar. (3.0 cr.; A-F only; prereq Fr or soph honors student; fall, offered periodically)
Honors seminar; emphasis on active learning; frequently interdisciplinary.
HSEM 2006H. Honors Seminar. (3.0 cr.; A-F only; prereq Fr or soph honors student; spring, offered periodically)
Special topics course. Active learning; frequently interdisciplinary.
HSEM 2007H. Honors Seminar. (2.0-3.0 cr. [max 9.0 cr.]; A-F; prereq [Fr or soph] honors student; fall, spring, offered periodically)
Honors seminar; emphasis on active learning; frequently interdisciplinary.
HSEM 2008H. Honors Seminar. (2.0-3.0 cr. [max 9.0 cr.]; A-F only; prereq [Fr or soph] honors student; spring, offered periodically)
Special topics discussion course; active learning; frequently interdisciplinary.
HSEM 2009H. Honors Seminar. (3.0 cr.; A-F only; prereq Fr or soph honors student; fall, offered periodically)
Special topics course. Active learning. Frequently interdisciplinary.
HSEM 2010H. Honors Seminar. (3.0 cr. [max 9.0 cr.]; A-F or Audit; prereq [Fr or soph with less than 60 cr]; honors; fall, spring, every year)
Topic specified in Course Guide.
HSEM 2011H. Honors Seminar. (2.0-3.0 cr. [max 6.0 cr.]; A-F only; prereq [Fr or soph] honors student; fall, offered periodically)
Special topics discussion course; active learning; frequently interdisciplinary.
HSEM 2017H. Honors Seminar. (2.0-3.0 cr. [max 6.0 cr.]; A-F only; prereq [Fr or soph] honors student; fall, offered periodically)
Special topics discussion course; active learning; frequently interdisciplinary.
HSEM 2020H. Honors Seminar. (3.0 cr. [max 9.0 cr.]; A-F or Audit; prereq [Fr or soph with less than 60 cr]; honors; fall, spring, every year)
Topic specified in Course Guide.
HSEM 2025H. Honors Seminar. (2.0-3.0 cr. [max 6.0 cr.]; A-F only; prereq [Fr or soph] honors; fall, spring, offered periodically)
Special topics. Emphasizes active learning. Frequently interdisciplinary.
HSEM 2028H. Honors Seminar. (2.0-3.0 cr. [max 6.0 cr.]; A-F only; prereq [Fr or soph] honors student; spring, offered periodically)
Special topics discussion course; active learning; frequently interdisciplinary.
HSEM 2030H. Honors Seminar. (3.0 cr. [max 9.0 cr.]; A-F or Audit; prereq [Fr or soph with less than 60 cr]; honors; fall, spring, every year)
Topic specified in Course Guide.
HSEM 2033H. Honors Seminar. (2.0-3.0 cr. [max 6.0 cr.]; A-F only; prereq [Fr or soph] honors student; spring, offered periodically)
Special topics Course; emphasis on active learning; frequently interdisciplinary.
HSEM 2037H. Honors Seminar. (3.0 cr. [max 6.0 cr.]; A-F only; prereq Fr or soph honors student; fall, offered periodically)
Special topics discussion. Active learning. Frequently interdisciplinary.
HSEM 2039H. Honors Seminar. (2.0-3.0 cr. [max 6.0 cr.]; A-F only; prereq [Fr or soph] honors student; spring, offered periodically)
Topics Course. Emphasizes active learning. Interdisciplinary.
HSEM 2040H. Honors Seminar. (2.0-3.0 cr. [max 6.0 cr.]; A-F only; prereq [Fr or soph] honors student; spring, offered periodically)
Special topics discussion course; active learning; frequently interdisciplinary.
HSEM 2045H. Honors Seminar. (2.0-3.0 cr. [max 6.0 cr.]; A-F only; prereq [Fr or soph] honors student; fall, offered periodically)
Special topics discussion course; active learning; frequently interdisciplinary.
HSEM 2046H. Honors Seminar. (2.0-3.0 cr. [max 9.0 cr.]; A-F only; fall, spring, offered periodically)
Emphasizes active learning. Frequently interdisciplinary.
HSEM 2047H. Honors Seminar. (3.0 cr.; A-F only; prereq Fr or soph honors student; fall, offered periodically)
Honors seminar. Emphasis on active learning. Frequently interdisciplinary.
HSEM 2049H. Honors Seminar. (3.0 cr.; A-F only; prereq Fr or soph honors student; spring, offered periodically)
Special topics course. Active learning. Frequently interdisciplinary.
HSEM 2050H. Honors Seminar. (3.0 cr. [max 9.0 cr.]; A-F or Audit; prereq [Fr or soph with less than 60 cr]; honors; fall, spring, every year)
Topic specified in Course Guide.
HSEM 2051H. Honors Seminar. (2.0-3.0 cr. [max 12.0 cr.]; A-F only; fall, spring, offered periodically)
Honors seminar. Emphasis on active learning; frequently interdisciplinary.
HSEM 2053H. Honors Seminar. (3.0 cr.; A-F only; prereq [Fr or soph] honors student; fall, offered periodically)
Special topics discussion course; active learning; frequently interdisciplinary.
HSEM 2054H. Honors Seminar. (2.0-3.0 cr. [max 6.0 cr.]; A-F only; prereq [Fr or soph] honors; spring, offered periodically)
Honors seminar. Emphasizes active learning. Frequently interdisciplinary.
HSEM 2060H. Honors Seminar. (3.0 cr. [max 9.0 cr.]; A-F or Audit; prereq [Fr or soph with less than 60 cr]; honors; fall, every year)
Topic specified in Course Guide.
HSEM 2070H. Honors Seminar. (3.0 cr. [max 9.0 cr.]; A-F or Audit; prereq [Fr or soph with less than 60 cr]; honors; fall, every year)
Topic specified in Course Guide.
HSEM 2101H. Honors Seminar. (2.0-3.0 cr.; A-F only; prereq [Fr or soph] honors student; fall, offered periodically)
Special topics discussion course; active learning; frequently interdisciplinary.
HSEM 2103H. Honors Seminar. (2.0-3.0 cr. [max 9.0 cr.]; A-F only; prereq Fr or soph honors student; fall, spring, offered periodically)
Honors seminar; emphasis on active learning; frequently interdisciplinary.
HSEM 2105H. Honors Seminar. (3.0 cr. [max 9.0 cr.]; A-F only; prereq Fr or soph honors student; fall, offered periodically)
Honors seminar. Emphasis on active learning. Frequently interdisciplinary.
HSEM 2106H. Honors Seminar. (2.0-3.0 cr.; A-F only; prereq Fr or soph honors student; spring, offered periodically)
Special topics course. Active learning. Frequently interdisciplinary.
HSEM 2110V. Honors Seminar. (3.0 cr. [max 9.0 cr.]; A-F only; prereq [Fr or soph] honors; fall, spring, every year)
Topics course, offered interdisciplinary.
HSEM 2120V. Honors Seminar. (3.0 cr. [max 9.0 cr.]; A-F only; fall, spring, every year)
Honors seminar, writing intensive.

HSEM 2130V. Honors Seminar. (3.0 cr. [max 9.0 cr.]; A-F only; prereq Honors, [fr or soph]; fall, every year)
Honors seminar, writing intensive.

HSEM 2205H. Honors Seminar. (2.0-3.0 cr. [max 6.0 cr.]; A-F only; prereq [Fr or soph] honors student; fall, offered periodically)
Special topics discussion; active learning; frequently interdisciplinary.

HSEM 2206H. Honors Seminar. (2.0-3.0 cr. [max 6.0 cr.]; A-F only; prereq [Fr or soph] honors student; fall, offered periodically)
Special topics discussion; active learning; frequently interdisciplinary.

HSEM 2209H. Honors Seminar. (2.0-3.0 cr. [max 6.0 cr.]; A-F only; prereq [Fr or soph] honors student; spring, offered periodically)
Special topics discussion course; active learning; frequently interdisciplinary.

HSEM 2529H. Honors Seminar. (3.0 cr.; A-F only; prereq Fr or soph honors student; fall, offered periodically)
Topics Course. Emphasizes active learning. Frequently interdisciplinary.

HSEM 2530H. Honors Seminar. (2.0-3.0 cr. [max 6.0 cr.]; A-F only; prereq [Fr or soph] honors student; spring, offered periodically)
Special topics discussion. Emphasizes active learning. Frequently interdisciplinary.

HSEM 2538H. Honors Seminar. (2.0-3.0 cr. [max 6.0 cr.]; A-F only; prereq [Fr or soph] honors student; spring, offered periodically)
Special topics discussion. Emphasizes active learning. Frequently interdisciplinary.

HSEM 2539H. Honors Seminar. (3.0 cr.; A-F only; prereq Fr or soph honors student; fall, offered periodically)
Special topics. Discussion oriented. Emphasizes active learning. Frequently interdisciplinary.

HSEM 2541H. Honors Seminar. (3.0 cr.; max 9.0 cr.; A-F only; prereq Honors student; fall, offered periodically)
Special topics course. Active learning. Frequently interdisciplinary.

HSEM 2601H. Honors Seminar. (2.0-3.0 cr. [max 6.0 cr.]; A-F only; prereq Fr or soph honors student; fall, offered periodically)
Special topics discussion; active learning; frequently interdisciplinary.

HSEM 2607H. Honors Seminar. (2.0-3.0 cr. [max 9.0 cr.]; A-F only; prereq Fr or soph honors student; fall, offered periodically)
Honors seminar; emphasis on active learning; frequently interdisciplinary.

HSEM 2609H. Honors Seminar. (3.0 cr. [max 6.0 cr.]; A-F only; fall, every year)
Emphasizes active learning. Frequently interdisciplinary.

HSEM 2624H. Honors Seminar. (2.0-3.0 cr. [max 6.0 cr.]; A-F only; prereq [Fr or soph] honors student; spring, offered periodically)
Special topics course; emphasis on active learning; frequently interdisciplinary.

HSEM 2627H. Honors Seminar. (2.0-3.0 cr. [max 6.0 cr.]; A-F only; prereq [Fr or soph] honors student; fall, offered periodically)
Special topics course; emphasis on active learning; frequently interdisciplinary.

HSEM 2630H. Honors Seminar. (2.0-3.0 cr. [max 6.0 cr.]; A-F only; prereq [Fr or soph] honors student; spring, offered periodically)
Emphasizes active learning. Frequently interdisciplinary.

HSEM 2701H. Honors Seminar. (2.0-3.0 cr. [max 6.0 cr.]; A-F only; prereq [Fr or soph] honors student; fall, offered periodically)
Special topics discussion; active learning; frequently interdisciplinary.

HSEM 2702H. Honors Seminar. (2.0-3.0 cr. [max 6.0 cr.]; A-F only; prereq [Fr or soph] honors student; spring, offered periodically)
Emphasizes active learning. Frequently interdisciplinary.

HSEM 2707H. Honors Seminar. (2.0-3.0 cr. [max 12.0 cr.]; A-F only; spring, offered periodically)
Emphasizes active learning. Frequently interdisciplinary.

HSEM 2710H. Honors Seminar. (2.0-3.0 cr. [max 6.0 cr.]; A-F only; prereq Fr or soph honors student; spring, offered periodically)
Special topics course; emphasis on active learning; frequently interdisciplinary.

HSEM 2714H. Honors Seminar. (2.0-3.0 cr. [max 6.0 cr.]; A-F only; prereq [Fr or soph] honors student; spring, offered periodically)
Discussion oriented. Emphasizes active learning. Frequently interdisciplinary.

HSEM 2717H. Honors Seminar. (2.0-3.0 cr. ; A-F only; prereq Fr or soph honors student; fall, offered periodically)
Special topics course. Active learning. Frequently interdisciplinary.
HSEM 3017H. Honors Seminar. (2.0-3.0 cr. [max 6.0 cr.]; A-F only; prereq [Jr or sr] honors student; fall, offered periodically) Special topics course; emphasis on active learning; frequently interdisciplinary.

HSEM 3019H. Honors Seminar. (2.0-3.0 cr. [max 6.0 cr.]; A-F only; prereq [Jr or sr] honors student; fall, offered periodically) Special topics discussion; active learning; frequently interdisciplinary.

HSEM 3020H. Honors Seminar. (2.0-4.0 cr. [max 12.0 cr.]; A-F or Audit; prereq [Jr or sr], honors; fall, spring, every year) Special topics. Discussions, active learning. Often interdisciplinary.

HSEM 3021H. Honors Seminar. (2.0-3.0 cr. [max 9.0 cr.]; A-F only; prereq Jr or sr honors; fall, spring, offered periodically) Honors seminar; emphasis on active learning; frequently interdisciplinary.

HSEM 3022H. Honors Seminar. (2.0-3.0 cr. [max 9.0 cr.]; A-F only; prereq [Jr or sr], honors; fall, spring, offered periodically) Special topics. Discussion oriented, emphasizes active learning. Frequently interdisciplinary.

HSEM 3025H. Honors Seminar. (2.0-3.0 cr. [max 6.0 cr.]; A-F only; prereq [Jr or sr] honors student; fall, offered periodically) Special topics course; emphasis on active learning; frequently interdisciplinary.

HSEM 3026H. Honors Seminar. (2.0-3.0 cr. [max 6.0 cr.]; A-F only; prereq [Jr or sr] honors student; fall, offered periodically) Topics course; emphasis on active learning; frequently interdisciplinary.

HSEM 3027H. Honors Seminar. (3.0 cr.; A-F only; prereq Jr or Sr Honors Student; fall, offered periodically) Honors seminar. Emphasis on active learning, offered periodically.

HSEM 3028H. Honors Seminar. (2.0-3.0 cr. [max 6.0 cr.]; A-F only; prereq [Jr or sr] honors student; spring, offered periodically) Special topics discussion; active learning; frequently interdisciplinary.

HSEM 3030H. Honors Seminar. (3.0 cr. [max 9.0 cr.]; A-F or Audit; prereq [Jr or sr], honors; fall, spring, every year) Special topics. Discussions, active learning. Often interdisciplinary.

HSEM 3033H. Honors Seminar. (2.0-3.0 cr. [max 6.0 cr.]; A-F only; prereq [Jr or sr] honors student; fall, offered periodically) Special topics discussion; active learning; frequently interdisciplinary.

HSEM 3034H. Honors Seminar. (2.0-3.0 cr.; A-F only; prereq [Jr or sr], honors; fall, every year) Special topics. Discussion oriented, emphasizes active learning. Frequently interdisciplinary.

HSEM 3037H. Honors Seminar. (2.0-3.0 cr. [max 6.0 cr.]; A-F only; prereq [Jr or sr] honors student; fall, offered periodically) Special topics discussion; active learning, frequently interdisciplinary.

HSEM 3038H. Honors Seminar. (2.0-3.0 cr.; A-F only; prereq [Jr or sr], honors; spring, offered periodically) Special topics discussion course; emphasizes active learning. Frequently interdisciplinary.

HSEM 3039H. Honors Seminar. (3.0 cr. [max 6.0 cr.]; A-F only; prereq [Jr or sr] honors student; fall, offered periodically) Special topics discussion course; active learning; frequently interdisciplinary.

HSEM 3040H. Honors Seminar. (3.0 cr. [max 12.0 cr.]; A-F or Audit; prereq [Jr or sr], honors; fall, spring, every year) Special topics. Discussions, active learning. Often interdisciplinary.

HSEM 3046H. Honors Seminar. (2.0-3.0 cr. [max 6.0 cr.]; A-F only; prereq [Jr or sr] honors student; spring, offered periodically) Special topics discussion; active learning; frequently interdisciplinary.

HSEM 3047H. Honors Seminar. (2.0-3.0 cr. [max 6.0 cr.]; A-F only; prereq [Jr or sr] honors student; fall, offered periodically) Special topics discussion; active learning; frequently interdisciplinary.

HSEM 3047V. Honors Seminar. (3.0 cr. [max 6.0 cr.]; A-F only; prereq [Jr or sr] honors student; fall, offered periodically) Special topics discussion course; active learning; frequently interdisciplinary.

HSEM 3048H. Honors Seminar. (2.0-3.0 cr. [max 6.0 cr.]; A-F only; prereq [Jr or sr] honors student; spring, offered periodically) Special topics discussion course; active learning; frequently interdisciplinary.

HSEM 3049H. Honors Seminar. (2.0-3.0 cr. [max 6.0 cr.]; A-F only; prereq [Jr or sr] honors student; fall, offered periodically) Special topics discussion course; active learning; frequently interdisciplinary.

HSEM 3050H. Honors Seminar. (3.0 cr. [max 9.0 cr.]; A-F or Audit; prereq [Jr or sr], honors; fall, spring, every year) Special topics. Discussions, active learning, fall, spring, offered periodically.

HSEM 3051H. Honors Seminar. (2.0-3.0 cr. [max 6.0 cr.]; A-F only; prereq [Jr or sr] honors student; fall, offered periodically) Special topics discussion; active learning; frequently interdisciplinary.

HSEM 3052H. Honors Seminar. (2.0-3.0 cr. [max 6.0 cr.]; A-F only; prereq [Jr or sr] honors student; spring, offered periodically) Special topics discussion course; emphasizes active learning; frequently interdisciplinary.

HSEM 3053H. Honors Seminar. (2.0-3.0 cr. [max 6.0 cr.]; A-F only; spring, every year) Honors Seminar

HSEM 3054H. Honors Seminar. (2.0-3.0 cr. [max 6.0 cr.]; A-F only; prereq [Jr or sr] honors student; spring, offered periodically) Special topics discussion; active learning; frequently interdisciplinary.

HSEM 3055H. Honors Seminar. (2.0-3.0 cr. [max 6.0 cr.]; A-F only; fall, every year) Topics course.

HSEM 3059H. Honors seminar. (2.0-3.0 cr. [max 6.0 cr.]; A-F only; spring, every year) Honors Seminar

HSEM 3060H. Honors Seminar. (3.0 cr. [max 9.0 cr.]; A-F or Audit; prereq [Jr or sr], honors; fall, spring, every year) Special topics course designed to add breadth and depth to the education of honors students. Discussions and active learning. Often interdisciplinary in perspective.

HSEM 3067V. Honors Seminar. (3.0 cr.; A-F only; prereq Jr or Sr honors; fall, spring, every year) Active learning. Frequently interdisciplinary.

HSEM 3068H. Honors Seminar. (2.0-3.0 cr. [max 9.0 cr.]; A-F only; prereq [Jr or sr], honors; fall, spring, offered periodically) Special topics. Discussion oriented, emphasizes active learning. Frequently interdisciplinary.

HSEM 3070H. Honors Seminar. (3.0 cr. [max 9.0 cr.]; A-F or Audit; prereq [Jr or sr], honors; fall, spring, every year) Special topics course designed to add breadth and depth to the education of honors students. Discussions and active learning. Often interdisciplinary in perspective.

HSEM 3080H. Honors Seminar. (3.0 cr.; A-F or Audit; prereq [Jr or sr], honors; fall, spring, every year) Special topics course designed to add breadth and depth to the education of honors students. Discussions and active learning. Often interdisciplinary in perspective.

HSEM 3090H. Honors Seminar. (3.0 cr. [max 12.0 cr.]; A-F only; prereq [Jr or sr], honors; fall, spring, every year) Special topics course designed to add breadth and depth to the education of honors students. Discussions and active learning. Often interdisciplinary in perspective.

HSEM 3093H. Directed Studies. (1.0-4.0 cr. [max 16.0 cr.]; fall, every year) Additional research related to seminar topic. Prereq [Jr or sr], honors, instr consent, dept consent, college consent.

HSEM 3103H. Honors Seminar. (2.0-3.0 cr. [max 9.0 cr.]; A-F only; prereq [Jr or sr] honors students; fall, spring, offered periodically) Honors seminar; emphasis on active learning; frequently interdisciplinary.

HSEM 3106H. Honors Seminar. (2.0-3.0 cr. [max 6.0 cr.]; A-F only; prereq Jr or Sr honors students; spring, offered periodically) Special topics course. Active learning. Frequently interdisciplinary.

HSEM 3110V. Writing Intensive Honors Seminar. (3.0 cr. [max 12.0 cr.]; A-F only; prereq [Jr or sr], honors; fall, spring, every year) Special topics course. Discussions, active learning. Often interdisciplinary in perspective.

HSEM 3120V. Honors Seminar. (1.0-3.0 cr. [max 12.0 cr.]; A-F or Audit; prereq Jr or sr, honors; fall, spring, offered periodically)
Special topics course designed to add breadth and depth to the education of honors students. Discussions and active learning. Often interdisciplinary in perspective.

HSEM 310V. Honors Seminar. (1.0-3.0 cr.; A-F or Audit; prereq Jr or sr, honors; fall, spring, offered periodically)
Special topics course designed to add breadth and depth to the education of honors students. Discussions and active learning. Often interdisciplinary in perspective.

HSEM 3140V. Honors Seminar. (1.0-3.0 cr.; A-F or Audit; prereq Jr or sr, honors; fall, spring, offered periodically)
Special topics course designed to add breadth and depth to the education of honors students. Discussions and active learning. Often interdisciplinary in perspective.

HSEM 3201H. Honors Seminar. (3.0 cr.; A-F only; prereq Jr or sr honors student; fall, offered periodically)
Honors seminar. Emphasis on active learning. Frequently interdisciplinary.

HSEM 3202H. Honors Seminar. (3.0 cr.; A-F only; prereq Jr or sr honors student; spring, offered periodically)
Honors seminar. Emphasis on active learning. Frequently interdisciplinary.

HSEM 3205H. Honors Seminar. (2.0-3.0 cr.; max 6.0 cr.; A-F only; prereq Jr or sr honors student; fall, offered periodically)
Special topics discussion; active learning; frequently interdisciplinary.

HSEM 3206H. Honors Seminar. (2.0-3.0 cr.; max 9.0 cr.; A-F only; fall, spring, offered periodically)
Emphasizes active learning. Frequently interdisciplinary.

HSEM 3207H. Honors Seminar. (2.0-3.0 cr.; max 12.0 cr.; A-F only; fall, spring, offered periodically)
Emphasizes active learning. Frequently interdisciplinary.

HSEM 3210H. Honors Book Discussion. (1.0 cr. [max 2.0 cr.; S-N only; prereq Jr or sr], honors; fall, spring, every year)
Students read a text, meet to discuss. Lectures on text by faculty, other experts.

HSEM 3307H. Honors seminar. (2.0-3.0 cr.; max 6.0 cr.; A-F only; spring, every year)

HSEM 3308H. Honors Seminar. (3.0 cr.; A-F only; prereq Jr or sr honors student; spring, offered periodically)
Special topics course. Active learning. Frequently interdisciplinary.

HSEM 3320H. Honors Seminar. (2.0-3.0 cr.; max 9.0 cr.; A-F only; prereq Jr or sr, honors; fall, spring, offered periodically)
Special topics, discussions, active learning. Often interdisciplinary.

HSEM 3323H. Honors Seminar. (2.0-3.0 cr.; max 6.0 cr.; A-F only; prereq Jr or Sr honors student; fall, offered periodically)
Special topics course. Active learning. Frequently interdisciplinary.

HSEM 3404H. Honors Seminar. (2.0-3.0 cr.; max 6.0 cr.; A-F only; prereq Jr or Sr honors student; spring, offered periodically)
Special topics discussion; active learning; frequently interdisciplinary.

HSEM 3410H. Honors Seminar. (2.0-3.0 cr.; A-F only; prereq Jr or sr honors; spring, offered periodically)
Special topics. Discussion based. Frequently interdisciplinary.

HSEM 3522H. Honors Seminar. (2.0-3.0 cr.; max 9.0 cr.; A-F only; prereq Jr or sr, honors; fall, spring, offered periodically)
Special topics. Discussion oriented, emphasizes active learning. Frequently interdisciplinary.

HSEM 3530H. Honors Seminar. (2.0-3.0 cr.; max 6.0 cr.; A-F only; prereq Jr or sr honors; spring, offered periodically)
Special topics course, emphasis on active learning, frequently interdisciplinary.

HSEM 3608H. Honors Seminar. (2.0-3.0 cr.; A-F only; prereq Jr or sr honors student; spring, offered periodically)
Special topics course. Active learning. Frequently interdisciplinary.

HSEM 3609H. Honors seminar. (2.0-3.0 cr.; max 6.0 cr.; A-F only; spring, every year)

HSEM 3614H. Honors Seminar. (2.0-3.0 cr.; A-F only; prereq Jr or sr; honors student; spring, offered periodically)
Special topics discussion course. Active learning, frequently interdisciplinary.

HSEM 3701H. Honors Seminar. (2.0 cr.; A-F only; prereq Jr or Sr honors student; fall, offered periodically)
Honors seminar. Emphasis on active learning. Frequently interdisciplinary.

HSEM 3702H. Honors Seminar. (3.0 cr.; A-F only; prereq Jr or Sr honors student; spring, every year)
Special topics Course; emphasis on active learning; frequently interdisciplinary.

HSEM 3708H. Honors Seminar. (2.0-3.0 cr.; max 6.0 cr.; A-F only; spring, every year)
Frequently interdisciplinary.

HSEM 3716H. Honors Seminar. (2.0-3.0 cr.; max 6.0 cr.; A-F only; prereq Jr or Sr honors student; spring, offered periodically)
Emphasizes active learning. Frequently interdisciplinary.

HSEM 3719H. Honors Seminar. (2.0-3.0 cr.; A-F only; prereq Jr or Sr honors student; fall, offered periodically)
Special topics course. Active learning. Frequently interdisciplinary.

HSEM 3720H. Honors Seminar. (2.0-3.0 cr.; A-F only; prereq Jr or sr honors student; spring, offered periodically)
Special topics discussion course. Active learning, frequently interdisciplinary.

HSEM 3801H. Honors Seminar. (2.0-3.0 cr.; A-F only; prereq Jr or Sr, honors; fall, offered periodically)
Emphasizes active learning. Frequently interdisciplinary.

HSEM 3802H. Honors Seminar. (2.0-3.0 cr.; max 9.0 cr.; A-F only; prereq Jr or sr; honors; spring, offered periodically)
Emphasizes active learning. Frequently interdisciplinary.

HSEM 3991H. Honors Directed Research. (1.0-3.0 cr.; max 6.0 cr.; A-F only; fall, every year)
TBD

HSEM 3992H. Honors Interdisciplinary Research. (1.0-3.0 cr.; max 9.0 cr.; A-F only; prereq Jr or sr; honors student; spring, offered periodically)
Independent/collaborative research course arranged with a faculty member through which honors students will bring varying academic perspectives to research topics.

Horticultural Science (HORT)
College of Food, Agricultural and Natural Resource Sciences

HORT 1001. Plant Propagation. (4.0 cr.; fall, spring, every year)
Principles and techniques of propagating plants by seeds, cuttings, grafts, buds, layers, and division. Lectures on principles; labs on practice of various propagating techniques.

HORT 1003. Horticulture for the Home Gardener. (3.0 cr.; spring, every year)

HORT 1013. Floral Design. (3.0 cr.; fall, offered periodically)

HORT 1014. Edible Landscape. (3.0 cr.; spring, every year)
Tracing our relationship with edible landscapes traces to our hunting-gathering origins. Technological/social changes that have distanced us from our food. Integrating food plants into pleasing, sustainable, and edible landscapes in yards, neighborhoods, and cities.

HORT 1015. Woody and Herbaceous Plants. (4.0 cr.; A-F only; fall, every year)
How to identify plants around the world. A notable cultivars.

HORT 1031. Vines and Wines: Introduction to Viticulture and Enology. (3.0 cr.; Student Option No Audit; prereq 21 yrs of age by date of 1st class meeting; fall, spring, every year)
History of wine, principles of biology, culture of grapevine, fermentation, sensory evaluation of wine.

**HORT 1061. The Sustainable Lawn.** (3.0 cr.; fall, every year)
Common turf grasses. How to manage home lawn in sustainable way. Maintaining quality turf areas with reduced inputs.

**HORT 1090. Directed Studies.** (1.0-3.0 cr.; prereq # or department permission; fall, spring, summer, every year)
Approved field, lab, or greenhouse experiences in application of horticultural information/practices.

**HORT 1901. Topics: Freshman Seminar.** (3.0 cr.; prereq Fr; fall, every year)
Topics vary.

**HORT 1905. Freshman Seminar.** (1.0-3.0 cr.; prereq Fr; fall, spring, every year)
Topics vary.

**HORT 1942. Topics: Freshman Seminar.** (3.0 cr.; A-F or Audit; fall, spring, every year)
Interdisciplinary seminar. Topics specified in Class Schedule.

**HORT 2031. Organic Food: How to Grow It, Where to Buy It, Can it Feed the World?** (3.0 cr.; fall, every year)

**HORT 2100. Agricultural Biochemistry.** (3.0 cr.; A-F only; prereq CHEM 1011 or [1015, 1017] or CHEM 1021 or #; fall, every year)

**HORT 3000. Horticulture Global Seminar.** (3.0 cr. [max 6.0 cr.]; Student Option No Audit; summer, odd years)
Three-week travel course. In-depth study of particular topic in horticulture in a foreign country. Lectures and field trips for 15 days, with weekends free.

**HORT 3005W. Environmental Effects on Horticultural Crops.** (4.0 cr.; prereq 1001, BIOL 1009, soph; spring, every year)
Introduction to physiological basis for effects of environment on plant growth/development. How to produce optimal plant growth. Experimental technique, data analysis, scientific writing. Lecture, readings, lab.

**HORT 3090. Directed Studies.** (1.0-3.0 cr.; [max 6.0 cr.]; prereq Nonfr, #; fall, spring, summer, every year)
Approved field, lab, or greenhouse experiences in application of horticultural information/practices.

**HORT 3131. Student Organic Farm Planning, Growing, and Marketing.** (3.0 cr.; =AGRO 5131, AGRO 3131, HORT 5131; prereq 1001 or AGRO 1101 or AGRO 1103 or BIOL 1001 or BIOL 1009 or #; spring, every year)
Students plan/implement cropping/marketing strategies for organic produce/flowers from Student Organic Farm on St. Paul campus.

**HORT 3480. Topics in Sustainable Horticulture.** (1.0-3.0 cr.; A-F only; fall, spring, summer, every year)
Various topics.

**HORT 4000. International Experiences in Horticultural Science.** (3.0 cr.; [max 6.0 cr.]; spring, every year)
Perspectives in horticultural science/cultural diversity through various international settings.
Preparation for international study tour of one to three weeks.

**HORT 4015. Advanced Woody and Herbaceous Plant Topics.** (1.0 cr. [max 7.0 cr.]; A-F only; prereq 1015; fall, spring, summer, every year)
Species, cultivars, identification, and use for each genus of one group of plants.

**HORT 4016W. Turfgrass Management.** (3.0 cr.; prereq 1001 or #; fall, every year)

**HORT 4062. Turfgrass Weed and Disease Science.** (1.0-3.0 cr.; A-F only; prereq [4061, PLPA 2001] or #; fall, every year)
Turfgrass weed/disease problems. How to deal with these problems using an integrated approach. Biology, identifying features, and management strategies for several turfgrass diseases/weeds. How to apply IPM principles to turfgrass weed/disease problems.

**HORT 4063. Turfgrass Science.** (3.0 cr.; A-F only; prereq 4061; spring, every year)
Ecology, physiology, and theory of turf population dynamics. Specialized management situations such as golf course, commercial sod production, and fine turf athletic settings.

**HORT 4071W. Applications of Biotechnology to Plant Improvement.** (4.0 cr.; prereq [Bioi 1009 or equiv or grad student]; #; fall, every year)

**HORT 4096. Professional Experience Program: Internship.** (1.0 cr. [max 2.0 cr.]; S-N only; prereq CFANS undergrad, completed internship contract prior to employment; fall, spring, summer, every year)
Professional experience in horticulture firms or government agencies attained through supervised practical experience. Students evaluate reports, consult with faculty advisers/employers.

**HORT 4096W. Professional Experience Program: Internship.** (2.0 cr.; A-F only; prereq CFANS undergrad; fall, spring, summer, every year)
Professional experience in horticultural businesses, government agencies, arboreta, and botanical gardens achieved through a supervised practical experience. Students produce a final publication focusing on writing for lay audiences. Project starts before the internship begins and ends approximately two months after the internship is complete.

**HORT 4141W. Plant Production I.** (4.0 cr.; A-F only; prereq 1001 or 1015 or #; fall, every year)
Basic techniques in producing nursery plants, including irrigation, fertilization, and pruning. Lectures, labs, weekly discussions.

**HORT 4401. Plant Genetics and Breeding.** (4.0 cr.; =[AGRO 4401]; prereq Biol 1009 or equiv or grad; #; spring, every year)
Principles of plant genetics and environmental variation. Applications of genetics to crop evolution and breeding of self-pollinated, cross-pollinated, and asexually propagated crops. Lab experiments investigate hybridization, variation, and selection.

**HORT 4461. Horticultural Marketing.** (3.0 cr.; A-F only; =APEC 4461; prereq APEC 1101 or ECON 1101; fall, every year)
Major areas in horticultural marketing. Difference between horticultural products and commercial commodities. Core marketing components that should be used by every small horticultural business. Approaches to consumer research.

**HORT 4461. Aquaponics: Integrated fish and plant food systems.** (4.0 cr.; A-F only; prereq [Biol 1001 or 1009], [Chem 1015, Chem 1017] or [Chem 1061, Chem 1065] or #; spring, every year)
Advanced training/experience at intersection of biology, engineering, economics, policy, culture, environment. Emphasis on experiential learning (i.e., system design/maintenance, community engagement).

**HORT 4480. Pollinator Protection in Managed Landscapes.** (3.0 cr.; A-F or Audit; prereq [1001 or AGRO 1101 or BIOL 1009 or BIOL 1001 or ENT 1001 or PLPA 1005], 30 credits completed (non-freshman status); spring, every year)
Insect pollinators in agricultural/other natural landscapes. Risks to pollinators. Ways risks can be reduced, minimized, or overcome. Ways public policy has impacted pollinators/how future policy decisions will affect pollinator protection efforts.

**HORT 5007. Advanced Plant Propagation.** (3.0 cr.; prereq 1001 or BIOL 2022; spring, even years)
HORT 5011. Common Chinese Medicinal Plants: Classification, Identification, and Application. (3.0 cr.; prereq 1001 or BIOL 1009 or #; fall, odd years)

HORT 5012. Common Chinese Medicinal Plants: Growing and Processing. (3.0 cr.; prereq 1001 or BIOL 1009 or CHEM 1015 or #; fall, even years)
How to grow, process, store 40 common Chinese herbs/herbal products.

HORT 5023. Public Garden Management. (2.0 cr.; spring, every year)

HORT 5031. Fruit Production and Viticulture for Local and Organic Markets. (3.0 cr.; A-F or Audit; prereq [1001, 3005] or #; fall, odd years)
Principles of fruit production. Temperature fruit crops. Integrated management of fruit cropping systems. Site selection, cultural management practices, taxonomic classification, physiological/environmental control of plant development. Writing.

HORT 5032. Organic Vegetable Production. (3.0 cr.; A-F or Audit; prereq [3005, ENT 1005, PLPA 2001, SOIL 2125] or #; spring, even years)
Integrated management of vegetable cropping. Site selection/environment, seed/stand establishment, cultural management, commodity use, handling. Types of vegetable cultivars. Breeding, physiological/environmental control.

HORT 5051. Plant Production II. (4.0 cr.; A-F or Audit; prereq 1001, 1015; spring, every year)

HORT 5058. Plant Cytogenetics. (2.0 cr.; prereq [HORT/AGRO 4401, BIOL 4004] or #; spring, even years)

HORT 5059. Plant Cytogenetics Lab. (1.0 cr. [max 2.0 cr.; prereq [HORT/AGRO 4401, BIOL 4004] or #; spring, even years)
Consolidate knowledge of plant cytogenetics by practicing series of microscopy/
computational technologies. Examine number, movement, structure/structure modification of chromosomes. Application in plant improvement.

HORT 5061. Advanced Turfgrass Science. (2.0 cr.; prereq 4061; spring, every year)
For advanced students in turf with career objectives in professional turf management. Emphasis on ecology, physiology, theory of turf population dynamics/specialized management situations such as golf course, commercial sod production, fine turf athletic settings.

HORT 5071. Ecological Restoration. (4.0 cr.; prereq [one college course in ecology, one college course in [plant science or botany]] or #; fall, every year)

HORT 5090. Directed Studies. (1.0-3.0 cr. [max 6.0 cr.; prereq 8 cr upper div Hort courses; #; fall, spring, summer, every year])
In-depth exploration of concepts, technology, materials, or programs in specific area to expand professional competency/self-confidence. Planning, organizing, implementing, and evaluating knowledge obtained from formal education and from experience.

HORT 5131. Student Organic Farm Planning, Growing, and Marketing. (3.0 cr.; [HORT 3131, AGRO 5131, AGRO 3131]; prereq 1001 or AGRO 1101 or AGRO 1103 or BIOL 1001 or BIOL 1009 or #; spring, every year)
Students plan/implement cropping/marketing strategies for organic produce/flowers from Student Organic Farm on St. Paul campus.

HSG 1461. Introduction to Housing. (3.0 cr.; A-F or Audit; fall, every year)
Physical, social, economic, and psychological aspects of housing. Housing as process/product for the individual, family, and community. Impacts of federal, state, and local governmental policies and economic trends.

HSG 2196. Work Experience in Housing Studies. (1.0-4.0 cr. [max 8.0 cr.]; S-N only; prereq [Plan submitted/approved by [adviser, internship supervisor], written approval of supervisor; #; fall, spring, summer, every year])
Supervised work experience relating activity in business, industry, or government to the student's area of study. Integrative paper or project may be required.

HSG 3170. Topics in Housing Studies. (1.0-4.0 cr. [max 32.0 cr.]; A-F or Audit; fall, spring, summer, every year)
In-depth investigation of specific topic.

HSG 3482. Sustainable Housing: Community, Environment, and Technology. (3.0 cr.; A-F or Audit; =ESP 3601; spring, offered periodically)

HSG 4160H. Honors Capstone Project. (2.0 cr. [max 4.0 cr.]; A-F only; prereq Housing studies honors; fall, spring, every year)
Individualizes honors experience by connecting aspects of major program with special academic interests.

HSG 4193. Directed Study in Housing Studies. (1.0-4.0 cr. [max 8.0 cr.]; A-F or Audit; prereq Undergrad; #; fall, spring, summer, every year)
Independent study in Housing Studies under tutorial guidance.

HSG 4196. Internship in Housing Studies. (1.0-4.0 cr.; S-N or Audit; =GDES 4196, ADES 4196; prereq Completion of at least one-half of professional sequence, plan submitted/approved in advance by [adviser, internship supervisor], written consent of faculty supervisor; #; fall, spring, summer, every year)
Supervised work experience relating activity in business, industry, or government to the student's area of study. Integrative paper or project may be required.

HSG 4413. A Systems Approach to Residential Construction. (4.0 cr.; A-F or Audit; =BBE 5413, BBE 4413; prereq Upper div or #; spring, every year)
Dynamic/interrelated issues of energy, moisture control, indoor air quality in residential buildings. Emphasizes design, construction, and operational aspects to provide an energy efficient, durable structure, and healthy living environment. Interaction between moisture and wood products within building system.

HSG 4461. Housing Development and Management. (4.0 cr.; A-F or Audit; prereq [[1461 or DHA 1461], [2463 or DHA 2463]] or grad student or #; spring, every year)
Housing development process/financing. Management of multifamily housing. Emphasizes housing for low-income families/specific populations (e.g., older residents).

HSG 4465. Housing in a Global Perspective. (3.0 cr.; A-F or Audit; prereq [2401 or DHA 2401], [2463 or DHA 2463] or grad student or #; spring, every year)
Demographic changes, economic connections, and public policies for housing around the world. Sustainable development, rural-to-urban migration, land distribution, economic globalization, and civil conflict and war.
HSG 4467W. Housing and the Social Environment. (4.0 cr.; A-F or Audit; prereq 2401 or DHA 2401 or #; fall, every year) Housing choices in context of social environment. Emphasizes special needs of elderly, disabled, minorities, large families, female-headed households, and low-income households. Students conduct a post-occupancy evaluation of housing.

HSG 5170. Topics in Housing Studies. (1.0-4.0 cr. [max 32.0 cr.]; A-F or Audit; prereq Jr or sr or grad student; fall, spring, summer, every year) In-depth investigation of a single specific topic, announced in advance.

HSG 5193. Directed Study in Housing Studies. (1.0-4.0 cr. [max 8.0 cr.]; A-F or Audit; prereq Jr or sr or grad student; fall, spring, summer, every year) Independent study in Housing Studies under tutorial guidance.

HSG 5196. Field Study: National/International. (1.0-10.0 cr.; A-F or Audit; = [GDES 5196, APST 5196, DES 5196]; prereq #: fall, spring, summer, every year) Faculty-directed field study in national or international setting.

HSG 5463. Housing Policy. (3.0 cr.; A-F or Audit; = [PA 5261]; prereq [2401 or DHA 2401], [2463 or DHA 2463] or #; spring, every year) Institutional/environmental settings that make up housing policy in the United States. Competing ideas about solving housing problems through public intervention in the market. Federal/local public sector responses to housing problems.

HSG 5464. Understanding Housing: Assessment and Analysis. (3.0 cr.; A-F or Audit; = [PA 5261]; prereq [2401 or DHA 2401], [2463 or DHA 2463] or #; spring, every year) Analytical design applied to analysis/presentation of housing/housing-related data. Use of Geographical Information Systems (GIS) to display, analyze, and communicate spatial data related to housing.

HSG 5467. Housing and the Social Environment. (4.0 cr.; A-F or Audit; prereq Grad student; fall, every year) Housing choices in context of social environment. Emphasizes special needs of elderly, disabled, minorities, large families, female-headed households, and low-income households. Students conduct a post-occupancy evaluation of housing.

HSG 5471. Housing Studies Certificate Seminar. (2.0 cr.; A-F or Audit; prereq Admitted to Housing Studies Certificate Prog; spring, even years) Integrative seminar and "capstone" to Certificate program. Students prepare an individual career plan that focuses on application of housing studies to community/workplace.

HSG 5481. Promoting Independence in Housing and Community. (3.0 cr.; A-F or Audit; prereq [2401 or DHA 2401]; [jr or sr or grad student] or #; fall, odd years) Housing, work, and community environments as they relate to aging and managing disabilities. Principles of home modification, universal design, livable communities, and assistive technology to support individuals/families.

HSG 5484. Rural Housing Issues. (3.0 cr.; A-F or Audit; prereq [2401 or DHA 2401], [2463 or DHA 2463] or #; spring, odd years) Housing issues for non-metropolitan places, small towns, and rural areas. Housing needs and policy implications for rural residents. Economic development strategies for housing availability, adequacy, and affordability.

Human Factors (HUMF)

College of Design

HUMF 5001. Foundations of Human Factors/Ergonomics. (3.0 cr.; A-F or Audit; = [KIN 5001]; prereq Grad HumF major or minor or #) Variability in human performance influenced by interaction with designs of machines/tools, computers/software, complex technological systems, jobs/working conditions, organizations, sociotechnical institutions. Conceptual, empirical, practical aspects of human factors/ergonomics.

HUMF 5193. Directed Study in Human Factors and Ergonomics. (1.0-4.0 cr. [max 8.0 cr.]; A-F only; prereq #: fall, spring, summer, every year) Independent study in human factors/ergonomics under tutorial guidance.

HUMF 5211. Human Factors and Work Analysis. (4.0 cr.; A-F or Audit; = [ME 5211, IE 5511, IE 4511]; fall, every year) Human factors engineering (ergonomics), methods engineering, work measurement, displays, controls, instrument layout, supervisory control. Anthropometry, work physiology, biomechanics. Noise, illumination, toxicology. Operations analysis, motion study, time standards.

HUMF 5722. Human Factors Psychology. (3.0 cr.; A-F or Audit; prereq Grad student or #) Psychological principles that underlie human interactions with technological systems. Techniques/methodologies to assess faulty/incorrect system design. Emphasizes human-centered approaches. Rigorous evaluation of human-machine interaction.

HUMF 5874. Service Design: Designing complex systems to improve service delivery. (4.0 cr.; A-F only; prereq Grad student; spring, every year) Real world service delivery problems. Perceptual/cognitive strengths/weaknesses addressed when designing systems.

Human Resources and Industrial Relations (HRIR)

Curtis L. Carlson School of Management

HRIR 1907W. Freshman Seminar. (3.0 cr. [max 6.0 cr.]; A-F only; prereq Fr; fall, every year) Topics vary.


HRIR 3031. Staffing and Selection: Strategic and Operational Concerns. (2.0 cr.; prereq 3021, [CSOM or HRD junior or senior or #]; spring, every year) Introduction to theory/practice of staffing decisions. Recruitment, selection, promotion, demotion, transfer, dismissal, layoff, retirement. Staffing analyzed from strategic/operational perspectives. Legal issues.

HRIR 3032. Training and Development. (2.0 cr.; prereq 3021, [CSOM or HRD junior or senior or #]; spring, every year) Introduction to theory/research/practice of design/implementation/evaluation of employee training/development programs. Training as process for influencing individual/organizational outcomes.

HRIR 3041. The Individual in the Organization. (2.0 cr.; prereq 3021, [CSOM or HRD junior or senior or #]; fall, every year) Factors influencing individual work performance. Includes motivation, perceptual differences, career choice, psychological contracts, assumptions about workers/work, leadership/management, learning/skill development, openness to change. Examines evidence on current trends.

HRIR 3042. The Individual and Organizational Performance. (2.0 cr.; prereq 3021, [CSOM or HRD junior or senior or #]; fall, every year) Factors influencing group, team, organizational performance. Systems that drive organizational success. Job design/organization structure, organization effectiveness measures, culture, group dynamics, teamwork. Power/influence.

HRIR 3051. Compensation: Theory and Practice. (2.0 cr.; prereq 3021, [CSOM or HRD junior or senior or #]; fall, every year) Introduction to compensation/reward programs in employing organizations. Theories of organizational/employee behavior used in
design/implementation of pay programs. Design, implementation, job evaluation, salary surveys, skill-based pay, merit-based pay, other compensation programs.

HRIR 3071. Union Organizing and Labor Relations. (2.0 cr.; prereq 3021, [CSOM or HRD junior or senior or %]; spring, every year) Analysis of labor unions, employee associations, collective bargaining within framework of contemporary American legislation/policy. Forming/organizing labor unions. Management strategies/responsibilities, historical influences on policy/practice in private/public sectors.

HRIR 3072. Collective Bargaining and Dispute Resolution. (2.0 cr.; prereq 3021, [CSOM or HRD junior or senior or %]; spring, every year) Collective bargaining, contract administration, grievance processing, interest/rights arbitration, strikes, related policies/practices of employers, workers, labor unions in private/public sectors. Impact/transfer of practices to non-union sector.

HRIR 4100W. HRIR Capstone: Personal and Organizational Leadership. (4.0 cr.; A-F only; prereq 3021, 6 HRIR credits, [CSOM or HRD junior or senior or %]; spring, every year) Leadership as important competency for HR professionals. Reflection/growth of personal leadership skills. Techniques, strategies, philosophies to develop leadership acumen of individuals within organizations. Leadership research.

HRIR 5000. Topics in Human Resources and Industrial Relations. (2.0 cr. [max 8.0 cr.]; prereq HRIR MA student must register A-F, 3021, [CSOM or HRD junior or senior or %]; fall, spring, summer, every year) Topics in human resources/industrial relations.

HRIR 5028. Leadership and Personal Development. (2.0 cr.; A-F only; spring, every year) Effective/ethical leadership. Leadership theory. Personal leadership strengths/vulnerabilities. Exercises, role playing, giving/receiving feedback. Students create leadership development plan.

HRIR 5222. Managing Diversity. (2.0 cr.; prereq HRIR MA student must register A-F, 3021, [CSOM or HRD junior or senior or %]; fall, spring, every year) How to manage diverse workforce. Human resource practices examined with respect to diversity. How to incorporate diversity into decision making to enhance organizational performance.


HRIR 5443. Principles of Effective Coaching. (2.0 cr.; prereq HRIR MA student must register A-F, 3021, [CSOM or HRD junior or senior or %]; fall, every year) Skills/competencies required to coach, mentor, develop employees/leaders. Managing coaching process. Planning coaching relationship. Coaching as leadership development strategy. Coaching executives.


HRIR 5655. Public Policies on Work and Pay. (3.0 cr.; =[IPA 5431]; prereq HRIR MA student must register A-F, ECON 1101, [CSOM or HRD junior or senior or %]; spring, every year) Analysis of public policies regarding employment, unions, labor markets. Public programs affecting wages, unemployment, training, worker mobility, security, quality of work life. Policy implications of changing nature of work.


HRIR 5992. Independent Study in Human Resources and Industrial Relations. (1.0-8.0 cr.; prereq % or %; fall, spring, summer, every year) Individual readings or research topics.

**Icelandic (ICEL)**

**College of Liberal Arts**

ICEL 1101. Intensive Modern Icelandic. (6.0 cr.; =[ICEL 4101]; prereq %; summer, every year) Basic listening, speaking, reading, writing. Everyday subjects (shopping, directions, family, food, housing). Culture/society. First half is at University of Minnesota-Twin Cities; second half is at University of Iceland-Reykjavik. Six-week course.

ICEL 4101. Intensive Modern Icelandic. (3.0 cr.; =[ICEL 1101]; prereq grad student, %; summer, every year) Basic listening, speaking, reading, writing. Everyday subjects (shopping, directions, family, food, housing). Culture/society. First half is at University of Minnesota-Twin Cities; second half is at University of Iceland-Reykjavik. Six-week course. Meets with 1101.

**Industrial Engineering (IE)**

College of Science and Engineering

IE 1101. Foundations of Industrial and Systems Engineering. (4.0 cr.; A-F only; prereq [MATH 1372 or equiv], CSE student; fall, every year) History/development of industrial/systems engineering, operations planning, quality control, human factors, resource management, financial engineering, facility layout/optimization, probabilistic/stochastic models, simulation, project management.

IE 2021. Engineering Economics. (4.0 cr.; A-F only; prereq [MATH 1372 or equiv], CSE student; fall, every year) Cost/design process, cost estimation models, cash flow analysis, interest rate models, time value of money, evaluation of projects, internal rate of return, depreciation/income taxes, price changes/inflation, capital budgeting, decision making under uncertainty.

IE 3011. Optimization I. (4.0 cr.; A-F only; prereq 1101, MATH 2374, MATH 2373, Upper Division CSE; fall, every year) Optimization models, data/solutions, linear programming, simplex method, duality theory, sensitivity analysis, network optimization models, integer programming.

IE 3012. Optimization II. (4.0 cr.; A-F only; prereq 3011, ISyE major; fall, every year) Nonlinear programming, convexity, gradient method, constrained optimization, Lagrangian function, KKT condition, duality theory, dynamic optimization.

IE 3041. Industrial Assignment I. (2.0 cr.; A-F or Audit; prereq ME upper division, registration in ME co-op program; spring, every year) Industrial work assignment in engineering intern program. Evaluation based on student’s formal written report covering semester’s work assignment.

IE 3521. Statistics, Quality, and Reliability. (4.0 cr.; prereq MATH 1372 or equiv; fall, spring, summer, every year) Random variables/probability distributions, statistical sampling/measurement, statistical inference, confidence intervals, hypothesis testing, single/multivariate regression, design of experiments, statistical quality control, quality management, reliability, maintainability.

IE 3522. Quality Engineering and Reliability. (4.0 cr.; A-F only; =IE 5522); prereq 3521,
MATH 2373, MATH 2374, ISyE major; spring, every year)
Quality engineering/management, economics of quality. Statistical process control, reliability, maintainability, availability.

IE 3553. Simulation. (4.0 cr.; A-F only; = [IE 5553]; prereq CSCI 1113, 3521, ISyE major; spring, every year)
Introduction to techniques/tools of stochastic simulation. Applications from finance/insurance risk. Problems in inventory/queueing.

IE 4011. Stochastic Models. (4.0 cr.; A-F only; prereq ISyE major; MATH 2373, MATH 2374, ISyE major; spring, every year)

IE 4041W. Senior Design. (4.0 cr.; A-F only; prereq 1101, 2021, 3012, 3522, 3553, 4011, 4511, 4541W, 3521, 4551, ISyE senior; spring, every year)
Work in small teams to address open-ended problem in industrial/systems engineering. Teams work with faculty or industry advisers. Project, midterm/final presentation, final report.

IE 4042. Industrial Assignment II. (2.0 cr.; A-F or Audit; prereq ME upper div, registration in ME co-op program; fall, spring, offered periodically)
Industrial work assignment in engineering intern program. Evaluation based on student's formal written report.

IE 4043. Industrial Assignment III. (4.0 cr.; A-F or Audit; prereq 4042, spring, every year)
Solution of system design problems that require developing criteria, evaluating alternatives, and generating a preliminary design. Final report emphasizes design communication and describes design decision process, analysis, and final recommendations.

IE 4511. Human Factors. (4.0 cr.; A-F only; = [ME 5211, IE 5511, HUMF 5211]; prereq ISyE senior; fall, every year)

IE 4541W. Project Management. (4.0 cr.; A-F only; = [IE 5541]; prereq ISyE senior; fall, every year)
Introduction to engineering project management. Analytical methods of selecting, organizing, budgeting, scheduling, and controlling projects. Risk management, team leadership, program management.

IE 4551. Production and Inventory Control. (4.0 cr.; A-F only; = [IE 5551]; prereq 3011, 3521, ISyE major; spring, every year)
Methods for managing production, inventory, supply chain operations. Demand forecasting, inventory control, production planning/scheduling, supply chain coordination, manufacturing flow analysis. Implications of emerging technologies, business practices, government regulations.

IE 5080. Topics in Industrial Engineering. (1.0-4.0 cr.; A-F only; = IE 4541W; prereq Upper div or grad student; fall, spring, offered periodically)
Topics vary each semester.

IE 5111. Systems Engineering I. (2.0 cr.; A-F or Audit; prereq CSE upper div or grad student; fall, every year)

IE 5112. Introduction to Operations Research. (3.0 cr.; A-F or Audit; prereq [Math 2243 or Math 2373 or equiv.]; one semester of probability or statistics, [CSE upper div or grad student]); fall, spring, every year)
Survey of Operations Research models/methods in deterministic/stochastic settings. Linear programming, integer programming, networks, forecasting, Markov chains, and queuing systems. Examples from various application areas, such as systems engineering, logistics, design, and project management.

IE 5113. Systems Engineering II. (4.0 cr.; A-F or Audit; prereq 5111, a course on basic probability, [CSE upper div or grad student]; spring, every year)
Systems engineering thinking/techniques presented in 5111. Hands-on techniques applied to specific problems. Topics pertinent to effectiveness of design process. Practices and organizational/reward structure to support collaborative, globally distributed design team.

IE 5441. Financial Decision Making. (4.0 cr.; A-F only; prereq CSE upper div or grad student; fall, spring, summer, every year)
Cash flow streams, interest rates, fixed income securities. Evaluating investment alternatives, capital budgeting, dynamic cash flow process. Mean-variance portfolio selection, Capital Asset Pricing Model, utility maximization, risk aversion. Derivative securities, asset dynamics, basic option pricing theory.

IE 5511. Human Factors and Work Analysis. (4.0 cr.; A-F or Audit; prereq 5511, a course on basic probability, [CSE upper div or grad student]; fall, spring, every year)

IE 5513. Engineering Safety. (4.0 cr.; A-F or Audit; prereq Upper div CSE or grad student; fall, spring, every year)
Occupational, health, and product safety. Standards, laws, and regulations. Hazards and their engineering control, including general principles, tools and machines, mechanics and structures, electrical safety, materials handling, fire safety, and chemicals. Human behavior and safety, procedures and training, warnings and instructions.

IE 5522. Quality Engineering and Reliability. (4.0 cr.; = [IE 3522]; prereq 4521 or equiv.)
Quality engineering/management, economics of quality, statistical process control design of experiments, reliability, maintainability, availability.

IE 5531. Engineering Optimization I. (4.0 cr.; prereq Upper div or grad student or CSE; fall, every year)
Linear programming, simplex method, duality theory, sensitivity analysis, interior point methods, integer programming, branch/bound/dynamic programming. Emphasizes applications in production/logistics, including resource allocation, transportation, facility location, networks/flows, scheduling, production planning.

IE 5541. Project Management. (4.0 cr.; = [IE 4541W]; prereq Upper div or grad student; fall, spring, every year)
Introduction to engineering project management. Analytical methods of selecting, organizing, budgeting, scheduling, and controlling projects, including risk management, team leadership, and program management.

IE 5545. Decision Analysis. (4.0 cr.; prereq 4521 or equiv.)
Normative theories of decision making. Emphasizes structuring of hard decision problems arising in business and public policy contexts. Decision trees, expected utility theory, screening prospects by dominance, assessment of subjective probability, multiple attribute utility, analytic hierarchy process, benchmarking with data envelopment analysis, basics of game theory.

IE 5551. Production Planning and Inventory Control. (4.0 cr.; = [IE 4551]; prereq CSE or upper div or grad student; fall, spring, every year)
Inventory control, supply chain management, demand forecasting, capacity planning, aggregate production and material requirement planning, operations scheduling, and shop floor control. Quantitative models used to support decisions. Implications of emerging information technologies and of electronic commerce for supply chain management and factory operation.

IE 5553. Simulation. (4.0 cr.; = [IE 3553]; prereq Upper div or grad student; familiarity with probability/statistics recommended; fall, spring, offered periodically)
Discrete event simulation. Using integrated simulation/animation environment to create, analyze, and evaluate realistic models for various industry settings, including manufacturing/service operations and systems engineering. Experimental design.
Integration of hardware, software and operational practice. Recap of machine architecture/organization. Complex technology issues, e.g., designing for scalability, configuring systems, architecting storage systems, monitoring/testing performance, executing recovery processes, managing software licenses. Lab based; Microsoft Server, and Linux OS.

**INET 4032. Storage Design and Administration.** (2.0 cr.; A-F or Audit; fall, every year)


**INET 4041. Emerging Network Technologies and Applications.** (3.0 cr.; A-F or Audit; prereq [CSCI 4211 or equiv professional experience or #], 45 cr; fall, every year)


**INET 4051. IT Infrastructure Operations.** (3.0 cr.; A-F or Audit; prereq [CSCI 4211 or equiv professional experience or #], 45 cr; spring, every year)

Network, server, and database operations. Infrastructure architecture, organizational structure, security, metrics, vendor relations, outsourcing, capacity planning, strategic planning, budgeting. Online case study.

**INET 4061. Introduction to Business Intelligence and Data Warehousing.** (3.0 cr.; A-F or Audit; prereq [4707 or CSCI 4707 or #], sr; spring, every year)


**INET 4082. IT Infrastructure Projects and Processes.** (2.0 cr.; A-F or Audit; prereq 45 cr; spring, every year)


**INET 4083. System Analysis and Design.** (2.0 cr.; A-F or Audit; prereq 4082 or project management experience; spring, every year)

Requirements management, analysis, and design of computer system solutions targeting business objectives. System development life cycle. Development methodologies. Analysis/design tools/techniques; communication strategies. System architecture as business strategy.

**INET 4153. Policy and Regulation: Effects on Global IT Infrastructure.** (3.0 cr.; A-F or Audit; prereq 45 sem cr, experience with Windows/Internet; fall, every year)

Progress/change in telecommunications networks as function of policies/regulations.

Local/global telecommunications policy, technology convergence, emerging digital complex.

**INET 4165. Information Security: Technology, Ethics, Legality, and Standards.** (3.0 cr.; A-F or Audit; prereq CSCI 4061 or equiv experience with operating systems; spring, every year)


**INET 4193. Directed Study.** (1.0-4.0 cr. [max 12.0 cr.]; A-F or Audit; prereq IT student, %; fall, spring, summer, every year)

Independent project. Topic arranged with and supervised by ITI faculty.

**INET 4596. Internship.** (1.0-3.0 cr. [max 6.0 cr.]; A-F only; prereq [ITI major or certificate student], jr or sr, %; fall, spring, summer, every year)

Hands-on work experiences in a professional IT setting. Students apply coursework, contribute to knowledge of best practices, and participate in career development.

**INET 4707. Practice of Database Systems.** (3.0 cr.; A-F or Audit; = [CSCI 5707, CSCI 4707]; prereq CSCI 4061, at least 45 cr completed; CSCI majors contact CSci dept before registering; fall, every year)

Concepts, data models. Case studies, data manipulation languages, logical data models, database design, facilities for database security/integrity, applications.

**INET 4709. Art and Practice of Database Administration.** (3.0 cr.; A-F or Audit; prereq [4707 or CSCI 4707], CSCI 4061) or professional experience with SQL/basic operating systems; fall, spring, every year)


**INET 4710. Big Data Architecture.** (3.0 cr.; A-F or Audit; prereq [4031, 4709, familiarity with operating systems/databases] or #; fall, every year)

Factors that ensure success in Big Data initiative. Big Data definitions/architecture concepts, strategies, model development.

**INET 4711. Big Data Implementation.** (3.0 cr.; A-F or Audit; prereq 4031, 4709, 4710, familiarity with operating systems, databases, and basic programming (UNIX, Java or equivalent). Knowledge of Ruby on Rails highly recommended.; spring, every year)

Assess challenges involved in fully implementing big data system using open source technologies. Includes hands-on lab exercises to design/construct cloud-based data platform with appropriate capabilities, components, interfaces. Tool/technology evaluation, data services, cloud provisioning.
IDSC 3001. Information Systems for Business Processes and Management. (3.0 cr.; A-F or Audit; fall, spring, summer, every year)

IDSC 3001H. Honors: Information Systems for Business Processes and Management. (3.0 cr.; A-F or Audit; prereq [BA 1001 or experience using Windows/Internet]; honors; fall, every year)

IDSC 3101. Introduction to Programming. (2.0 cr.; A-F only; fall, spring, every year)
Computer programmin gs used by companies to build sophisticated information systems. Variables, control structures. Data structures such as arrays/collections. Programming style, graphical user interfaces (GUIs).

IDSC 3102. Intermediate Programming. (2.0 cr.; A-F only; prereq 3101 or [equiv experience, #]; fall, spring, every year)
Programming concepts to develop large, full-featured applications. Object-oriented programming, database applications, Web applications. Style, performance, UI design.

IDSC 3103. Data Modeling and Databases. (2.0 cr.; A-F only; fall, spring, every year)

IDSC 3104. Enterprise Systems. (2.0 cr.; A-F only; prereq 3001; fall, spring, every year)

IDSC 3202. Analysis and Modeling for Business Systems Development. (4.0 cr.; A-F or Audit; prereq 3001; fall, spring, every year)

IDSC 4204W. Information Services Management. (4.0 cr.; A-F or Audit; prereq 3202; fall, spring, every year)

IDSC 4301. Information Systems Capstone Course: A Live Case. (2.0 cr.; A-F only; prereq 3202, 4204W, CSOM major; fall, spring, every year)
Integrate various technologies to solve significant problem using “live case” format.

IDSC 4401. Information Security. (2.0 cr.; A-F only; prereq 3001; spring, every year)
Concepts/issues of security and data integrity threats that undermine utility, robustness, and confidence in electronic technologies in facilitating business transactions.

IDSC 4411. Accounting Information Systems and IT Governance. (2.0 cr.; A-F only; prereq 3001; spring, every year)
Information technology audit function, internal control, audit process, smart operations, network security, systems development life cycle, enterprise resource planning risk, compliance issues. IT governance, business continuity, frameworks/methodologies. Lectures, case studies, real-world examples.

IDSC 4421. Financial Information Systems and Technologies. (2.0 cr.; A-F or Audit; prereq 3001; fall, spring, summer, every year)
IS in financial services, corporate financial operations, and investment management. Traditional vs electronic financial markets, computerized trading, digital sources of financial data, electronic money, decision technologies in financial services. Software development skills for personal investments.

IDSC 4431. Advanced Database Design. (2.0 cr.; A-F or Audit; prereq 3103 or CSCI 4707 or CSCI 5707 or #; spring, every year)
Comparative review of data modeling methodologies. Advanced constructs in database design. Modeling subtypes/supertypes, ternary/higher-order relationships, integrity constraints. CASE tools. Representation of facts. Verbalization of data model.

IDSC 4441. Electronic Commerce. (2.0 cr.; A-F or Audit; prereq 3001; fall, spring, summer, offered periodically)

IDSC 4444. Business Analytics. (2.0 cr.; A-F only; prereq 3001; spring, every year)
Data mining/personalization techniques. Exploratory/predictive data mining techniques. Data preparation, data visualization, online analytical processing (OLAP), recommender systems. How business analytics techniques are applied in variety of business applications/organizational settings.

IDSC 4455. Web 2.0: The Business of Social Media. (2.0 cr.; A-F only; prereq 3001; spring, every year)
Business use of social media technologies. Blogs, wikis, online social networks. Readings, forum discussion, case analyses. How technologies engage consumers, market products or services, benefit from open innovation, foster collaboration among employees.

IDSC 4490. Information Systems Special Topics. (2.0 cr. [max 10.0 cr.]; A-F or Audit; fall, spring, every year)
Discussion and analysis of current topics and developments in information systems.

IDSC 4491. Independent Study in Information Systems. (1.0-4.0 cr; A-F only; prereq #; fall, spring, summer, offered periodically)
Independent study in information systems.

IDSC 4491. Independent Study in Information Systems. (1.0-4.0 cr; A-F only; prereq #; fall, spring, summer, offered periodically)
Independent study in information systems.

College of Science and Engineering

ISE 5101. Project Management. (3.0 cr.; A-F or Audit; prereq Open to general grad students but with #; fall, every year)
Broad areas in project management/leadership. Emphasizes practical understanding of business/engineering project management. Project planning, scheduling, controlling. Budgeting, staffing, task/cost control. Communicating with, motivating, leading, managing conflict.

ISE 5104. Construction Estimating. (2.0 cr.; A-F or Audit; prereq ISE grad student; )

ISE 5105. Computer Applications II. (1.0 cr.; A-F or Audit; prereq ISE grad student; )

ISE 5112. Infrastructure Systems Engineering Management. (2.0 cr.; A-F or Audit; prereq Open to advanced master's students; spring, every year)
Managing public works infrastructure. Case studies of decision making in environment of conflicting interests.

ISE 5113. Computer Applications in Infrastructure Systems Engineering. (2.0 cr.; A-F or Audit; prereq ISE grad student; fall, spring, every year)
Advanced application of computer tools/methods in infrastructure engineering problems. Spreadsheet Visual Basic programming, HTML, JAVA script.
Techniques for effective public communication. How to run public hearing. Resources for publishing public notices. Sequence course in three parts.

**ISME 5501. Geographic Information Systems.** (2.0 cr.; A-F or Audit; prereq ISE student; spring, every year)
Introduction to geographic Information Systems (GIS) for infrastructure. GIS application domains, data models/sources, analysis methods, and output techniques. Lectures, readings, hands-on experience with GIS software.

**ISME 5503. Financial Management in Public Organizations.** (2.0 cr.; A-F or Audit; prereq ISE student; fall, spring, every year)

**ISME 5504. Construction Law and Ethics.** (2.0 cr.; A-F or Audit; prereq ISE student; fall, every year)
Ethical framework for responsible management of public works projects. Moral leadership, trust in public/private organizations, quality control.

**Innovation Studies (IS)**

**College of Continuing Education**

**IS 4151. Innovation for Leaders and Organizations.** (3.0 cr.; A-F or Audit; prereq 45 cr; spring, every year)
History of innovation process, importance to individuals/organizations. Strategies to foster innovation. Responsibilities in innovation skill-building/leadership.

**IS 5001. Introduction to Innovation Studies.** (1.0-4.0 cr.; A-F or Audit; prereq %; fall, offered periodically)
Key concepts/models from sociology, futures study, and business. Innovative, team leadership strategies. Definition/application of just-in-time concept. Life-long self-improvement skills.

**IS 5002. Final Project for Innovation Studies.** (1.0-4.0 cr.; A-F or Audit; prereq Completion of IS requirements, %; fall, spring, summer, every year)
Either an internship in an organization or a hands-on study project on a contemporary issue or problem. Students apply expertise/ideas to a real-world situation.

**IS 5100. Innovation Studies Seminar.** (1.0-4.0 cr. [max 24.0 cr.]; A-F or Audit; prereq %; fall, spring, summer, every year)
Innovation studies topics.

**IS 5950. Special Topics.** (1.0-4.0 cr. [max 12.0 cr.]; A-F or Audit; prereq %; fall, spring, summer, every year)
Special interdisciplinary topics.

**IS 5993. Directed Studies.** (1.0-4.0 cr. [max 6.0 cr.]; prereq %; fall, spring, summer, every year)
Guided individual reading or study.

**Insurance and Risk Management (INS)**

**Curtis L. Carlson School of Management**

**INS 4100. Corporate Risk Management.** (2.0 cr.; fall, spring, every year)
Theory applied to corporate risk management and insurance practices. Identification, measurement, and treatment of an organization's financial risks integrated with its property, liability, workers compensation, and human resource risks. Selection and application of risk control and risk financing tools: risk retention, reduction and transfer, including insurance.

**INS 4101. Employee Benefits.** (2.0 cr.; fall, every year)

**INS 4200. Insurance Theory and Practice.** (2.0 cr.; spring, every year)
Risk theory is applied to practices in health, liability, life, property, and workers compensation insurance. Insurance marketing, pricing, underwriting, and claims administration, with adverse selection and moral hazard effects. Policy issues of tort versus no-fault compensation systems. Self-insurance and integrated risk financing methods.

**Inter-College Program (ICP)**

**College of Continuing Education**

**ICP 3000. Career Skills in the Professional Environment.** (2.0 cr.; prereq 60 cr; spring, summer, every year)
Career planning and job search processes appropriate to business/professional careers in corporate culture.

**ICP 3093. Directed Study.** (1.0-15.0 cr.; A-F only; prereq #; fall, spring, summer, every year)
Independent, directed study.

**ICP 3101W. Inter-College Program Proposal Development.** (2.0 cr.; A-F only; prereq ICP student or #; fall, spring, every year)
Write proposal of study/formulate plan of courses through which to complete degree.

**ICP 3201. Career and Internship Preparation.** (1.0 cr.; A-F only; prereq Soph or jr or sr or grad student; fall, spring, every year)
Self exploration, networking, industry research, job/internship search, resumes, cover letters, interviewing, salary negotiation, goal setting.

**Interdepartmental Study (ID)**

**College of Liberal Arts**

**ID 1201. Major and Career Exploration.** (2.0 cr.; prereq Fr or soph; fall, spring, every year)
Students learn about their unique interests, skills, personality, values. Using this information in choosing major/career.
Role of creative writers and literature in effecting social change.

ID 3562W. HECUA Off Campus Programs: Writing for Social Change: Creative Writing Workshop. (4.0 cr.; prereq &3561, &3563, %; fall, every year)
Testing theoretical perspectives of literature and social change by writing fiction, poetry, and creative nonfiction.

ID 3563. HECUA Off-Campus Study Program: WSC Internship Seminar. (8.0 cr.; prereq &3561, &3562, %; fall, every year)
Project-based internship with professional-level responsibilities. Opportunities to integrate experience with two companion courses.

ID 3571. HECUA: Inequality in America - Contested Theories of Poverty, Inequality, and Social Change. (4.0 cr.; prereq &3572, 3573, %; fall, spring, every year)
Roots/strategies for addressing urban inequality/poverty. Interdisciplinary field study, seminar work, internship.

ID 3572. HECUA: Inequality in America - Social Policy and Anti-Poverty Strategies in Theory and Practice. (4.0 cr.; prereq &3571, 3573, %; fall, spring, every year)
Roots/strategies for addressing urban inequality/poverty. Interdisciplinary field study, seminar work, internship.

ID 3573. HECUA: Inequality in America Internship Seminar. (8.0 cr.; prereq &3571, &3572, %; fall, spring, every year)
Roots/strategies for addressing urban inequality/poverty. Interdisciplinary field study, seminar work, internship.

ID 3574. HECUA Off-Campus Study Programs: Civil Rights Movement: History and Consequences. (6.0 cr.; A-F only; summer, every year)

ID 3581. HECUA: Arts for Social Change - Art and Culture in Political, Social, Historical Context. (4.0 cr.; prereq &3582, 3583, %; spring, every year)
Arts, popular culture, social change. Interdisciplinary field study, seminar work, internship.

ID 3582. HECUA: Arte Praxis - Social Justice Theory and Practice in the Field. (4.0 cr.; prereq &3581, 3583, %; spring, every year)
Arts, popular culture, social change. Interdisciplinary field study, seminar work, internship.

ID 3583. HECUA: Arts for Social Change Internship Seminar. (8.0 cr.; prereq &3581, &3582; spring, every year)
Arts, popular culture, social change. Interdisciplinary field study, seminar work, internship. Offered spring semester.

ID 3591. HECUA Off-Campus Study Program: Environmental Sustainability: Adaptive Ecosystem Management. (4.0 cr.; A-F only; prereq &3592, &3593, &3594, %; fall, every year)
Examine ecological and physical processes that underlie environmental degradation and learn to set up ecological monitoring through in-depth case studies of adaptive management projects.

ID 3592. HECUA Off-Campus Study Program: Environmental Sustainability: Dimensions of Environmental Change. (4.0 cr.; A-F only; prereq &3591, &3593, &3594, %; fall, every year)
How power dynamics and a global free market impact efforts to promote sustainability. The state's role in regulating resources and distributing environmental benefits. How social movements develop a collective future and mobilize actors to realize it.

ID 3593. HECUA Off-Campus Study Program in Sustainability: Field Methods Research and Investigation. (4.0 cr.; A-F only; prereq &3591, &3592, &3594, %; fall, every year)
Field research project on environmental issues. Students work with scientists and community members and conduct publishable research.

ID 3594. HECUA Off-Campus Study Program: Environmental Sustainability, Internship. (4.0 cr.; A-F only; prereq &3591, &3592, &3593, %; fall, every year)
Students work with an organization addressing issues such as how to manage infrastructure for a booming economy and population in the metropolitan area, how rural communities can maintain viable livelihoods, and how to avert environmental decline in threatened ecosystems.

ID 3595W. HECUA Off-Campus Study Program: Agriculture and Justice Agroecosystems in Context. (4.0 cr.; prereq #; spring, every year)
Through interdisciplinary/field-based methods, including farm stay/subsequent creation of "whole farm plan," students learn theory/practice of fundamental agroecological principles. Define, assess, interpret factors that contribute to greater sustainability of agroecosystems.

ID 3596. HECUA Off-Campus Study Program: Agriculture and Justice - Justice and the U.S. Food System. (4.0 cr.; prereq &3595, %; spring, every year)

ID 3597. HECUA Off-Campus Study Program: Agriculture and Justice Food Systems Internship (4 cr.). (4.0 cr.; prereq 3555, 3556; #; spring, summer, every year)
Minimum of 160 hours on substantive, mission-related projects at community-based organizations dedicated to food justice/food sovereignty in Twin Cities/greater Minnesota. Through written assignments/critical reflection, HECUA faculty link internship back to theoretical frames.
ID 3598. HECUA Off-Campus Study Program: Agriculture and Justice - Food Systems Internship (8 cr). (8.0 cr.; prereq %; spring, summer, every year) 
Minimum of 300 hours on substantive, mission-related projects at community-based organizations dedicated to food justice/food sovereignty in Twin Cities/greater Minnesota. Through written assignments/ critical reflection, HECUA faculty link internship back to theoretical frames.

ID 3900. University YMCA Collegiate Allies. (1.0 cr.; S-N only; prereq Active participation in a U YWCA program; #; fall, every year) 
Contextualize learning through multiple settings of real life experiences. Students are engaged in seminar topics that help them to find significant meaning and understanding of themselves and others in multicultural environments. Community service activities, connecting knowledge and practice, and reflecting on how experiences have informed them in becoming effective and engaged citizens and lifelong learners.

ID 3901. Scholars Program Capstone Seminar. (1.0 cr.; A-F only; prereq %; Community Engagement Scholars coordinator approval; fall, spring, every year) 
Complements Integrative Community Engagement Project. Guidance, support, and structure to complete ICEP. Students reflect on previous academic/community work and prepare for next phase of their life.

ID 3960. Interdepartmental Study Topics. (3.0 cr.; A-F only; summer, offered periodically) Selected interdepartmental topics not covered in regular courses.

ID 3993. Directed Study. (1.0-4.0 cr. [max 8.0 cr.]; fall, spring, every year) 
Guided individual reading or study. Prereq instr consent, dept consent, college consent.

Interdisciplinary Archaeological Studies (INAR) 
College of Liberal Arts

INAR 5100. Topics in Interdisciplinary Archaeological Studies. (3.0 cr.; A-F or Audit; prereq InAr grad major or #; fall, spring, offered periodically) Topics specified in the Class Schedule.

Interior Design (IDES) 
College of Design

IDES 1601. Interior Design Studio I. (4.0 cr.; A-F or Audit; prereq Interior design pre-major; fall, every year) 
Theories used to solve interior design problems related to human behavior. Design process. Communication skills that are required for interior design profession.

IDES 1602. Interior Design Studio II. (4.0 cr.; A-F only; prereq [1601 or DHA 1601] with grade of at least C, interior design pre-major; spring, every year) 
Introduction to interior design programming as method for understanding behaviors/requirements of humans in spaces. Use of color in three-dimensional environments. Developing communication skills. Problem-solving.

IDES 2196. Work Experience in Interior Design. (1.0-4.0 cr. [max 8.0 cr.]; S-N only; prereq Plan submitted/approved by [adviser, internship supervisor], written approval of supervisor, #; fall, spring, summer, every year) Supervised work experience in business, industry, or government, related to student's area of study.

IDES 2603. Interior Design Studio III. (4.0 cr.; A-F only; prereq [1602 or DHA 1602] with grade of at least C-, pass portfolio review, interior design major; fall, every year) Expanding presentation skills, visual communication of design process. Design of interior environment as influenced by neighborhood, adjacent structures, regional context, diverse cultures.

IDES 2604. Interior Design Studio IV. (4.0 cr.; A-F or Audit; prereq [2603 or DHA 2603], 2613; spring, every year) Relationship between exterior/interior design as it pertains to building construction. Methods/materials, principles of structure, building systems, construction details. Interface of electrical, HVAC, plumbing systems in buildings.

IDES 2612. Interior Materials and Specifications. (4.0 cr.; A-F or Audit; prereq [Pass portfolio review, interior design major] or #; spring, every year) Environmental issues, from global to interior spaces. Effect of building codes/legislation, social awareness. Functional/aesthetic relation of materials/resources to interior design.

IDES 2613. Interior Structures, Systems, and Life Safety. (4.0 cr.; A-F only; fall, spring, every year) Codes, standards, regulations, and guidelines that govern design of interior space and support life safety. Integration of building systems. Structures for non-residential/residential occupancy. Building/energy codes. Lectures, guest speakers, field trips.

IDES 2621. Computer Aided Design: Interior Design. (4.0 cr.; A-F only; prereq [Interior design major, pass portfolio review] or #; fall, every year) Application of two/three-dimensional computer drawing in design/visualization of interior space. AutoCAD software used on Windows-based system.

IDES 2622. Computer Applications I. (2.0 cr.; A-F only; prereq Interior design major; spring, every year) Computer-aided design, its role in interior design. Use of software applications for construction drawings, two/three-dimensional representation. Modeling for interior design problem-solving/visualization.

IDES 3161. History of Interiors and Furnishings: Ancient to 1750. (4.0 cr.; A-F or Audit; fall, every year) Study of European and American interiors and furnishings, including furniture, textiles, and decorative objects.

IDES 3162. History of Interiors and Furnishings: 1750 to Present. (4.0 cr.; A-F or Audit; spring, every year) European/American interiors/furnishings, including furniture, textiles, and decorative objects.

IDES 3170. Topics in Interior Design. (1.0-4.0 cr. [max 32.0 cr.]; A-F or Audit; fall, spring, summer, every year) Faculty-directed field study in national or international setting.

IDES 3196. Field Study: National or International. (1.0-4.0 cr. [max 10.0 cr.]; A-F or Audit; #; fall, spring, summer, every year) Advanced interior design problems dealing with small to medium scale spaces. Emphasizes special-needs populations.

IDES 3506. Interior Design Studio V. (4.0 cr.; A-F only; prereq [2604 or DHA 2604], 2613] with grade of at least C-, interior design major; spring, every year) Advanced interior design problems dealing with medium-scale spaces. Focuses on medium office design.


IDES 3614. Interior Design Ethics and Professional Practice. (4.0 cr.; A-F only; prereq 2604 or DHA 2604; fall, every year) Business of interior design, professional ethics, and responsible design. Ethical theory/conduct. Responsibility to business, clients, colleagues, and community at large and globally.

IDES 3622. Computer Applications II. (2.0 cr.; A-F only; prereq 2622; fall, every year) Advanced concepts/terms in computer modeling. Computer graphics, three-dimensional modeling, rendering, animation to provide representation strategies for interior design problem-solving/representation. Applications such as Autodesk Revit, AutoCAD, Autodesk 3ds Max Design.

IDES 4160H. Honors Capstone Project. (2.0 cr. [max 4.0 cr.]; A-F only; prereq Interior design honors; fall, spring, every year) Individualizes honors experience by connecting aspects of major program with special academic interests.

IDES 4193. Directed Study in Interior Design. (1.0-4.0 cr. [max 8.0 cr.]; A-F or Audit; prereq Undergrad, #; fall, spring, summer, every year)
Independent study in interior design under tutorial guidance.

**IDES 4196. Internship in Interior Design. (1.0 cr.; S-N or Audit; prereq 3606, #; fall, spring, summer, every year)** Supervised work experience relating activity in business, industry, or government to student's area of study. Integrative paper or project may be required.

**IDES 4607. Interior Design Studio VII. (4.0 cr.; A-F only; prereq [3605, 3606] or [DHA 3605, DHA 3606]) with grade of at least C--; 3614; fall, every year)** Advanced interior design problems dealing with large scale spaces. Historic precedent, adaptive use, renovation.

**IDES 4608. Interior Design Thesis. (4.0 cr.; A-F only; prereq [4615W or DHA 4615W], [4607 or DHA 4607] with grade of at least C--; spring, every year)** Comprehensive independent interior design project developed from student-conducted research/program developed in 4615W.

**IDES 4615W. Interior Design Research. (3.0 cr.; A-F only; prereq 3605 or DHA 3605; fall, every year)** Research methods for programming interior design solutions. Developing comprehensive program. Issues that affect interior design research/practices.

**IDES 4616. Sustainable Commercial Interior Design. (3.0 cr.; A-F only; prereq 2613 or DHA 2613 or Architecture major or #; spring, every year)** Intent, requirements, submittals, technologies/strategies to achieve LEED C1 standards in existing, new construction, or tenant improvement projects.

**IDES 5170. Topics in Interior Design. (1.0-4.0 cr. [max 32.0 cr.]; A-F or Audit; prereq Jr or sr or grad student; fall, spring, summer, every year)** In-depth investigation of specific topic, announced in advance.

**IDES 5193. Directed Study in Interior Design. (1.0-4.0 cr. [max 8.0 cr.]; A-F or Audit; prereq Jr or sr or grad student; fall, spring, summer, every year)** Independent study in interior design under tutorial guidance.

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**International Business (IBUS)**

**Curtis L. Carlson School of Management**

**IBUS 2950. Tracing the Global Supply Chain. (2.0 cr.; A-F only; prereq Approved application; fall, every year)** Concepts, principles, techniques for managing global supply chains. Emphasizes decision-making in global supply chain strategy through hands-on experiential learning.

**IBUS 3002. Managerial Accounting in Argentina. (4.0 cr.; A-F only; fall, every year)** Managerial accounting study abroad.

**IBUS 3003. Information Systems for Business Processes and Management: An International Perspective. (4.0 cr.; A-F only; fall, every year)** Study abroad.

**IBUS 3010. Introduction to Global Entrepreneurship in China. (4.0 cr. [max 12.0 cr.]; A-F only; spring, every year)** Terms, concepts, skills for analyzing fundamental business practices in global economy.


**IBUS 3033W. Business Communication in Spain. (4.0 cr.; A-F only; =MGMT 3033W); spring, every year)** Education abroad course. Similar to MGMT 3033W with additional international experience end of semester.

**IBUS 3080. Sustainability and Corporate Social Responsibility in Costa Rica. (4.0 cr.; A-F only; spring, every year)** Partnership with Caribou Coffee. Coffee value chain of Caribou Coffee, from coffee bean origins through coffee served at Caribou Coffee and stakeholders throughout. Students write report delivered to Caribou's top management team and employees.

**IBUS 3400. International Programs Elective. (1.0-4.0 cr. [max 8.0 cr.]; S-N only; fall, spring, summer, every year)** Elective course for education abroad.

**IBUS 3700. London School of Economics Summer Program. (3.0-6.0 cr. ; S-N only; summer, every year)** Summer study abroad at London School of Economics. Students select one or two sessions based on their academic needs/interests.

**IBUS 3800. CIMBA Summer Program. (0.0-6.0 cr.; A-F only; summer, every year)** Consortium Institute of Management/Business Analysis (CIMBA) Summer Program in Italy. Four-week program.

**IBUS 4010. Management of Technology in the Middle East. (3.0 cr.; A-F only; prereq Undergrad; spring, every year)** Undergraduate study abroad in Israel.

**IBUS 4050. Management of Innovation and Change. (4.0 cr.; A-F only; =MGMT 4050); prereq [Mktg 1001 or 3001 or 3010]; approved application; fall, every year)** Applying theories/research on how new organizational programs, products, technologies are developed/implemented. Diagnostic skills. How innovation unfolds.

**IBUS 4080. Health Care Industry Dynamics in Africa--An International Business Perspective. (4.0 cr.; A-F or Audit; fall, every year)** International business environment of South Africa.

**IBUS 4082W. Brand Management. (4.0 cr.; A-F only; =IBUS 4082); prereq MKTG 3001, MKTG 3010, MKTG 3040; spring, every year)** Brand asset management. Measuring brand knowledge. Building/leveraging brands. Managing brands globally.

**IBUS 4090. Corporate Strategy in Emerging Europe. (4.0 cr.; A-F only; spring, every year)** Consulting project focused on regional strategy of major American company expanding operations in Central/Eastern Europe. Business practices of corporations operating in emerging markets. Marketing, operations, international business topics.

**IBUS 5100. Undergraduate Semester: CIMBA (Consortium of Universities for International Studies). (0.0-18.0 cr. [max 54.0 cr.]; A-F only; prereq 60 cr; fall, spring, every year)** Semester of study at one of Carlson School's international exchange partner universities. Students select courses based on academic needs/interests. For current offerings, contact Carlson International Programs.

**IBUS 5101. Copenhagen Summer Program in International Business (Undergraduate). (7.5 cr.; S-N or Audit; prereq 60 cr; fall, spring, summer, every year)** Summer study abroad at one of Carlson School's international exchange partner universities, Vienna University of Economics/ Business Administration. Students select intensive/enrichment courses based on academic needs/interests.

**IBUS 5102. Vienna Summer Program in International Business (Undergraduate). (4.0-8.0 cr.; S-N only; summer, every year)** Summer study abroad at one of Carlson School's international exchange partner universities, BI Norwegian School of Management. Three-week program. Focuses on Scandinavian management/Norwegian life/society.

**IBUS 5103. Norway Summer Program in International Business (Undergraduate). (5.0 cr.; S-N only; summer, every year)** Summer study abroad at one of Carlson School's international exchange partner universities, BI Norwegian School of Management. Three-week program. Focuses on Scandinavian management/Norwegian life/society.

**IBUS 5110. Business and the Environment in Costa Rica. (4.0 cr.; A-F only; prereq Sr or grad student; fall, spring, every year)** How businesses maintain/increase profits by taking care of environment. Sustainable development, environmental strategy. Travel to Costa Rica to join students from INCAE (partner school) for series of courses. Case studies, site visits, field trips. Taught in English.

**IBUS 5120. Global Business Practicum in Central and Eastern Europe. (4.0 cr.; A-F only; prereq Carlson grad student; spring, summer, every year)**
Rapidly changing business environment of Central/Eastern Europe. Students work in teams with students from WU-Vienna University of Economics/Business for two weeks in May/June in Central/Eastern Europe.

IBUS 5130. France Seminar: Doing Business in the European Union (Graduate). (4.0 cr.; S-N only; prereq Carlson grad student; fall, spring, summer, every year)
Two-week study abroad program at Universite Jean-Moulin Lyon 3 in Lyon, France. Includes courses taught by international faculty, site visits, cultural excursions.

IBUS 5140. Vienna Summer Program: International Business (Graduate). (4.5-9.0 cr.; S-N only; prereq Carlson grad student; summer, every year)
Summer study abroad program at Europe’s largest business school (WU-Vienna). Students take three business classes, plus German language. Program participants from Europe, Asia, Latin America, United States.

IBUS 5150. India Seminar: Managing in a Global Environment. (4.0 cr.; A-F only; spring, every year)
View of sourcing/delivery of knowledge-intensive tasks. Site visits, meetings with business executives/governmental agencies. Two weeks in India over January break, preceded by Friday evening classes in fall term B (November, early December).

IBUS 5160. Cologne Summer Program: European Management (Grad). (8.0 cr. [max 24.0 cr.]; S-N only; prereq Carlson grad student; summer, every year)
Summer study abroad at one of Carlson School’s international exchange partner universities. Students select courses based on academic needs/interest.

IBUS 5170. Global Business Practicum in Northern China. (4.0 cr.; A-F only; prereq Grad student; spring, every year)
Collaboration with corporate partner/business school in China. Students work in multicultural teams to analyze real-life business problems that corporations face in China. Examine cultural, social, economic differences surrounding global business.

IBUS 5171. Global Business Practicum in Southern China. (4.0 cr.; A-F only; prereq Grad student; spring, every year)
Collaboration with corporate partner/business school in China. Work in multicultural teams to analyze real-life business problems that corporates face in China.

IBUS 5172. IBUS 5172: Global Business Practicum Brazil. (4.0 cr. [max 8.0 cr.]; A-F only; summer, every year)
Study abroad course. Short-term global enrichment program traveling to Brazil in May.

IBUS 5190. Brazil Seminar: Doing Business in Brazil. (4.0 cr.; A-F only; prereq Carlson grad student; spring, every year)
Two-week study abroad at Escola de Administracao de Empresas de Sao Paulo da Fundacao Getulio Vargas (FGV). Full class days, cultural tours, field trips, site visits.

IBUS 5200. International Business: Undergraduate Exchange. (0.0-16.0 cr. [max 160.0 cr.]; S-N or Audit; prereq 60 cr; fall, spring, every year)
Study at one of Carlson School’s international exchange partner universities. Students select courses based on academic needs/interests.

IBUS 5201. International Business: Undergraduate Exchange (1.0-6.0 cr. [max 60.0 cr.]; S-N or Audit; prereq 60 cr; fall, spring, every year)
Study at one of Carlson School’s international exchange partner universities. Students select courses based on academic needs/interests.

IBUS 5202. International Business: Undergraduate Exchange (1.0-6.0 cr. [max 60.0 cr.]; S-N or Audit; fall, spring, every year)
Study at one of Carlson School’s international exchange partner universities. Students select courses based on academic needs/interests.

IBUS 5203. International Business: Undergraduate Exchange (0.5-6.0 cr. [max 60.0 cr.]; S-N or Audit; fall, spring, every year)
Study at one of Carlson School’s international exchange partner universities. Students select courses based on academic needs/interests.

IBUS 5204. International Business: Undergraduate Exchange (1.0-6.0 cr. [max 60.0 cr.]; S-N or Audit; prereq 60 cr; fall, spring, every year)
Study at one of Carlson School’s international exchange partner universities. Students select courses based on academic needs/interests.

IBUS 5205. International Business: Undergraduate Exchange (1.0-6.0 cr. [max 60.0 cr.]; S-N or Audit; prereq 60 cr; fall, spring, every year)
Study at one of Carlson School’s international exchange partner universities. Students select courses based on academic needs/interests.

IBUS 5206. International Business: Undergraduate Exchange (1.0-6.0 cr. [max 60.0 cr.]; S-N or Audit; prereq 60 cr, Carlson School International Programs consent; fall, spring, every year)
Study at one of Carlson School’s international exchange partner universities. Students select courses based on academic needs/interests.

IBUS 5207. International Business: Undergraduate Exchange (1.0-6.0 cr. [max 60.0 cr.]; S-N or Audit; prereq 60 cr; fall, spring, every year)
Study at one of Carlson School’s international exchange partner universities. Students select courses based on academic needs/interests.

IBUS 5208. International Business: Undergraduate Exchange (1.0-6.0 cr. [max 60.0 cr.]; S-N or Audit; prereq 60 cr; fall, spring, every year)
Study at one of Carlson School’s international exchange partner universities. Students select courses based on academic needs/interests.

IBUS 5209. International Business: Undergraduate Exchange (1.0-6.0 cr. [max 60.0 cr.]; S-N or Audit; prereq 60 cr; fall, spring, every year)
Study at one of Carlson School’s international exchange partner universities. Students select courses based on academic needs/interests.

IBUS 5260. IBUS 5260: Integrated Corporate Reporting and the Triple Bottom Line. (4.0 cr.; A-F only; spring, every year)
View of integrated reporting (sustainability reporting) as it relates to various fields of business. Site visits, meetings with business executives/governmental agencies. Two weeks in the United Kingdom following commencement week, preceded by Spring B Term classes.

IBUS 5300. International Business: Graduate Exchange. (0.0-16.0 cr. [max 48.0 cr.]; S-N or Audit; prereq Carlson grad student; fall, spring, every year)
Study at one of Carlson School’s international exchange partner universities. Students select courses based on academic needs/interests. For current offerings, contact Carlson International Programs.

IBUS 5301. Copenhagen Summer Program in International Business (Graduate). (4.0-8.0 cr. [max 24.0 cr.]; S-N only; prereq Carlson grad student; summer, every year)
Summer study abroad at one of Carlson School’s international exchange partner universities. Students select courses based on academic needs/interests.

IBUS 5302. International Business: Graduate Exchange. (1.0-6.0 cr. [max 60.0 cr.]; S-N or Audit; prereq Carlson grad student; fall, spring, every year)
Study at one of Carlson School’s international exchange partner universities. Students select courses based on academic needs/interests.

IBUS 5303. International Business: Graduate Exchange. (1.0-6.0 cr. [max 60.0 cr.]; S-N or Audit; prereq Carlson grad student; fall, spring, every year)
Study at one of Carlson School’s international exchange partner universities. Students select courses based on academic needs/interests.

IBUS 5304. International Business: Graduate Exchange. (1.0-6.0 cr. [max 60.0 cr.]; S-N or Audit; prereq Carlson grad student; fall, spring, every year)
Study at one of Carlson School’s international exchange partner universities. Students select courses based on academic needs/interests.

IBUS 5305. International Business: Graduate Exchange. (0.0-18.0 cr. [max 180.0 cr.]; S-N or Audit; prereq Carlson grad student; fall, spring, every year)
Study at one of Carlson School’s international exchange partner universities. Students select courses based on academic needs/interests.

IBUS 5306. International Business: Graduate Exchange. (1.0-6.0 cr. [max 60.0 cr.]; S-N or Audit; prereq Carlson grad student; fall, spring, every year)
Study at one of Carlson School’s international exchange partner universities. Students select courses based on academic needs/interests.

IBUS 5307. International Business: Graduate Exchange. (1.0-6.0 cr. [max 60.0 cr.]; S-N or Audit; prereq Carlson grad student; fall, spring, every year)
Study at one of Carlson School’s international exchange partner universities. Students select courses based on academic needs/interests.
ITAL 100. Reading Italian in the Arts and Sciences. (0.0 cr.; S-N only; summer, every year)
Designed to teach a basic reading knowledge of the Italian language; full time is devoted to intensive reading and translation of texts from a wide variety of disciplines and to the teaching of translation techniques.

ITAL 1001. Beginning Italian. (5.0 cr.; )
Emphasis on the four language skills (listening, speaking, writing, and reading) and on Italian culture.

ITAL 1002. Beginning Italian. (5.0 cr.; )
Listening, speaking, writing, reading. Italian culture.

ITAL 1003. Intermediate Italian. (5.0 cr.;
Grammar review and development of intermediate level of proficiency in listening, reading, writing and speaking. Emphasis on some cultural aspects of contemporary Italy.

ITAL 1004. Intermediate Italian. (5.0 cr.;
Grammar review and development of intermediate level of proficiency in listening, reading, writing and speaking. Emphasis on some cultural aspects of contemporary Italy.

ITAL 1837. Imagining Italy: Italian and Italian-American Culture, History, and Society through Film. (4.0 cr.; )
Weekly guest lectures and critical readings expand from different disciplinary perspectives upon issues raised by films. Urban life, religion, nationalism, opera, violence, leisure, food, fascism, terrorism, family, emigration/immigration, ethnicity. Mediterranean culture.

ITAL 1904. Freshman Seminar. (3.0 cr.;
Topics specified in Class Schedule.

ITAL 3015. Reading, Conversation, and Composition. (4.0 cr.;
Intensive reading, writing, speaking practice. Study of cultural materials in authentic formats.

ITAL 3201. Reading Italian Texts: Poetics, Rhetoric, Theory. (3.0 cr.; )
A basic course in understanding the rhetorical and poetic aspects of language and literature; interpretive methods and theoretical concepts.

ITAL 3203. Italian Travelers: From the Enlightenment to the Present. (3.0 cr. ;
Examines literary representations of travel, migration, immigration, exile, and tourism in Italy from the Enlightenment to the present.

ITAL 3209. Literature of Medieval City-States. (4.0 cr. ;
The beginnings of Italian vernacular literature in the context of the city-states of the 11th to 14th centuries.

ITAL 3305. Staging the Self: Theater and Drama in Modern Italy. (4.0 cr. ;
Theatrical representations of the self in modern Italy. Particular attention given to issues of identity, gender, and class in theatrical works ranging from Alfieri's Mirra, Pirandello's Enrico IV to Dacia Maraini's Clytemnestra.

ITAL 3459W. Senior Project. (1.0 cr.;
Research/ writing on issue/theme in Italian studies. Projects range from scholarly paper to artistic/creative writing or musical composition, photography, poetry, or fiction. Research/analytical component.

ITAL 3502. Making of Modern Italy: From the Enlightenment to the Present. (3.0 cr.
Italian literary, cultural, and symbolic practices from the Enlightenment to the present.

ITAL 3550. Topics in 19th Century Italy. (3.0 cr.
Topics in 19th Century Italy. Content varies depending on instructor.

ITAL 3637. From Ancient Rome to Renaissance Florence: Siena on the "French Road". (3.0 cr.;
Topics of interest in studies of Italian or Italian American culture of 20th century. Literary, critical, cultural, historical, or social issues, a specific author, genre, or other topic. Content varies by instructor, see Course Guide.

ITAL 3806. Negotiating the Terms: Italian Film and Literature. (3.0 cr.;
Examines cinematic representations of Italian literary texts; introduces the basic tools of literary and film analysis; discusses how both media impact Italian culture. Taught in English.

ITAL 3837. Imagining Italy: Italian and Italian-American Culture, History, and Society Through Film. (4.0 cr.; )
Italian/Italian-American history, culture, and society through films; "Name of the rose," "Cinema Paradiso," "Big Night," "Life is Beautiful." Issues raised by films: urban life, nationalism, opera, terrorism, violence, food, family, emigration, ethnicity, desire.

ITAL 3850. Topics in Italian Cinema. (3.0 cr.
Examines theme, problem, style, period, or filmmaker in Italian cinema history. Attention devoted to locating Italian visual culture within context of wider transnational political/artistic networks. Content varies depending on year/instructor.

ITAL 4001. Beginning Italian. (2.0 cr.;
Meets concurrently with 1001. See 1001 for course description.

ITAL 4002. Beginning Italian. (2.0 cr.;
Meets concurrently with 1002. See 1002 for course description.

ITAL 4003. Intermediate Italian. (2.0 cr.
Meets concurrently with 1003. See 1003 for course description.

ISG 5010. Risk Analysis for Introduced Species and Genotypes. (3.0 cr.; A-F only; )
Examines literary representations of travel, migration, immigration, exile, and tourism in Italy from the Enlightenment to the present.

ISG 5020. Risk Analysis Modeling for Introduced Species and Genotypes. (1.0 cr.;
Four-day workshop. Role/mechanics of mathematical modeling within ecological risk assessment. Integrated exercises, cases.

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Four-day workshop. Role/mechanics of mathematical modeling within ecological risk assessment. Integrated exercises, cases.
ITAL 4004. Intermediate Italian. (2.0 cr.; =ITAL 1004; prereq Grad student or #: fall, spring, summer, every year) Meets concurrently with 1004. See 1004 for course description.

ITAL 4970. Directed Readings. (1.0-4.0 cr. [max 16.0 cr.;]; prereq #: fall, spring, summer, every year) Meets unique requirements decided on by faculty member and student. Individual contracts list contact hours, number of credits, written and other work required.

ITAL 5201. Reading Italian Texts: Poetics, Rhetoric, Theory. (3.0 cr. [max 12.0 cr.;]=ITAL 3201; prereq grad student or #: ) Rhetorical/poetic aspects of language and literature. Interpretive methods, theoretical concepts.

ITAL 5203. Italian Travelers: From the Enlightenment to the Present. (3.0 cr. [max 12.0 cr.;]=ITAL 3203; prereq grad student or #: ) Literary representations of travel, migration, immigration, exile, and tourism in Italy, from Enlightenment to present.

ITAL 5305. Staging the Self: Theater and Drama in Modern Italy. (4.0 cr. [max 16.0 cr.;]=ITAL 3305; prereq grad student or #: ) Theatrical representations of the self in modern Italian literature. Focuses on issues of identity, gender, and class in theatrical works ranging from Alfieri's Mirra, Pirandello's Enrico IV to Dacia Maraini's Clytemnestra.

ITAL 5337. Nation and Narration: Writings in the 19th Century. (4.0 cr. [max 16.0 cr.;]=ITAL 3337; prereq 3015; ) Introduces the construction of modern Italian national identity by examining the role that literature plays in this process. Works by Manzoni, Foscolo, Leopardi, Gioia, Verga, Serao, and Deledda studied in the context of a range of sociopolitical and cultural issues.

ITAL 5401. Mondo di Dante. (4.0 cr. [max 16.0 cr.;]; prereq 3015, 3201 or #: ) Intensive reading of Dante's Inferno, Purgatorio, and Vita Nuova with emphasis on Dante's linguistic and cultural contributions.

ITAL 5502. Making of Modern Italy: From the Enlightenment to the Present. (3.0 cr. [max 12.0 cr.;]=ITAL 3502; prereq grad student or #: ) Italian literary, cultural, and symbolic practices, from Enlightenment to present.

ITAL 5550. Topics in 19th Century Italy. (3.0 cr. [max 12.0 cr.;]; prereq Ital 3015 or #:; fall, every year) Explores the literature and culture of Italy in the 19th century. Content will vary depending on the instructor. Topics and readings may include literary, critical, cultural, historical, and/or social issues, a specific author, a genre, or other topics of interest for the period. Specific content will be posted in the department and listed in the Course Guide.

ITAL 5609. World of Dante. (4.0 cr. [max 8.0 cr.;] ) Taught in English. Intensive reading of Dante's works. Focus on Dante's life and the historical context of his work. Topics and readings may include literary, critical, cultural, historical, and/or social issues.

ITAL 5640. Topics in Italian Studies. (3.0 cr. [max 12.0 cr.;]; prereq Ital 3015; fall, every year) Topics of interest in studies of Italian and/or Italian American culture of the 20th century. Topics and readings may include literary, critical, cultural, historical, and/or social issues, a specific author, a genre, or other topics.

ITAL 5970. Directed Readings. (1.0-4.0 cr. [max 16.0 cr.;]; prereq #: fall, spring, every year) Meets unique requirements decided on by faculty member and student. Individual contracts list contact hours, number of credits, written and other work required.

JPN 1011. Beginning Japanese I. (5.0 cr. [max 6.0 cr.;]=JPN 4001; fall, spring, summer, every year) Introduction to speaking, reading, writing Japanese. Prepares students for 1012.

JPN 1012. Beginning Japanese II. (5.0 cr.;=JPN 4002; prereq 1011; spring, summer, every year) Introduction to speaking, reading, writing Japanese. Prepares students for 2101.

JPN 3021. Intermediate Japanese I. (5.0 cr.;=JPN 4003; prereq 1012 or #: fall, every year) Intermediate speaking, reading, writing Japanese. Prepares students for 3022.

JPN 3022. Intermediate Japanese II. (5.0 cr.;=JPN 4004; prereq 3021 or #: spring, every year) Intermediate-level instruction in speaking, reading, writing Japanese. Prepares students for 3031.


JPN 3032. Third Year Japanese II. (4.0 cr.;=JPN 4006; prereq 3031 or #: spring, every year) Advanced intermediate-level instruction in speaking, reading, writing Japanese. Development of reading proficiency in modern Japanese prose.

JPN 3090H. Honors Course: Tutorial. (1.0-4.0 cr.; ) Tutorial.

JPN 3290. Japanese Language Teaching Tutorial. (1.0 cr. [max 2.0 cr.;]; S-N only; prereq Grade of A in 4042; fall, spring, every year) Students tutor beginning students of Japanese language and are part of department's Japanese language team.

JPN 4001. Beginning Japanese I. (3.0 cr.;=JPN 1011; prereq Grad student or #: fall, summer, every year) Speaking, reading, writing Japanese. Meets with 1011.

JPN 4002. Beginning Japanese II. (3.0 cr.;=JPN 1012; prereq 4001, grad student; spring, summer, every year) Speaking, reading, writing Japanese. Meets with 1012.


JPN 4041. Advanced Japanese Conversation and Composition I. (4.0 cr.; prereq 3032 or #: fall, every year) Practice in advanced spoken/written Japanese. Assignments include essays, summaries, formal interviews in Japanese.

JPN 4042. Advanced Japanese Conversation and Composition II. (4.0 cr.; prereq 4041 or #: spring, every year) Practice in advanced spoken/written Japanese. Typical assignments include essays, summaries, formal interviews in Japanese.

JPN 5040. Readings in Japanese Texts. (3.0 cr. [max 9.0 cr.;]; A-P or Audit; prereq 4042 or equiv or #: fall, spring, every year) Students read authentic materials of various types to increase reading/speaking ability. Topics specified in Class Schedule.

JPN 5071. Communicative Competence for Japan-Oriented Careers. (4.0 cr.; prereq 4041 or 4042 or #: ) Effective communication using spoken and written Japanese in contexts likely to be encountered by a career-oriented professional in Japan.

JPN 5211. Introductory Classical Chinese I. (3.0 cr.;=KOR 5211, CHN 5211; prereq Two years of an East Asian language (Chinese, Japanese, Korean) or equivalent or #: fall, offered periodically) Reading excerpts from canonical Chinese texts. Transnational nature of Classical Chinese and its importance in study of East Asian cultures. Taught in English.
Jewish Studies (JWST)

College of Liberal Arts

JWST 1034. Introduction to Jewish History and Civilization. (3.0 cr.; =RELS 1034, HIST 3534, RELS 3034, JWST 3034, HIST 1534); fall, every year)
Jewish history, society, and culture from Second Temple period (5th century BCE) to modern era as illuminated by literature, philosophy, art, film, music, religious law/custom, and artifacts of daily life. Emphasizes political, social, and cultural contexts that shaped development of Jewish ideas, practices, and institutions.

JWST 1201. The Bible: Context and Interpretation. (3.0 cr.; =RELS 3201, JWST 1201, RELS 3201, CNES 1201, JWST 3201); fall, spring, offered periodically

JWST 1701. Beginning Yiddish I. (3.0 cr.; fall, every year)
Introduction to Yiddish.

JWST 1702. Beginning Yiddish II. (3.0 cr.; spring, every year)
First year, second semester introduction to Yiddish.

JWST 1905. Freshman Seminar. (3.0 cr.; fall, offered periodically)
Topics specified in Class Schedule.

JWST 1990W. Remembering to Forget: The Holocaust and Its Afterlife. (3.0 cr.; =SPAN 1990W); fall, spring, offered periodically
Holocaust as inescapable event and as ultimate measure of all traumatic events in history. Testimonies, artistic endeavors, popular culture, and theory. Emphasizes both urge to study Holocaust as singular event and drawbacks of hyper-memory bordering on amnesia.

JWST 3034. Introduction to Jewish History and Civilization. (3.0 cr.; =RELS 1034, HIST 3534, JWST 1034, RELS 3034, HIST 1534); fall, every year)
Jewish history, society, and culture from Second Temple period (5th century BCE) to modern era as illuminated by literature, philosophy, art, film, music, religious law/custom, and artifacts of daily life. Emphasizes political, social, and cultural contexts that shaped development of Jewish ideas, practices, and institutions.

JWST 3115. Midrash: Jewish Biblical Interpretation. (3.0 cr.; =RELS 3115, CNES 3115, RELS 3115, JWST 3115); fall, spring, offered periodically
Jewish law studied as a mirror of society and as a way to actualize its value. Consideration of original socioreligious contexts and current applications. Selections include biblical interpretations addressing moral, theological, legal, and literary problems.

JWST 3201. The Bible: Context and Interpretation. (3.0 cr.; =RELS 3201, JWST 1201, RELS 1201, RELS 3201, CNES 1201); fall, spring, every year)

JWST 3202. Bible: Prophecy in Ancient Israel. (3.0 cr.; =RELS 3202, ANE 1002, CNES 3202); prereq RelS 1001 or CNES 1201 or CNES 2011; fall, spring, even years)

JWST 3203. The Bible: Wisdom, Poetry, and Apocalyptic. (3.0 cr.; =JANE 1003, RELS 3203, CNES 3203); fall, offered periodically

JWST 3204. Dead Sea Scrolls. (3.0 cr.; =JWST 5204, RELS 3204, RELS 5204, CNES 5204, CNES 3204); spring, even years
Introduction to Dead Sea Scrolls and Qumran. Contents of Dead Sea Scrolls, significance for understanding development of the Bible. Background of Judaism and Christianity. Archaeological site of Qumran.

JWST 3205. Women, Gender, and the Hebrew Bible. (3.0 cr.; =RELS 3205, CNES 3205); spring, even years
How men, women, gender, sexuality is portrayed in Hebrew Bible. Social/religious roles/status of women in ancient Israel. Read biblical texts from academic point of view.

JWST 3502. Ancient Israel: From Conquest to Exile. (3.0 cr.; =RELS 3502, HIST 3502, CNES 3502); prereq Knowledge of Hebrew not required, 3501 recommended; fall, offered periodically
Israelite history in context of what is known from Egyptian, Canaanite, and Mesopotamian sources. Focuses on issues raised by archaeological data related to Israelite conquest of Canaan.

JWST 3511. Muslims and Jews: Conflict and Co-existence in the Middle East and North Africa Since 1700. (3.0 cr.; =HIST 3511, RELS 3079); fall, odd years
Diversity of social/cultural interactions between Muslims and Jews and between Islam and Judaism since 1700. What enabled the two religious communities to peacefully coexist? What were causes of conflict? Why is history of Muslim-Jewish relations such a contested issue?

JWST 3512. History of Modern Israel/Palestine: Society, Culture, and Politics. (3.0 cr.; =HIST 3512, GLOS 3942); fall, odd years)

JWST 3520. History of the Holocaust. (3.0 cr.; =RELS 3520, HIST 3727, JWST 3521W, RELS 3521W, HIST 3727W); fall, spring, every year)

JWST 3521W. History of the Holocaust. (3.0 cr.; =RELS 3520, HIST 3727, JWST 3521W, RELS 3521W, HIST 3727W); fall, spring, every year)

JWST 3522. History of the Arab-Israeli Conflict. (3.0 cr.; )
The events leading to the re-establishment of the State of Israel in 1948 and subsequent conflicts and negotiations up to present. Zionism and Arab resistance, Great Powers' involvement, War of Independence/First Palestine War, subsequent conflicts and their aftermath.

JWST 3601. Fleeing Hitler: German and Austrian Filmmakers Between Europe and Hollywood. (3.0 cr.; =GER 1601H, GER 1601); fall, odd years)
German/American films by famous directors who left Europe in Nazi period. Analysis of films by Fritz Lang, Max Ophuls, Robert Siodmak, Otto Preminger, Billy Wilder, Douglas Sirk, and others. Films as art works and as cultural products of particular social, political, and historical moments.

JWST 3603. Jews and Muslims in Medieval Iberia. (3.0 cr.; =SPAN 3603, RELS 3719); spring, even years)

JWST 3606. Christians, Muslims, and Jews in the Middle Ages. (3.0 cr.; = [HIST 3606, RELS 3717]; fall, spring, even years) Muslim/Christian expansion, jihad/crusade, anti-Jewish violence/persecution. Trade, intellectual exchange, religious dialogue.

JWST 3631. Jewish Writers and Rebels in German, Austrian, and American Culture. (3.0 cr.; = [CSCL 3631, GER 3631]; fall, offered periodically) Investigate literary and cultural modes of writing used by Jewish writers in Germany, Austria, and America to deal with problems of identity, anti-Semitism, and assimilation. Focus on 20th century. All readings (novels, poetry, stories) in English.

JWST 3632W. Jewish Women in the United States. (3.0 cr.; = [AMST 3632W]; fall, spring, even years) Analyze of the cultural, social, economic, and religious conditions of European Jewry and American society in the 19th- and 20th-centuries that structured the lives of American Jewish women.

JWST 3729. Nazi Germany and Hitler's Europe. (3.0 cr.; = [HIST 3729]; fall, spring, offered periodically) Comprehensive exploration of Third Reich. How Nazis came to power, transformations of 1930s, imposition of racial politics against Jews/others, nature of total war. Historical accounts, memoirs, state documents, view films.

JWST 3775. History of Jews in Europe and the Atlantic World, from 1700 to Present. (3.0 cr.; = [HIST 3775]; fall, spring, offered periodically) Social, cultural, and political experience of Jews in Europe and the Americas. Emancipation, social/economic development, assimilation, migration, political anti-Semitism, Zionism, the holocaust, transformations after 1945.


JWST 3900. Topics: Jewish Studies. (3.0 cr. [max 15.0 cr.]; A-F or Audit; fall, spring, offered periodically) Historical, religious, sociological, anthropological, and humanistic study of Judaism and the Jewish people. Approach, method of study vary with topic.

JWST 4000W. Final Project, Writing Intensive. (4.0 cr.; A-F or Audit; prerequisite JWST major, permission of dir of undergrad studies; fall, spring, offered periodically) Independent research/writing under supervision of a faculty sponsor. A student may approach any JWST faculty member to develop a program of independent research/writing in an area of student's choosing.

JWST 4001W. Final Project, Writing Intensive. (1.0 cr.; A-F or Audit; prerequisite JWST 5900, JWST major, permission of dir of undergrad studies; fall, spring, every year) Independent research and writing, under supervision of a faculty sponsor. Student makes a contract with instructor to write an indepth research paper, or comparable project, to be completed in conjunction with a JWST 5xxx course.

JWST 4878W. Israeli-Palestinian Situation. (4.0 cr.; = [POL 4878W]; fall, spring, every year) Situation as clash of two communities. History, politics, respective narratives of each community. Divisions within each community that are consequential for reconciliation. Examples of reconciliation literature from both communities.

JWST 5115W. Midrash: Jewish Biblical Interpretation. (3.0 cr.; = [RELS 3115, JWST 3115, RELS 5115, CNES 3115]; fall, spring, offered periodically) Jewish law studies as mirror of society and as way to actualize its value. Original socioreligious contexts, current applications. Biblical interpretations addressing moral, theological, legal, and literary problems.

JWST 5204. Dead Sea Scrolls. (3.0 cr.; = [JWST 3204, RELS 3204, RELS 5204, CNES 3204]; spring, even years) Introduction to Dead Sea Scrolls and Qumran. Contents of Dead Sea Scrolls, significance for understanding development of the Bible. Background of Judaism and Christianity. Archaeological site of Qumran.

JWST 5513W. Scripture and Interpretation in Israelite Religion and Judaism. (3.0 cr.; A-F or Audit; = [RELS 5513, CNES 8513, CNES 5513W]; prerequisite at least one upper level course (3xxx or higher) in academic biblical or religious studies; spring, even years) Idea of divine revelation. Impact on religion/literature. How history of Bible's creation, transmission, interpretation help us think critically about role of revelation in religious traditions.

JWST 5900. Topics in Jewish Studies. (3.0-4.0 cr.; max 8.0 cr.; fall, spring, summer, every year) Topics specified in Class Schedule.

JWST 5992. Directed Readings. (1.0-12.0 cr.; = [HIST 5992]; fall, spring, summer, every year) Guided individual reading or study.


JOUR 1001. Introduction to Mass Communication. (3.0 cr.; = [JOUR 1001]; prerequisite Honors, [pre-jour or non-jour major]; fall, every year) Mass communication messages/industries. News, advertising, public relations, books, music, film, TV, video games. Technologies of media production, Internet, mobile/other message delivery systems. Political, legal, ethical, social, global aspects of mass communication.

JOUR 1501. Digital Games, Sims and Apps: Storytelling, Play and Commerce. (3.0 cr.; fall, every year) Introduction to academic study of video games, computer simulations/mobile game applications. Digital games as technology, mass communication industry, cultural form/set of design practices.

JOUR 1904. Freshman Seminar. (3.0 cr.; A-F or Audit; = [HIST 1904]; fall, spring, every year) Topics specified in Class Schedule.

JOUR 1905. Freshman Seminar. (3.0 cr.; A-F or Audit; prerequisite freshman; fall, offered periodically) Topics specified in Class Schedule.

JOUR 1910W. Freshman Seminar. (3.0 cr.; max 6.0 cr.; A-F or Audit; prerequisite freshman; fall, offered periodically) Topics specified in Class Schedule.

JOUR 3004V. Honors: Information for Mass Communication. (3.0 cr.; A-F only; prerequisite Honors, [jour major or mass comm minor or admitted pre-jour or approved BIS/IDIM/ICP program]; spring, every year) Information resources for professional/academic work in mass communication. Techniques for locating, retrieving, appraising, verifying information acquired from public records, libraries, research institutions, databases, Internet, observation, interviews.

JOUR 3004W. Information for Mass Communication. (3.0 cr.; A-F only; prerequisite: junior major or jour minor or admitted pre-jour or approved BIS/IDIM/ICP program; fall, spring, summer, every year) Information resources for professional/academic work in mass communication. Techniques for locating, retrieving, appraising, verifying information acquired from public records, libraries, research institutions, databases, Internet, observation, interviews.

JOUR 3005. Mass Media Effects. (3.0 cr.; fall, spring, every year) Mass media as tools to change beliefs, attitudes, behavior. How/when media has such
effects, whether media effects will change as function of trends in media development. Social science perspective of media effects.

**JOUR 3006. Visual Communication.** (3.0 cr.; fall, spring, every year) Visual media, role of images in mass communication. Social, cultural, historical, psychological approaches.

**JOUR 3007. The Media in American History and Law: Case Studies.** (3.0 cr.; fall, every year) Media in socioeconomic-political-technological context of specific historical period. Focus on legal context/ethics questions.

**JOUR 3101. News Reporting and Writing.** (3.0 cr.; A-F only; [JOUR 3101H]; prerequisite [3004W or 3004V or &3004W or &3004V], [jour major or admitted pre-jour or approved BIS/IDIM/ICP program]; fall, spring, every year) Basic news gathering, journalistic writing. Developing story ideas. Problems associated with handling of news/features. Professional standards/responsibilities.

**JOUR 3102. Multimedia Production and Storytelling.** (3.0 cr.; A-F only; prerequisite [3004W or 3004V or &3004W or &3004V], [3101 or 3101H or &3101 or &3101H or 3279W or &3279W or 3241 or &3241], [jour major or admitted pre-jour or approved BIS/IDIM/ICP program]; fall, spring, every year) Assemble content for distribution across integrated media platforms. Audio slide shows, video with sound, computer-based management of photos/video, web-related skills. Media platforms.

**JOUR 3103. Interactive and Data Journalism.** (3.0 cr.; A-F only; prerequisite [3004W or 3004V], [3101 or 3101H or &3101 or &3101H or 3279W or &3279W or 3241 or &3241], [jour major or admitted pre-jour or approved BIS/IDIM/ICP program]; fall, spring, every year) Introduction to concepts, tools, techniques for journalism on digital platforms. Audience interactivity around news. Stories through data visualizations. Best practices for social media/blogging. Finding, assessing, structuring data.

**JOUR 3121. Intermediate News Reporting.** (3.0 cr.; A-F only; prerequisite [3004W or 3004V], [3101 or 3101H], [jour major or approved BIS/IDIM/ICP program]; fall, spring, every year) Reporting news fundamental to basic beats in most news organizations. Crime, government, politics, environment, health, in-depth profiles, issues relating to civic life.

**JOUR 3155. Editing for Print and Digital Audiences.** (3.0 cr.; A-F only; prerequisite [3004W or 3004V, 3011 or 3011H], [jour major or approved BIS/IDIM/ICP program]; fall, every year) Improving copy through copy editing/rewriting. Selecting/editing news-editorial content for newspapers, magazines, online services. Experience using news judgment to present information in print/web.

**JOUR 3173W. Magazine Writing.** (3.0 cr.; A-F only; prerequisite [3004W or 3004V, 3101 or 3101H, or &3279W], [jour major or approved BIS/IDIM/ICP program]; fall, spring, every year) Writing feature articles for consumer/trade publications. Market free-lance methods.

**JOUR 3201. Principles of Strategic Communication.** (3.0 cr.; A-F or Audit; prerequisite [3004W or 3004V or &3004W or &3004V], [jour major or mass comm minor or admitted pre-jour or approved BIS/IDIM/ICP program]; fall, spring, summer, every year) Preparation for advanced coursework in advertising or public relations.

**JOUR 3241. Advertising Strategy and Creative Development.** (3.0 cr.; A-F only; prerequisite [3004W or 3004V], 3201, [jour major or approved BIS/IDIM/ICP program]; fall, spring, every year) Advertising appeals/strategy. Advertising for print/broadcast/web. Individual/group projects.

**JOUR 3251. Evaluative Research in Strategic Communication.** (3.0 cr.; A-F only; prerequisite [3004W or 3004V], [3201 or 3202], [jour major or approved BIS/IDIM/ICP major; fall, spring, every year) Applied quantitative research methods in advertising/public relations campaign development, management, and evaluation. Focus on scientific primary research methods.

**JOUR 3253. Account Planning.** (3.0 cr.; A-F only; prerequisite [JOUR 3004W or JOUR 3004V, [JOUR 3201 or JOUR 3202], [jour major or approved BIS/IDIM/ICP major; fall, spring, every year) Role of account planning in integrated strategic communications development. Students master skills needed to become an account planner/apply skills in various situations/settings.

**JOUR 3261. Media Planning.** (3.0 cr.; A-F only; prerequisite [3004W or 3004V], [3201 or 3202], [jour major or approved BIS/IDIM/ICP program]; fall, spring, every year) Media strategy, planning, selection process within context of broader marketing communications process. Paid, owned, earned media across advertising, digital (including social), direct marketing/public relations disciplines.

**JOUR 3275. Digital Media in Strategic Communication.** (3.0 cr.; A-F only; prerequisite [3004W or 3004V], [3201 or 3202], [jour major or approved BIS/IDIM/ICP program]; fall, spring, every year) Skills course focused on digital media, including integrating variety of social networking platforms with conventional strategic communication activities.

**JOUR 3279W. Professional Writing for Strategic Communication.** (3.0 cr.; A-F only; prerequisite [3004W or 3004V], [3201 or 3202], [jour major or approved BIS/IDIM/ICP]; fall, spring, every year) Writing expertise for public relations and advertising agency work, corporate and nonprofit strategic communication and development of tactical thinking.

**JOUR 3321. Media Design.** (3.0 cr.; A-F only; prerequisite [3004V or 3004W or &3004W or &3004V], [jour major or admitted pre-jour or approved BIS/IDIM/ICP program]; fall, spring, summer, every year) Basic principles of graphic design. Develop aesthetic sense/graphic design skills through study/creation of effective communication tools. Tutorial guides. Develop software technology skills necessary to complete assignments.

**JOUR 3451. TV, Radio and Digital News Reporting.** (3.0 cr.; A-F only; prerequisite [3004W or 3004V], [3101 or 3101H or &3279W], [jour major or approved BIS/IDIM/ICP program]; fall, spring, every year) News writing, reporting, video photography/editing, on-air delivery.

**JOUR 3551. Economics of New Media.** (3.0 cr.; spring, every year) Economic issues related to traditional/new media companies. Emerging communications technologies.

**JOUR 3552. Internet and Global Society.** (3.0 cr.; fall, every year) Structure/processes of Internet/global society in comparative context. Internet, via World Wide Web, as ideal site to explore how/why societies come to see world/issues.

**JOUR 3614. History of Media Communication.** (3.0 cr.; fall, spring, every year) Historical perspective on tools of communication from earliest times to present. Impact of new technologies on society.


**JOUR 3741. Diversity and Mass Communication.** (3.0 cr.; fall, every year) Past/present depictions of people of color in movies, literature, radio/TV against anthropological, psychological, sociological knowledge/experience. Personal/political effects of media depictions.

**JOUR 3745. Mass Media and Popular Culture.** (3.0 cr.; [JOUR 3745H]; fall, spring, summer, every year) Mass media's role in formation of popular culture/cultural discourse. Prevalent media metaphors, caricatures, stereotypes. Social/commercial pressures influencing media representation.

**JOUR 3771. Mass Media Ethics: Moral Reasoning and Case Studies.** (3.0 cr.; fall, spring, summer, every year) Overview of ethical dilemmas faced by journalists, advertisers, public relations/communications specialists. Case studies, ethical principles/theories, professional codes of ethics.

**JOUR 3775. Administrative Law and Regulation for Strategic Communication.** (3.0 cr.; spring, every year) Mass communication law/regulation for professional strategic communicators. Court
decisions/regulations affecting legal rights/
privileges relevant to advertising, public
relations, new media professions.

**JOUR 3776. Mass Communication Law.** (3.0
cr.; [JOUR 3776H]; fall, spring, every year)
Brief historical background, First Amendment
erights, basic law of defamation, free press/ fair
trial, access to news, access to press, privacy, contempt, obscenity, regulation of broadcasting/advertising.

**JOUR 3776H. Mass Communication Law.** (3.0
cr.; A-F only; [JOUR 3776]; prereq
Honors; spring, every year)
Brief historical background, First Amendment
erights, basic law of defamation, free press/fair
trial. Access to news/press, privacy, contempt,
obscenity. Regulation of broadcasting/
advertising.

**JOUR 3796. Mass Media and Politics.** (3.0
cr.; fall, every year)
Analysis of mass media in politics. Television/ electoral campaigns. News coverage vs
newsmaking. Free press in democracy.

**JOUR 3991. Special Topics in Mass Communication: Context.** (3.0 cr. [max 6.0
cr.]; A-F or Audit; fall, spring, summer,
every year)
Directed study, projects. Prereq [Jour major or
junior major or approved IDIM major or
ICP major or BIS major], instr consent, dept
consent, college consent.

**JOUR 3996. Directed Internship.** (1.0-3.0 cr.
[max 6.0 cr.]; A-F or Audit; fall, spring, summer,
every year)
Internship supervised by communications
organization at which student is working and by
student's academic sponsor.

**JOUR 4171. Covering the Arts.** (3.0 cr.; A-
F only; prereq [3004W or 3004V, 3101 or
3101H]. [Jour major or approved BIS/IDIM/ICP
program] or #; spring, every year)
Assignments follow Twin Cities arts/
entertainment scene or particular arts
organization (e.g., Jungle Theater) through its
season. Weekly writing assignments, readings,
field trips, guest lectures from artists/art
journalists.

**JOUR 4193. Brovald-Sim Community Journalism Practicum: Murphy News Service.** (3.0
cr.; A-F only; prereq [3004W or 3004V],
[3101 or 3101H]. [Jour major or
approved BIS/IDIM/ICP program]; fall, spring,
every year)
Serves as staff writer for student-produced
Murphy News Service. Work with instructors/
editors to create bylined stories in print,
online/multimedia formats for Twin Cities-
area newspapers and news service website.
Regular off-campus reporting at participating
newspapers. Weekly staff meetings.

**JOUR 4242. Advertising Portfolio Development.** (3.0 cr.; A-F only; prereq
[3004W or 3004V], 3201, 3241. [Jour major or
approved BIS/IDIM/ICP program]; fall, spring,
every year)
Creative development, conceptual thinking.
Develop innovative creative ideas based on
strategies. Emphasizes print. Applying creative thought
to advertising ideas. How to put content together.

**JOUR 4251. Psychology of Advertising.** (3.0
cr.; [JOUR 5251]; fall, spring, every year)
Psychological principles, research techniques, applications in advertising/selling. Consumer
attitudes/behavior. Psychological mechanisms
upon which effectiveness of advertisements/
commercials depends.

**JOUR 4259. Strategic Communication Case Analysis.** (3.0 cr.; [JOUR 32xx courses, jour major or approved BIS/ IDIM/ICP program]; fall, spring, every year)
Strategic communication cases related to
campaigns/issues in business, government,
education, or community.

**JOUR 4262. Management for Strategic Communication.** (3.0 cr.; A-F only; prereq
[3004W or 3004V], [3201 or Jour 3202], any one additional
32xx skills course, jour major or approved BIS/IDIM/ICP program; fall, spring, every year)
Concepts/methods for effective management in
field of mass communication.

**JOUR 4263. Strategic Communication Campaigns.** (3.0 cr.; [JOUR 32xx courses, jour major or approved BIS/IDIM/ICP program]; spring, every year)
Developing campaign strategy/tactics.
Planning/decision-making skills. Students work in
groups with varying specializations.

**JOUR 4272. Interactive Advertising.** (3.0 cr.; A-
F or Audit; prereq Jour major or mass comm
minor or approved BIS/IDIM/ICP program; spring,
every year)
Interactive advertising models. Issues related
to creating, measuring, pricing, targeting
interactive ads. Interactive ads in global, legal,
ethical contexts.

**JOUR 4274W. Advertising in Society.** (3.0
cr.; fall, spring, every year)
Forms of regulation. Self-regulation/
governmental. Critique of advertising's role
in society. Current issues (e.g., stereotyping,
political advertising, advertising to children).
Ethics in advertising.

**JOUR 4302. Electronic Photojournalism.** (3.0 cr.; A-F or Audit; prereq [3004W or 3004V],
3102. [Jour major or approved BIS/IDIM/ICP
program]; fall, spring, every year)
Practice of photojournalism in contemporary
digital environment. Visual storytelling, digital
processing, professional/ethical issues.

**JOUR 4303. Documentary Photojournalism.** (3.0 cr.; A-F only; prereq [3004W or 3004V],
3402. [Jour major or approved BIS/IDIM/ICP
program] or #; spring, every year)
Conceptualize, research, produce documentary
projects consisting of edited photographs/
accompanying text. Projects presented in print
or online. Examples of differing approaches,
exemplary documentary work.

**JOUR 4451. Advanced TV, Radio and Digital News Reporting.** (3.0 cr.; A-F or Audit; prereq
[3004W or 3004V], [3101 or 3101H], 3451,
[3121 or 3312]. [Jour major or approved BIS/ IDIM/ICP program]; fall, every year)
Researching, reporting, shooting, writing,
editing TV news packages. Lecture, lab.

**JOUR 4452. Electronic Newscast Producing.** (3.0 cr.; A-F only; prereq [3004W or 3004V],
[3101 or 3101H], 3451, [3121 or 3312][Jour major or approved BIS/IDIM/ICP program];
fall, every year)
Planning, writing, producing live TV newscasts.
Lecture, lab.

**JOUR 4551. New Media and Culture.** (3.0 cr.;
spring, every year)
History, theories, social impact of digital/
interactive media on culture. How new media,
including Internet, mobile devices, websites,
applications, social media, may change ways people communicate/distribute/process information.

**JOUR 4721. Mass Media and U.S. Society.** (3.0 cr.; [JOUR 4721H]; spring, every year)
Economic, political, social determinants of character/content of mass communications in America. Effect, structure, functioning of mass media. Problems, prospects, criticism.

**JOUR 4721H. Mass Media and U.S. Society.** (3.0 cr.; A-F only; [JOUR 4721]; prereq
Honors; spring, every year)
Economic, political, social determinants of character/content of mass communications in America. Effect, structure, functioning of mass media. Problems, prospects, criticism.

**JOUR 4733H. Honors Thesis Seminar.** (3.0 cr.; A-F only; prereq Jour major. [jr or sr],
honors; fall, spring, every year)
Students work under supervision of instructor, with input from subject or methodological
advisers, to define research question, conduct
research, and write thesis. Students serve as
consultants to one another.

**JOUR 4801. Global Communication.** (3.0 cr.;
spring, every year)
Structures, processes, consequences of
global mass communication. Problems in
free flow of information. Roles of international
organizations. Mass communication in social,
political, economic development. Implications
for conflict resolution.

**JOUR 4990. Special Topics in Mass Communication: Professional.** (3.0 cr. [max
6.0 cr.]; A-F or Audit; prereq [3101 or 3201 or
3202]), 3004, [Jour major or approved IDIM major or ICP major or BIS major]; fall, spring,
summer, every year)
Professional-skills-learning opportunity not
regularly offered. Topics specified in Class Schedule.

**JOUR 4991. Special Topics in Mass Communication: Context.** (3.0 cr. [max
6.0 cr.]; A-F or Audit; fall, spring, offered
periodically)
Special context topics not regularly offered.
Topics specified in Class Schedule.
JOUR 4992. Field Based Practicum. (3.0 cr.; [max 6.0 cr.]; A-F or Audit; prereq Jour major; fall, spring, every year) Professional-skill-learning experience on-site at media organization. Topics specified in Class Schedule.

JOUR 4993H. Honors: Projects. (3.0 cr.; A-F or Audit; fall, spring, summer, every year) Honors projects. Prereq Jour major, honors div regis, college consent, dept consent, instr consent.

JOUR 5131. In-Depth Reporting. (3.0 cr.; A-F only; prereq [3004W or 3004V], [3101 or 3101H], 3121, [jour major or approved BIS/IDIM/ICP program]; fall, every year) Techniques/issues of special project stories. Explanatory, investigative, civic, literary, or ethnographic journalism. Topics (e.g., civil rights, governmental malfeasance, health care problems) typically involved in stories.

JOUR 5155. Database Reporting. (3.0 cr.; A-F only; prereq [3004W or 3004V], [3101 or 3101H], 3121, [jour major or approved BIS/IDIM/ICP program]; spring, every year) Obtaining/analyzing digital data for computer-assisted reporting that can be published on various media platforms. Using spreadsheets/databases to manage information, find news stories, produce maps/graphics.

JOUR 5174. Magazine Editing and Production. (3.0 cr.; A-F only; prereq [3004W or 3004V], [3155 or 3173W or 3279W or 3321 or 4302]; [jour major or approved BIS/IDIM/ICP program]; fall, spring, every year) Writing, editing, illustration, design, layout, photos/composition of print or web magazine. Emphasizes reporting, telling substantive stories. Work in groups with varying specializations.

JOUR 5251. Psychology of Advertising. (3.0 cr.; [max 3.0 cr.]; = [JOUR 4251]; prereq Strat Comm MA grad major or grad mass comm major/minor or #; spring, every year) Psychological principles, research techniques, applications in advertising/selling. Consumer attitudes/behavior. Psychological mechanisms upon which effectiveness of advertisements/commercials depends.

JOUR 5501. Communication, Public Opinion, and Social Media. (3.0 cr.; fall, every year) Theories of mass communication, persuasion, attitude change. Functions of mediated communication in formation/diffusion of public opinion about major social/political issues. Social media as tool for measuring/influencing public opinion.


JOUR 5542. Theory-based Health Message Design. (3.0 cr.; A-F or Audit; spring, every year) Best practices for message design across media/contexts. Students apply concepts to design health campaign messages that affect various audiences. Implications of theories of message engagement for current public health practice.

JOUR 5543. Public Health Campaign Evaluation. (3.0 cr.; A-F or Audit; prereq [5541, [enrolled in MA in health journalism or grad student or jour major or mass comm minor or approved IDIM major or ICP major or BIS major]] or #; spring, every year) Draws upon the campaign evaluation literature. Recommendations on evaluation research design. Cross-sectional, experimental, and time-based designs. Focuses on summative efforts.

JOUR 5552. Law of Internet Communications. (3.0 cr.; A-F or Audit; spring, every year) Whether/how/which traditional media laws/regulations apply to Internet. Developing law of communication on Internet, global/ethical issues.

JOUR 5601W. History of Journalism. (3.0 cr.; spring, every year) Development of American media from beginnings in Europe to present day. Rise of film/radio/television/Internet. Relation of communications development to political, economic, social trends.

JOUR 5606W. Literary Aspects of Journalism. (3.0 cr.; = [ENGW 5606]; spring, every year) Literary aspects of journalism. American/British writers, past/present. Lectures, discussions, weekly papers, critiques.


JOUR 5777. Contemporary Problems in Freedom of Speech and Press. (3.0 cr.; A-F or Audit; = [LAW 6030]; prereq Jour major or jour minor or approved BIS/IDIM/ICP program; fall, every year) Legal/constitutional derivation of freedom of press/speech. Emphasizes case law, statutes, judicial theories. Leading cases in privacy torts, prior restraints, news gathering/dissemination. Access to courts/government, including via Internet. Legal-research techniques.

JOUR 5990. Special Topics in Mass Communication: Professional. (3.0 cr.; [max 6.0 cr.]; A-F or Audit; prereq Jour major or approved IDIM major or ICP major or BIS major; spring, every year) Professional-skill-learning opportunity not regularly offered. Topics specified in Class Schedule.

JOUR 5991. Special Topics in Mass Communication: Context. (3.0 cr.; [max 6.0 cr.]; A-F or Audit; spring, offered periodically) Special context topics not regularly offered. Topics specified in Class Schedule.

JOUR 5993. Directed Study. (1.0-3.0 cr.; [max 6.0 cr.]; A-F or Audit; fall, spring, summer, every year) Directed study/projects. Prereq [jour major or jour minor or approved IDIM major or ICP major or BIS major]. GPA of at least 3.00, college consent, dept consent, instr consent.

Kinesiology (KIN)

College of Education and Human Development

KIN 1050. Beginning Military Physical Fitness Training. (1.0 cr.; [max 4.0 cr.]; A-F or Audit; fall, spring, every year) The Army's model of physical fitness training is used to address five aspects of fitness in the context of running, weight training, strength exercise, circuit training, and team sport activities. Students are organized into groups of similar fitness levels.

KIN 1375. Play Behavior. (3.0 cr.; spring, summer, every year) Overview of play behavior across species, cultures, social settings. Relationship of play between physical/psychological development, role of sports/games in play, design of toys/playgrounds.

KIN 1871. Survey of Kinesiology, Recreation, and Sport. (3.0 cr.; A-F or Audit; fall, spring, summer, every year) Professional practice and disciplinary dimensions of kinesiology, recreation, and sport. Subdisciplines, relevant issues, practical applications.

KIN 1902. Freshman Seminar: Cultural Diversity. (1.0-3.0 cr.; [max 6.0 cr.]; prereq Fr; fall, offered periodically) Interdisciplinary seminar. Topics specified in Class Schedule.

KIN 1904. Freshman Seminar: Global Perspectives. (3.0 cr.; [max 6.0 cr.]; prereq Fr; fall, spring, offered periodically) Interdisciplinary seminar. Topics specified in Class Schedule.

KIN 1905. Freshman Seminar. (1.0-3.0 cr.; [max 6.0 cr.]; prereq Fr; fall, every year) Interdisciplinary seminar. Topics specified in Class Schedule.

KIN 3001. Lifetime Health and Wellness. (3.0 cr.; A-F or Audit; fall, spring, summer, every year) Overview of health/wellness. Physical, emotional, intellectual, spiritual, social, environmental, and financial health. Influence of societal changes on general health/wellness of diverse populations.

KIN 3027. Human Anatomy for Kinesiology Students. (3.0 cr.; A-F or Audit; spring, every year)
Introduction to human anatomy. Emphasizes musculoskeletal anatomy germane to athletic training, biomechanics, exercise physiology, motor learning/development.

KIN 3050. Advanced Military Physical Fitness Training. (1.0 cr.; max 4.0 cr.; A-F or Audit; prereq 4 cr of 1050 or #; fall, spring, every year) Students take on leadership roles in implementing Army's model of physical fitness training. Model addresses five aspects of fitness in the context of running, weight training, strength exercise, circuit training, and team sport activities.

KIN 3112. Introduction to Biomechanics. (4.0 cr.; A-F only; prereq [PHYS 1101W or PHYS 1201W or PHYS 1301W or PHYS 1401V or 1107], [3027 or 3111 or ANAT 3001 or ANAT 3601 or ANAT 3611 or INMD 3001 or INMD 3601]; 3385 recommended; fall, spring, summer, every year) Mechanical principles governing human motion. Human bone, muscle, and neurophysiology. Measurements of human performance. Clinical/applied sport biomechanics. Lab introduces technology for assessing human motor function such as electromyography or force sensors.

KIN 3114. Prevention and Care of Athletic Injuries. (3.0 cr.; A-F only; prereq [3027 or ANAT 3001 or ANAT 3601 or ANAT 3611 or equiv], [CEHD student or #]; fall, spring, summer, every year) Principles in athletic training for prevention/care of injury. Taping/bracing techniques. Lab.

KIN 3126W. Sport and Exercise Psychology. (3.0 cr.; A-F or Audit; prereq Kin major or #; fall, spring, summer, every year) Thoughts, feelings, and behaviors of people in physical activity contexts. Foundations approach to theory/research in sport and exercise psychology.

KIN 3131W. History and Philosophy of Sport. (3.0 cr.; A-F or Audit; prereq Kin major or #; fall, spring, summer, every year) Introductory description and interpretation of the historical and philosophical development of physical education and sport from primitive societies to 20th century civilization.

KIN 3132. Introduction to Motor Development Across the Lifespan. (3.0 cr.; A-F or Audit; prereq Kin major or #; spring, summer, every year) Developmental aspects of human movement behavior/learning. Life span change of motor skills.

KIN 3135. Introduction to Motor Learning and Control. (3.0 cr.; A-F or Audit; prereq Kin major or #; fall, spring, every year) Main theoretical ideas/research that have advanced motor control/learning over last three decades.

KIN 3136. Mental Skills Training for Sport. (3.0 cr.; A-F only; fall, spring, every year) Experientially-based course. Using mental skills training strategies (e.g., imagery, goal setting, relaxation, cognitive restructuring, motivation) for enhancing sport performance and personal growth of athletes.

KIN 3143. Organization and Administration of Sport. (3.0 cr.; A-F or Audit; prereq Kin major or #; fall, spring, summer, every year) How to organize/administer sports/activities. Practice/class organization, meet/game organization, facility/equipment needs, finances.

KIN 3168. Soccer Coaching Theory and Skill Development. (2.0 cr.; A-F only; prereq [Enrolled in coaching program or Kin major or #], skills sufficient for participating in drills/game/match/context for demonstration/teaching purposes; spring, every year) Coaching theory and skill development necessary to coach soccer.

KIN 3169. Volleyball Coaching Theory and Skill Development. (2.0 cr.; A-F only; prereq [Enrolled in coaching program or KIN major or #], skills sufficient for participating in drills/game/match/context for demonstration/teaching purposes; spring, every year) Coaching theory and skill development necessary to coach volleyball.

KIN 3171. Baseball Coaching Theory and Skill Development. (2.0 cr.; A-F only; prereq [Enrolled in coaching program or KIN major or #], skills sufficient for participating in drills/game/match/context for demonstration/teaching purposes; fall, summer, every year) Coaching theory and skill development necessary to coach baseball.

KIN 3172. Basketball Coaching Theory and Skill Development. (2.0 cr.; A-F only; prereq [Enrolled in coaching program or KIN major or #], skills sufficient for participating in drills/game/match/context for demonstration/teaching purposes; fall, summer, every year) Coaching theory and skill development necessary to coach basketball.

KIN 3173. Football Coaching Theory and Skill Development. (2.0 cr.; A-F only; prereq [Enrolled in coaching program or KIN major or #], skills sufficient for participating in drills/game/match/context for demonstration/teaching purposes; spring, summer, every year) Coaching theory and skill development necessary to coach football.

KIN 3178. Tennis Coaching Theory and Skill Development. (2.0 cr.; A-F only; prereq [Enrolled in coaching program or KIN major or #], skills sufficient for participating in drills/game/match/context for demonstration/teaching purposes; fall, summer, offered periodically) Coaching theory and skill development necessary to coach tennis.

KIN 3179. Track and Field Coaching Theory and Skill Development. (2.0 cr.; A-F only; prereq [Enrolled in coaching program or KIN major or #], skills sufficient for participating in drills/game/match/context for demonstration/teaching purposes; fall, every year) Coaching theory and skill development necessary to coach track and field.

KIN 3327. Teaching Physical Education in the Elementary School. (2.0 cr.; A-F or Audit; prereq Elem ed major; fall, spring, every year) Overview of the elementary physical education process with focus on a classroom teacher's perspective and needs. Representative experiences include participation, lecture, micro-teaching, final test.

KIN 3385. Human Physiology. (4.0 cr.; A-F or Audit; prereq [KIN 3027 or ANAT 3001 or ANAT 3601 or ANAT 3611], KIN major) or #; fall, spring, summer, every year) Functional/integrative approach organized by level of description, from molecular genetics to dynamic movement/clinical conditions. Cellular mechanisms for major physiological functions. Exercise, fitness, health, growth.

KIN 3505. Intro to Human-Centered Design. (3.0 cr.; [KIN 5505]; fall, every year) Application of design to meet human needs. Design of fabricated products, tools/machines, software/hardware interfaces, art/culture, living environments, and complex sociotechnical systems.

KIN 3696. Supervised Practical Experience. (1.0-10.0 cr.; S-N only; prereq #; fall, spring, summer, every year) On-the-job supervised practical experience in the fields of sport and exercise under a specialist in a particular area of study or emphasis.

KIN 3982. Research Methods in Kinesiology. (3.0 cr.; A-F or Audit; prereq Kin major or #; fall, spring, summer, every year) How to understand/interpret/read research. Research question, study design, quantitative/qualitative methods. Instrumentation, statistical methods, study limitations/implications. Critiquing peer-reviewed articles. Designing a research study.

KIN 3993. Directed Study in Kinesiology. (1.0-10.0 cr.; A-F only; prereq #; fall, spring, summer, every year) Students work with faculty and graduate students on research or scholarly/creative activities. Students usually assist with faculty scholarship or carry out projects of their own under faculty supervision.

KIN 3993H. Directed Study in Kinesiology: Honors. (1.0-10.0 cr.; A-F only; prereq Kin honors; #; fall, spring, summer, every year) Student-selected clinical or research experience.

KIN 4001H. Honors Seminar in Kinesiology. (3.0 cr. [max 6.0 cr.]; A-F or Audit; prereq Kinesiology honors; fall, spring, every year) Contemporary issues in kinesiological research. Laboratory rotations, development of UROP project proposal, development of senior thesis topic, advanced study, career opportunities in Kinesiology, special learning opportunities.

KIN 4133. Perceptual-Motor Control and Learning. (3.0 cr.; A-F or Audit; prereq [3112, 3132, 3135, KIN major] or #; fall, spring, summer, every year) Concepts/principles of coordination/control of perceptually guided movement. Constraints
KIN 4134. The Aging Motor System. (3.0 cr.; A-F only; prereq [3132, 3135, Kin major] or #; fall, spring, every year) Impact of aging on the motor system and its influence on activities of daily living (ADL); posture, falls, participation in physical activity, performance of daily living skills, and the role of physical activity in reduction of future health problems.

KIN 4136. Embodied Cognition. (3.0 cr.; A-F only; prereq 3132 or 3135 or #; fall, spring, every year) Introduction to relations between physical behavior/mental activity. Cognitive, emotional, social aspects. Concepts of embodied cognition, their relation to traditional concepts of mind/body. Lifespan development, empirical research.

KIN 4385. Exercise Physiology. (4.0 cr.; A-F or Audit; prereq [[3385 or PHSL 3051], or equiv], Kin major] or #; fall, spring, every year) Effects of exercise on physiological systems of human body. Energy/nutritional requirements of exercise, exercise prescription, athletic conditioning, ergogenic aids, exercise in environmental extremes, gender/heritability factors related to adaptation to training.

KIN 4441. Movement Neuroscience. (3.0 cr. [max 6.0 cr.]; A-F only; prereq 3135 or #; fall, offered periodically) Neural basis of human motor function. Neuroanatomy and neurophysiology of motor control and learning. Seminar for students in kinesiology, neuroscience, physical therapy, physiology, psychology, bioengineering, and human movement science.

KIN 4520. Current Topics in Kinesiology. (2.0-4.0 cr. [max 12.0 cr.]; prereq Upper div in KIN or REC or SMGT or coaching or #; fall, spring, every year) Issues in kinesiology or topics not normally available through regular curriculum offerings.

KIN 4641. Training and Conditioning for Sport. (3.0 cr.; A-F or Audit; prereq [KIN 4385 or exercise physiology course], [upper level undergrad or M.Ed. or grad student]; fall, spring, every year) Physiology/methodology of training/conditioning athletes. Students construct training/conditioning programs for athletes. Different components that enhance training adaptation.

KIN 4697. Student Coaching and Seminar. (3.0 cr.; S-N or Audit; #[KIN 5697]; prereq [Coaching minor or certificate] student, GPA of at least 2.50; fall, spring, summer, every year) Student coaching practicum under supervision of mentor. Seminar classes. Development of integrative project.

KIN 4741. Strength and Power Development and Program Design. (3.0 cr.; A-F or Audit; prereq Kinesiology major or coaching minor or coaching certificate or kinesiology MEd or #; fall, spring, summer, every year) How to scientifically design resistance training programs and modify them for special populations (athletes, children, seniors, etc.). How exercise prescription design works in applied field.

KIN 4841. Athletic Performance and Environmental Considerations. (3.0 cr.; Student Option No Audit; prereq 4385 or 4641 or #; spring, summer, every year) Physiological mechanisms controlling body's response to training. Environmental factors that affect athletic performance, such as heat, humidity, and altitude.

KIN 4941. Applied Sport Science. (3.0 cr.; Student Option No Audit; prereq 4981 or #; summer, every year) Introduction to varied contributions of sport sciences to athletic performance. Evaluation of historical research's contributions toward modern day research questions.

KIN 4981. Understanding Kinesiology Research. (3.0 cr.; A-F only; prereq Intro statistics recommended; fall, spring, summer, every year) Prepares students to critically analyze research specific to kinesiology.

KIN 5001. Foundations of Human Factors/ Ergonomics. (3.0 cr.; A-F or Audit; [HUMF 5001]; fall, every year) Variability in human performance as influenced by interaction with designs of machines and tools, computers and software, complex technological systems, jobs and working conditions, organizations, and sociotechnical institutions. Emphasizes conceptual, empirical, practical aspects of human factors/ergonomic science.

KIN 5103. Developmental/Adapted Physical Education. (3.0 cr.; A-F or Audit; fall, spring, summer, every year) Introduction to physical education for students with disabilities, emphasizing conceptual, empirical, practical aspects of human movement science.

KIN 5111. Sports Facilities. (3.0 cr.; A-F or Audit; prereq initial licensure/MEd phys ed student; fall, spring, every year) Theory/research on social influences, individual differences, motivational processes. How sport/physical activity contribute to psycho-social development. Social psychological factors influencing physical activity beliefs/behaviors.

KIN 5126. Social Psychology of Sport & Physical Activity. (3.0 cr.; A-F only; prereq 3126W or equiv or grad student or #; fall, spring, every year) Psychological dimensions of coaching across age levels, including coaching philosophy, leadership, communication, motivation, and mental skills training for performance enhancement.


KIN 5152. Curriculum Development in Physical Education. (2.0 cr.; A-F or Audit; prereq initial licensure/MEd phys ed student; spring, every year) Trends, issues, and challenges in early childhood/K-12 physical education. Potential effect on curriculum.

KIN 5171. Foundations of Kinesiology. (3.0 cr.; A-F or Audit; prereq Kin major or #; fall, every year) Introduction to the emerging field of kinesiology, broadly conceived as the study of human movement. Development and
emergence of the term kinesiology and the scholarly, political, and educational ramifications of its development.

KIN 5196. Practicum: Developmental/Adapted Physical Education. (1.0-4.0 cr.; S-N only; prereq [5103 or 5104]; #; fall, every year) Observation of, participation in physical education instruction for students with disabilities. Current issues in developmental/adapted physical education. Exchange of ideas/problems.


KIN 5202. Current Issues in Health. (2.0 cr.; A-F only; summer, every year) Critical thinking for health issues in research/media. Issues specific to conflict, stress, public policy, and communication. Projects, debates.

KIN 5203. Health Media, Consumerism, and Communication. (2.0 cr.; A-F only; spring, every year) Effects of media, consumerism, technology, and health related issues. Students form/defend opinions on positive/negative aspects of how health information is disseminated and how individual health decisions are made.

KIN 5204. Methods in Health Education. (3.0 cr.; A-F only; prereq Health licensure student or #; fall, every year) Background knowledge/skills to deliver comprehensive health education program. Techniques, skills, and methods for teaching active learning projects. Lessons/units in health curriculum discussed/demonstrated. Focuses on grades 5-12.


KIN 5235. Advanced Biomechanics II: Kinetics. (3.0 cr.; A-F or Audit; prereq [3112 or equiv], PMed 5135, undergrad college physics, intro calculus; spring, even years) Kinetic aspects of human movement (single/multi-joint torques, simple inverted pendulum models, mass-spring systems). Analysis of experimental data and of computer simulations. Lectures, seminars, lab.

KIN 5371. Sport and Society. (3.0 cr.; A-F or Audit; prereq [3126W, grad student] or #; spring, every year) Sport, sporting processes, social influences, systems. Structures that have existed and exist within/among societies, nations, and cultures. Contemporary issues such as social differentiation, violence, and honesty.

KIN 5375. Competitive Sport for Children and Youth. (3.0 cr.; spring, summer, every year) Cognitive, behavioral, and biological factors having important implications for competitive sport participants from early childhood through high school age. Emphasis on translating sport science research into practical implications for youth sport coaches, teachers, and administrators.

KIN 5385. Exercise for Healthy Aging & Disease Prevention and Management. (3.0 cr.; A-F only; prereq Physiology or biology undergrad; spring, every year) Exercise testing/prescription with modifications required because of special considerations associated with aging, gender differences, or presence of medical conditions.

KIN 5421. Sport Finance. (3.0 cr.; A-F or Audit; prereq Grad student or #; fall, every year) Introduction to financial analysis in sport. Cash flow statements, budgeting issues, traditional/innovative revenue producing strategies available to sport organizations. Discussion, practical analysis of current market.

KIN 5435. Advanced Theory and Techniques of Exercise Science. (3.0 cr.; A-F only; prereq [3385, 4385, Kin major] or #; spring, every year) Theoretical constructs, in-depth description of procedures used in exercise science research and clinical settings. Laboratory exercises, lectures.

KIN 5461. Issues in the Sport Industry. (3.0 cr.; A-F only; prereq postbac or grad student or #; fall, every year) Critical analysis of management issues within sport industry. Strategic management, corporate social responsibility, human resource management/diversity, governance, sport globalization, sport development.

KIN 5485. Advanced Electrocardiogram Interpretation. (3.0 cr.; A-F only; prereq [3385, 4385] or #; fall, every year) Placement and interpretation. Clinical exercise testing hands-on experience in electrocardiogram for resting and exercise testing situations.

KIN 5505. Human-Centered Design - Principles and Applications. (3.0 cr.; =KIN 3505); fall, every year) Application of design to meet human needs. Design of fabricated products, tools/machines, software/hardware interfaces, art/culture, living environments, and complex sociotechnical systems.

KIN 5511. Sport and Gender. (3.0 cr.; A-F only; =REC 5511); fall, every year) Critically examines women's involvement in/contributions to sport, physical activity, and leisure.

KIN 5585. Pediatric Physiology and Health: Concepts and Applications. (2.0 cr.; A-F only; prereq 3385 or 4385; summer, every year) Current understanding of pediatric medicine and exercise physiology. Use of physical activity and weight management in the treatment of various diseases (i.e, obesity) that affect children and adolescents.

KIN 5601. Sport Management Ethics and Policy. (3.0 cr.; A-F or Audit; prereq MEd or grad student or #; spring, every year) How to critically analyze ethical concepts that underpin or inform sport policies and evaluate sport policies from a normative point of view. Selected sport policy issues are used to illustrate relevance of ethical considerations in policy development and to explore the ethical implications of sport policy.

KIN 5631. Programming and Promotion in Sport. (3.0 cr.; A-F or Audit; prereq Kin or Rec grad student or #; fall, spring, every year) Introduction to marketing concepts as they apply to sport industry. Consumer behavior, market research, marketing mix, corporate sponsorship, licensing. Discussion, practical application.

KIN 5641. Scientific Theory and Application of Training and Conditioning in Sport. (3.0 cr.; A-F only; prereq 4385 or SPST 3641 or SPST 4641 or exercise physiology course or #; spring, summer, every year) Current scientific literature on physiological adaptation through training/conditioning for sport. Applying methods in research journals to improve physiological adaptation through training/conditioning with sport specificity.

KIN 5696. Practicum in Kinesiology. (1.0-6.0 cr.; S-N only; prereq [Kin MEd or grad student]; #; fall, spring, every year) Practical experience in kinesiology under supervision of a University faculty member and an agency supervisor.

KIN 5720. Special Topics in Kinesiology. (2.0-4.0 cr. [max 12.0 cr.]; prereq Kin upper div undergrad or grad student or #; fall, spring, summer, every year) Current issues in the broad field and subfields in kinesiology, or related coursework in areas not normally available through regular offerings.

KIN 5723. Psychology of Sport Injury. (3.0 cr.; prereq Intro psych course; fall, spring, every year) Psychosocial bases of risk factors preceding sport injury, responses to the occurrence of sport injury, and the rehabilitation process. Lecture, discussion, guest lecture, interviews, and presentation experience.

KIN 5725. Organization and Management of Physical Education and Sport. (3.0 cr.; A-F or Audit; prereq Grad/initial licensure or #; spring, summer, every year) Comprehensive analysis of organization and management of physical education and sport in educational settings. Focus on management and planning processes, management skills, functions, roles, decision making, leadership, shared systems, and organizational motivation. For physical education teachers, coaches, community sport administrators.

KIN 5801. Legal Aspects of Sport and Recreation. (4.0 cr.; A-F or Audit; prereq Kin or rec major; fall, spring, every year) Legal issues related to recreation, park, and sport programs/facilities in public/private sectors.
KIN 5804. National Collegiate Athletic Association (NCAA) Compliance. (2.0 cr.; A-F only; prereq [Upper div undergrad or grad student] in KIN, #; spring, every year) Governance structure, policies, and procedures in intercollegiate athletics. Careers in college athletics as coach, administrator, athletic trainer, counselor, etc.

KIN 5941. Clinical Movement Neuroscience. (3.0 cr.; A-F only; prereq [3027 or ANAT 3001 or ANAT 3601 or ANAT 3611 or equiv], [PHSL 3051 or equiv], [4441]; spring, offered periodically) Various neural subsystems involved in controlling human motor function. How injury and disease of the nervous system affects motor behavior. Possibilities for rehabilitation and treatment. Lectures, seminars, class presentations.

KIN 5981. Research Methodology in Kinesiology, Recreation, and Sport. (3.0 cr.; A-F or Audit; = [REC 5981]; prereq 3151 or equiv; fall, spring, summer, every year) Defines/reviews various types of research in exercise/sport science, physical education, and recreation studies. Qualitative research, field studies, and methods of introspection as alternative research strategies to traditional scientific paradigm.

KIN 5987. Professional Skills and Grant Writing for Health Sciences. (2.0 cr.; Student Option No Audit; prereq Grad student; spring, even years) Introduction to structure/function of different organizations (e.g., NIH, AHA). Writing/reviewing grants/Manuscripts. Preparing for a job in academia.

KIN 5992. Readings in Kinesiology. (1.0-9.0 cr.; A-F only; prereq [KIN upper div undergrad or MEd or grad student], #; fall, spring, summer, every year) Independent study under tutorial guidance.

KIN 5995. Research Problems in Applied Kinesiology. (1.0-6.0 cr.; A-F only; prereq [KIN upper div undergrad or MEd or grad student], 15 cr of major coursework [including 4981 or 5981], #; fall, spring, summer, every year) Selected topics in physical activity and human performance.

Korean (KOR)
College of Liberal Arts

KOR 1011. Beginning Korean I. (5.0 cr.; = [KOR 4001]; fall, every year) Basic grammatical structure, vocabulary, expressions of modern colloquial Korean. Introduces Korean writing system.

KOR 1012. Beginning Korean II. (5.0 cr.; = [KOR 4002]; prereq 1011; spring, every year) Basic grammatical structure, vocabulary, expressions of modern colloquial Korean.

KOR 3021. Intermediate Korean I. (5.0 cr.; = [KOR 4003]; prereq 1012; fall, every year) Speaking, reading, writing at intermediate level in modern colloquial Korean. Simple narration/ written reports. Some basic Chinese characters may be introduced.

KOR 3022. Intermediate Korean II. (5.0 cr.; = [KOR 4004]; prereq 3021; spring, every year) Speaking, reading, writing at intermediate level in modern colloquial Korean. Narration/ written reports. Introduction of additional basic Chinese characters.

KOR 3031. Third Year Korean I. (4.0 cr.; = [KOR 4005]; prereq 3022; fall, every year) Speaking, reading, writing at advanced level in modern colloquial Korean. Narration/ written reports. Further Chinese characters introduced.

HIST 3200. Seminar in Korean History. (3.0 cr.; = [HIST 3201]; fall, spring, summer, every year) May be taken for credit a maximum of two times. Prereq instr consent. Historical development of Korea. Study of modern and contemporary Korean society.


KOR 4002. Beginning Korean II. (3.0 cr.; = [KOR 3002]; prereq 4001, grad student; spring, every year) Basic grammatical structure, vocabulary, expressions of modern colloquial Korean. Meets with 1012.

KOR 4003. Intermediate Korean I. (3.0 cr.; = [KOR 3021]; prereq 4002, grad student; fall, every year) Speaking, reading, writing in modern colloquial Korean. Simple narration/written reports. Basic Chinese characters may be introduced. Meets with HMNG 3021.


KOR 4006. Third Year Korean II. (3.0 cr.; = [KOR 3032]; prereq 4005, grad student; spring, every year) Speaking, reading, writing in modern colloquial Korean. Narration, written reports. Further Chinese characters.
program, anatomy course, physiology course or #. General and organ system pathology.

LAMP 4177. Nature of Disease: Pathology for Allied Health Students. (3.0 cr.; prereq [one anatomy course, one physiology course, registered in allied health program] or #; spring, summer, every year) Human disease as alteration of normal structure/function of anatomy/physiology. Variety of lecturers cover their area of expertise. Grade based on five unit exams. Offered in classroom/online in spring, online-only in summer.

LAMP 5100. General and Systemic Pathology for Dental Students. (5.0 cr.; A-F or Audit; prereq Registered dental student; fall, spring, every year) Causes, courses, mechanisms, and outcomes of disease. Required as preparation for clinical dental practice and oral pathology.

LAMP 5125. Chronobiology. (2.0-6.0 cr.; O-N or Audit; summer, every year) How to interpret biologic time series and how to use them in practice as well as in designing chronobiology experiments. Chronobiologic procedures of data collection and analysis, interpretation of the output in clinical practice.

Land and Atmospheric Science (LAAS)
College of Food, Agricultural and Natural Resource Sciences

LAAS 5050. Integrated Topics in Land & Atmospheric Science. (3.0 cr.; A-F or Audit; fall, every year) Earth system science. Interactions between the land and atmosphere. Biogeochemistry, human-environment interactions, environmental biophysics, and global environmental change.

LAAS 5051. Thesis Proposal Writing for Land & Atmospheric Science . (2.0 cr.; A-F or Audit; spring, every year) Grant proposals, including proposal formats of various funding sources, how to develop a significance statement, hypotheses and objectives, background, methods, project summary, time line, and budget. Critique proposal samples/discuss other aspects of seeking funding for research. Discuss LAAS graduate program prelim exam process.

LAAS 5311. Soil Chemistry and Mineralogy. (3.0 cr.; prereq [[Chem 1022 or equiv], Phys 1102, grad] or #; fall, spring, every year) Structural chemistry, origin/identification of crystalline soil clay minerals. Structure of soil organic matter. Chemical processes in soil: solubility, adsorption/desorption, ion exchange, oxidation/reduction, acidity, alkalinity. Solution of problems related to environmental degradation, plant nutrition, and soil genesis.

LAAS 5425. Atmospheric Processes I: Thermodynamics and Dynamics of the Atmosphere. (3.0 cr.; A-F or Audit; prereq One yr college-level [calculus, physics]; fall, odd years) Basic laws governing atmospheric motion through analysis of atmospheric dynamics and thermodynamics at the micro, synoptic, and global scales. Fundamental thermodynamic and dynamical processes/equations governing the behavior of the atmosphere/aply to larger-scale geophysical situations.

LAAS 5426. Atmospheric Processes II: Radiation, Composition, and Climate. (3.0 cr.; A-F or Audit; prereq [one yr college-level [calculus, physics, chemistry]]; LAAS 5425 recommended; spring, even years) Atmospheric radiation, composition/chemistry, climate change. Radiative transfer in Earth's atmosphere. Changing chemical makeup of troposphere/stratosphere. Interplay between natural processes and human activities in air pollution, stratospheric ozone depletion, and chemical forcing of climate. Anthropogenic contribution to climate change/role of land-atmosphere feedbacks affecting atmosphere's energy budget and cycling of greenhouse gases. Application to numerical modeling.

LAAS 5480. Special Topics in Land and Atmospheric Science. (1.0-4.0 cr.; max 6.0 cr.; prereq grad student or #; fall, spring, summer, every year) Lectures by visiting scholar or regular staff member. Topics specified in Class Schedule.


Landscape Architecture (LA)
College of Design

LA 1001. Sustainability by Design. (3.0 cr.; A-F only; spring, every year) How the Twin Cities region (as example of many metropolitan areas) can adapt to climate change, depleted energy resources, and other environmental impacts. How cities and places are designed, how places influence sustainable lifestyles. How to adapt the Twin Cities/other cities to a changing world.

LA 1201. Learning from the Landscape. (3.0 cr.; A-F or Audit; fall, every year) Physical elements shaping the world. Shapes, forms, and order of towns, cities, and countryside. How design, planning, and natural systems, taken together, shape physical surroundings. Lectures, discussions, field trips.

LA 1301. Introduction to Landscape Architecture Drawing. (3.0 cr.; A-F or Audit; fall, spring, summer, every year) Development of basic skills in perceiving/representing material environment. Sketching/drawing conventions of visual phenomena/forms.

LA 1401. The Designed Environment. (3.0 cr.; A-F or Audit; fall, spring, every year) Examination of relationships between place and space, and realms of the ideal and real, public and private. Survey of how the fields of architecture, landscape architecture, and urban design have explored those issues.

LA 1601. Design and Equity. (3.0 cr.; A-F or Audit; [LA 3601]; spring, every year) Investigate world from new perspectives. Spaces of everyday life that reflect/shape values. Meets with LA 3601.

LA 2301. Advanced Representation for Environmental Design. (3.0 cr.; prereq 1301; fall, every year) Perceiving/representing material environment. Multiple media approaches in environmental design representation. Analytic diagramming as means of developing design ideas. Interface between hand rendered and digital representation.

LA 2302. Computer-Aided Representation for Environmental Design . (3.0 cr.; prereq 1301, 2301; spring, every year) Use of computer-aided design (CAD) technologies in developing, representing, and communicating environmental design ideas. Adobe Creative Suite™, Autodesk AutoCAD™, DynaSCAPE™ ESRI ArcMap™, etc. Integration of images generated from various computer and hand-rendered technologies.

LA 3001. Understanding and Creating Landscape Space. (3.0 cr.; A-F or Audit; prereq Landscape design and planning [major or minor] or #; fall, every year) Introduction to spatial design issues at all scales.

LA 3002. Informants of Creating Landscape Space. (3.0 cr.; A-F or Audit; prereq 3001, Arch 3401, 3501; ) Development of the design program. Site analysis of landscape space. Design exercises show how design program and site analysis inform creation of landscape space in developing schematic designs at varying geographic scales and in different geographic settings. Lectures, readings, discussions.

LA 3003. Case Studies in Sustainable Landscape Planning and Design . (3.0 cr.; [LA 5003]; fall, every year) Sustainable landscape design/planning practices. Integrative potential between practices and changes in global biodiversity, quality of air/water resources, development/consumption of resources, and climate. Practice/metrics-based selection, deployment, and management of sustainable design.

LA 3004. Regional Landscape Planning. (3.0 cr.; prereq FR 3131 or &FR 3131 or GEOG 3561 or &GEOG 3561; spring, every year) Critical environmental parameters affecting growth/development of metropolitan areas. Students assess these parameters and prepare multifunctional land use plan for a defined locale.

LA 3204. Holistic Landscape Ecology and Bioregional Practice. (3.0 cr.; A-F or Audit;
prereq [EEB 3001 or ESPM 3108], sr BED major or equiv; spring, every year) Bioregional practice, how it responds to landscape ecology of great bioregions. Scientific/cultural basis for bioregional design and landscape sustainability.

LA 3413. Introduction to Landscape Architectural History. (3.0 cr.; A-F or Audit; spring, every year) Study of landscape architecture's roots by examining the creation of landscapes over time. Influences of ecological and environmental issues as well as political, economic, and social contexts on the cultural construction of landscape ideas and meaning and creation of landscape architectural works.

LA 3501. Environmental Design and Its Biological and Physical Context. (3.0 cr.; A-F or Audit; spring, summer, every year) Dynamic relationships between environmentally designed places and biological/physical contexts. Integration of created place and biological/physical contexts. Case studies, student design.

LA 3514. Making the Mississippi. (3.0 cr.; A-F or Audit; [LA 5514]; spring, every year) Environmental parameters affecting growth/development of metropolitan areas. Students assess these parameters and prepare a multifunctional land use plan for a defined locale.

LA 3571. Landscape Construction: Site Systems and Engineering. (3.0 cr.; A-F or Audit; prereq BED major or BED minor or #; fall, every year) Theory applications of landform systems for design. Landform typography, representation methods, manipulation techniques, use of land survey data, earthwork construction issues. Spatial accommodation of vehicles in landscape architecture, including road design.

LA 3601. Design and Equity. (3.0 cr.; A-F or Audit; [LA 1601]; spring, every year) Investigate world from new perspectives. Spaces of everyday life that reflect/shape values. Meets with LA 1601.

LA 4001. Sustainable Landscape Design and Planning Practices. (3.0 cr.; [LA 5001]; prereq 1301, [2301 or ARCH 3301]; 3001, 3002; fall, every year) Changes in global biodiversity. Quality of air/water resources. Development/consumption of energy resources. Climate change. Design for sustainable practices to create evocative/meaningful landscapes.

LA 4002. Implementation of Sustainable Landscape Design and Planning Practices. (3.0 cr.; prereq 1301, 2301, 2302, 3001, 3002, 3003, 4001; spring, every year) Capstone experience. Service-learning project. Groups of students develop sustainable landscape designs/plans that address project implementation.

LA 4096. Internship in Landscape Design and Planning. (1.0 cr.; S-N only; prereq 1301, 2301, 2302, 3001, 3002, 3003; fall, spring, summer, every year) Supervised professional experience in environmental design firms or government agencies. Students perform professional services and relate these experiences to their education in environmental design.

LA 4160H. Thesis/Capstone Project. (2.0 cr. [max 4.0 cr.]; A-F only; fall, spring, every year) Individualizes honors experience by connecting aspects of major program with special academic interests.


LA 5001. Sustainable Landscape Design and Planning Practices. (3.0 cr.; [LA 4001]; prereq 5201, 5203; fall, every year) Systemic, formal and spatial relationships. Quantitative and qualitative changes in global biodiversity, quality of the earth's air, soil, and water resources, development and consumption of energy resources and climate change. Development of design processes for selection, deployment, and management of sustainable practices.

LA 5002. Implementation of Sustainable Landscape Design and Planning Practices. (3.0 cr.; prereq 5201, 5203; spring, every year) Design exploration of a complex urban site. Habitation patterns and sociocultural systems that slow and reverse environmental degradation and climate change. Researching/creating landscape patterns that address multi-scalar sustainability.

LA 5003. Case Studies in Sustainable Landscape Planning and Design. (3.0 cr.; [LA 3003]; fall, every year) Ecology, design, materials, policy, and community. Working from site to regional scales, evaluate case studies through the lens of larger issues and systems, including infrastructure, urban water cycle, transportation, energy, health, food systems, innovation, and metrics.

LA 5004. Regional Landscape Planning. (3.0 cr.; prereq FR 3131 or &FR 3131 or FR 5131 or &FR 5131 or GEG 3561 or &GEG 3561 or GEG 5561 or &GEOG 5561; spring, every year) Critical environmental parameters affecting the growth and development of metropolitan areas. Students assess these parameters/prerequisites a multifunctional land use plan for a defined locale.

LA 5131. Geospatial Data Analysis and Design. (3.0 cr.; A-F only; prereq Master of Landscape Architecture Student or #; fall, every year) Introduction to geospatial data analysis/application in landscape architectural, environmental design research/practice.

LA 5201. Making Landscape Spaces and Types. (6.0 cr.; A-F or Audit; prereq B.E.D accelerated status or LA grad or #; fall, every year) Design exploration using 3-D models and historical precedent studies to create outdoor spaces for human habitation and use. Application of the basic landscape palette of landform, plants, and structures to give physical, emotional, cognitive, and social definition to created places.

LA 5202. Landscape Analysis Workshop. (1.0 cr.; S-N or Audit; fall, every year) Introduction to field techniques for site analysis, including vegetation, soil, and landform description. One-week session, before fall term, at lake Itasca Forestry and Biological Station.

LA 5203. Ecological Dimensions of Space Making. (6.0 cr.; A-F or Audit; prereq LA MAJOR or #; recommended for both BED and Grad students; spring, every year) Design studio experience drawing on ecological, cultural, aesthetic influences to explore development of design ideas responsive to ecological issues and human experience.

LA 5204. Metropolitan Landscape Ecology. (3.0 cr.; A-F only; prereq BED accelerated status or LA grad student or #; fall, spring, every year) Theories/principles of holistic landscape ecology. People, nature, and environmental stewardship in metropolitan landscapes. Urban areas, rural areas that provide food, water, energy, and recreation.

LA 5301. Introduction to Landscape Architecture. (3.0 cr.; [LA 5371, ARCH 2301, LA 5376]; prereq LA grad student or accelerated B.E.D. student; fall, spring, every year) Perceiving/representing material environment. Sketching/drawing conventions, visual phenomena/forms.

LA 5351. AutoCAD I. (3.0 cr.; prereq B.E.D. major or LA grad or #; may not be taken for graduate credit; fall, spring, summer, every year) Basic concepts, tools, and techniques of computer-aided drawing. Introduction to current AutoCAD Release software. Strategies and techniques for producing dimensioned and annotated drawings. Introduction to 3-D drawing capabilities. Use of dimension variables, attributes, blocks, symbols, and creation of customized menus.

LA 5352. AutoCAD II. (3.0 cr.; prereq Arch 5351 or LA 5351, B.E.D. major or LA grad or #; may not be taken for graduate credit; fall, every year) Intermediate concepts, tools, and techniques of computer-aided drawing with current AutoCAD Release software. Strategies and techniques for producing dimensioned and annotated drawing. Use of dimension variables, attributes, blocks, symbols, and creation of customized menus.

LA 5371. Computer Methods I. (1.0 cr.; S-N or Audit; [LA 5301, ARCH 2301, LA 5376]; prereq B.E.D. accelerated status or LA grad or #; fall, every year)
Introduction to current techniques, programs, and new editions of computer programs, and their application to landscape architecture computing.

LA 5372. Computer Methods II. (1.0 cr.; S-N or Audit; = [LA 5375, ARCH 5372, LA 5377]; prereq Arch/LA 5371, LA grad or #; spring, every year)
Current techniques and computer programs, and their application to landscape architecture computing.

LA 5374. Representation for Landscape Architectural Construction. (3.0 cr.; fall, spring, every year)

LA 5375. Advanced Rendering in Landscape Architecture. (3.0 cr.; = [ARCH 5372, LA 5372, LA 5377]; spring, every year)

LA 5400. Topics in Landscape Architecture. (1.0-3.0 cr. [max 12.0 cr.]; prereq B.E.D. accelerated status or LA grad or #; fall, spring, every year)
Current topics in landscape architecture. Taught by regular or visiting faculty in their areas of specialization.

LA 5401. Directed Studies in Emerging Areas of Landscape Architecture. (1.0-3.0 cr. [max 12.0 cr.]; prereq #; fall, spring, every year)
tbd

LA 5402. Directed Studies in Landscape Architecture History and Theory. (1.0-6.0 cr. [max 12.0 cr.]; prereq #; fall, spring, every year)
Independent studies under the direction of landscape architecture faculty.

LA 5403. Directed Studies in Landscape Architecture Technology. (1.0-6.0 cr. [max 12.0 cr.]; prereq #; fall, spring, every year)
Independent studies under the direction of landscape architecture faculty.

LA 5404. Directed Studies in Landscape Architecture Design. (1.0-6.0 cr. [max 12.0 cr.]; prereq #; fall, spring, every year)
Independent studies under the direction of landscape architecture faculty.

LA 5405. Interdisciplinary Studies in Landscape Architecture. (1.0-6.0 cr. [max 12.0 cr.]; A-F or Audit; prereq #; fall, spring, every year)
Research, planning, or design projects. Topics vary.

LA 5406. Urban Design Journal. (3.0-4.0 cr.; A-F or Audit; prereq Admitted to Denmark International Study Program co-sponsored by the University; given in Denmark; fall, spring, every year)
Methods and theories in urban design and human behavior. Students develop journal as tool for experiencing, analyzing, and recording the urban landscape, its fabric, spatial elements, and individual components, and for analyzing design solutions.

LA 5407. Landscape Architecture Studio. (3.0-4.0 cr.; A-F or Audit; prereq Admitted to Denmark International Study Program co-sponsored by the University; given in Denmark; fall, spring, every year)
Individual and small-group projects focusing on urban issues; design process in Danish conditions; solutions based on knowledge of Danish problems in landscape and urban design and an understanding of how these problems are solved within Danish and European contexts.

LA 5408. Landscape Architecture, Architecture, and Planning. (3.0-4.0 cr.; A-F or Audit; prereq Admitted to Denmark International Study Program co-sponsored by the University; given in Denmark; fall, spring, every year)
Methods and theories in urban design and human behavior. Students develop urban design journal as tool for experiencing, analyzing, and recording the urban landscape, its fabric, spatial elements, and individual components, and for analyzing design solutions.

LA 5413. Introduction to Landscape Architectural History. (3.0 cr.; A-F or Audit; prereq One course in history at 1xxx or higher; fall, every year)
Introductory course examines the multiple roots of landscape architecture by examining the making of types of landscapes over time. Emphasis on ecological and environmental issues, and issues related to political, economic, and social contexts of landscape architectural works.

LA 5514. Making the Mississippi. (3.0 cr.; A-F or Audit; = [LA 3514]; spring, every year)
Critical environmental parameters affecting growth/development of metropolitan areas. Students assess these parameters and prepare a multi-functional land use plan for a defined locale.

LA 5571. Landscape Construction: Landform Systems and Spatial Performance. (3.0 cr.; A-F or Audit; prereq Accelerated BED student or LA grad student; fall, every year)
Theory and professional applications of landform systems for design. Landform typology, representation methods, manipulation techniques, use of land survey data, earthwork construction issues. Spatial accommodation of vehicles in landscape architecture, including road design.

LA 5572. Plants in Design. (3.0 cr.; A-F or Audit; prereq [5201, 5203, plant identification course] or #; fall, spring, every year)
Design principles for using plants in landscape. Cultural/ecological principles in design projects of various scales. Lectures, presentations, field trips, readings, projects.

LA 5573. Landscape Technology: Introduction to Geographic Information Systems. (3.0 cr.; A-F or Audit; prereq jr or sr B.E.D. major or LA grad or #;)
GIS as an analytical tool to solve geographical problems of regional landscape design and resource management. Topics include application techniques, analytical procedures, data characteristics, data sources, input/output methods, and implementation.

LA 5574. Identification of Minnesota Flora. (3.0 cr.; A-F or Audit; prereq BED accelerated status or LA grad student or #; fall, every year)
Introduction to identification of approximately 500 plants commonly used by landscape architects and environmental designers in Minnesota. Students develop a working knowledge of over 250 plants. Focuses on plant selection techniques, plant landscape associations, and issues of plants for use in standard landscape architectural settings. Regular field sessions.

LA 5576. Ecological Restoration Project Planning and Management. (3.0 cr.; A-F only; prereq [MLA student, senior B.E.D.] or senior or grad with one college course in ecology/one college course in plant science or botany; #; fall, every year)
Applied practice of ecological restoration of landscapes. Grasslands, wetlands, forests, disturbed agricultural sites, former industrial parcels. Restoration management, skills needed to lead successful projects.

LA 5705. Regreening Minds, Cities, and Regions. (3.0 cr.; A-F only; prereq Landscape Architecture graduate student or #; fall, every year)

LA 5755. Infrastructure, Natural Systems and the Space of Inhabited Landscapes. (3.0 cr.; A-F or Audit; = [LA 4755]; prereq Grad student; fall, every year)
Cross-disciplinary exploration of urban infrastructural solutions to mitigate/reverse anthropogenic impacts on Earth. Design of sustainable urban infrastructure systems, policy options, available technologies, criteria, design methods.

LA 5771. Landscape Infrastructure and Systems I. (3.0 cr. [max 6.0 cr.]; A-F only; prereq Master of Landscape Architecture Student, [Accelerated Track B.E.D or #]; fall, every year)
Basic principles, techniques, skills of creating infrastructures of built landscapes. Basic concepts of simple plant taxonomy, plant community structure, earthwork, water management, landscape structures. Small site scale design development.

LA 5772. Landscape Infrastructure Systems II. (3.0 cr. [max 6.0 cr.]; A-F only; prereq
Latin (LAT)  
College of Liberal Arts

LAT 1001. Beginning Latin I. (5.0 cr.; = [LAT 5001; LAT 1111H]; fall, every year)  
Introduction to grammar/vocabulary of classical Latin as written in Rome in 1st centuries BCE/CE. Forms/simple constructions. Some reading of simple, heavily adapted passages from ancient texts.

LAT 1002. Beginning Latin II. (5.0 cr.; prerequisite Grade of at least C- or S in 1001 or #; spring, every year)  
Continuation of Latin 1001. More complex constructions, including participles, clauses, indirect discourse. Some reading of adapted passages from ancient texts.

LAT 3003. Intermediate Latin Prose. (4.0 cr.; = [LAT 5003]; prerequisite Grade of at least C- or S in 1002 or 5001 or #; fall, every year)  
Introduction to Latin prose authors of 1st centuries BCE/CE. Readings of continuous passages of unadapted Latin texts (history, speeches, letters). Review of grammar/vocabulary as needed. Some discussion of major themes/issues in Roman culture as illustrated by texts.

LAT 3004. Intermediate Latin Poetry: Vergil. (4.0 cr.; = [LAT 5004]; prerequisite Grade of at least C- or S in 3003 or 3113 or #; spring, every year)  
Introduction to Roman epic poetry. Readings of selections from Vergil’s Aeneid. Quantitative meter/poetic devices. Discussion of major themes/issues as developed in Vergil’s poetry.

LAT 3199. Latin AP Credit. (4.0-8.0 cr.; No prerequisite #; fall, every year)  
Prerequisite score of [3 or 4 or 5] on [AP Vergil or AP Latin Literature] exam.

LAT 3993. Directed Studies. (1.0-4.0 cr. [max 12.0 cr.; prerequisite # and #; fall, spring, every year)  
Guided individual reading or study.

LAT 4951W. Major Project. (4.0 cr.; prerequisite [Greek-Latin or Latin major], three 3xx Latin courses, #; fall, spring, every year)  
Research project using documents and other sources from the ancient world. Students select project in consultation with a faculty member who directs the research and writing.

LAT 5001. Intensive Latin. (3.0 cr.; = [LAT 1001, LAT 1111H]; prerequisite Previous experience in another foreign language is desirable; fall, every year)  
Covers material usually taught over two semesters.

LAT 5003. Intermediate Latin Prose: Graduate Student Enrollment. (3.0 cr.; = [LAT 3003]; prerequisite [Grade of at least C- or S] in [1002 or 5001] or #; graduate student; fall, every year)  

LAT 5004. Intermediate Latin Poetry for Graduate Students. (3.0 cr.; = [LAT 3004]; prerequisite [5003 or equiv]; graduate student or #; spring, every year)  

LAT 5100. Advanced Reading. (3.0 cr. [max 18.0 cr.]; prerequisite [3004 or equiv]; at least two years of college level Latin. Must contact Classical/Near Eastern Studies department for permission to register.; fall, spring, every year)  
Reading in Latin texts/authors. Texts/authors vary.

LAT 5200. Advanced Reading in Latin. (3.0 cr. [max 18.0 cr.]; prerequisite [3004 or equiv]; at least two years of college level Latin. Must contact Classical and Near Eastern Studies department for permission to register.; fall, spring, offered periodically)  
Authors of late antiquity, Middle Ages, Renaissance. Topics specified in Class Schedule.

LAT 5701. Latin Prose Composition. (3.0 cr.; prerequisite Grad student or #; fall, spring, offered periodically)  
Latin grammar, syntax, diction, and prose style. Graduated exercises in prose composition.

LAT 5702. Text Criticism. (3.0 cr.; prerequisite Grad student or #; fall, spring, offered periodically)  

LAT 5703. Epigraphy. (3.0 cr.; prerequisite Grad student or #; fall, spring, offered periodically)  
Practical/theoretical introduction to Latin epigraphy (study/interpretation of inscriptions). Readings/discussion of epigraphic texts. Their value as historical documents, as evidence for development of Latin language, and as literary texts.

LAT 5705. Introduction to the Historical-Comparative Grammar of Greek and Latin. (3.0 cr.; = [GRK 5705]; prerequisite Two yrs college [Greek or Latin] or #; offered periodically)  
Historical/comparative grammar of Greek/Latin, from proto-Indo-European origins to classical norms.

LAT 5800. Sight Reading for Graduate Students. (1.0 cr. [max 6.0 cr.]; S-N only; prerequisite Enrolled in a grad program in Department of Classical/Near Eastern Studies; fall, spring, every year)  
Practice in reading Latin texts at sight.

LAT 5993. Directed Studies. (1.0-4.0 cr. [max 18.0 cr.; prerequisite #; fall, spring, every year)  
Guided individual reading or study.

LAT 5994. Directed Research. (1.0-12.0 cr. [max 20.0 cr.]; prerequisite Grad student or #; fall, spring, every year)  
Guided research on original topic chosen by student.

LAT 5996. Directed Instruction. (1.0-12.0 cr. [max 20.0 cr.]; prerequisite Grad student or #; fall, spring, every year)  
Supervised teaching internship.

Latin American Studies (LAS)  
College of Liberal Arts

LAS 3401W. Early Latin America to 1825. (4.0 cr.; A-F or Audit; = [HIST 3401W]; fall, spring, every year)  
Societies of Americas, Spain, and Portugal before contact. Interactions among Native Americans, African slaves, and Europeans, from colonization through independence. Religion, resistance, labor, gender, race. Primary sources, historical scholarship.

LAS 3402W. Modern Latin America 1825 to Present. (4.0 cr.; = [HIST 3402W]; fall, spring, summer, every year)  
National and contemporary period 1825 to present. Social, cultural, political, and economic change.

LAS 3429. Latin American History in Film and Text. (3.0 cr.; = [HIST 3429]; fall, spring, offered periodically)  
Cinematic representations of Latin America in the context of other historical and literary narratives. Experiences of Latinos in
Hollywood. Compare U.S. films with those produced in Latin America. Specific themes vary by term (e.g., women, revolution, colonialism).

**LAS 3441. Chicana/o History to 1900.** (3.0 cr.; = HiST 3441, HiST 3444, CHIC 3444; fall, offered periodically) The history of the Mexican people from the 16th through 19th centuries. Historical theories of colonialism, expansion, economy, assimilation, migration and settlement; race, class and gender, political, social and cultural interaction, and conflict.

**Law School (LAW)**

**LAW 3000. Introduction to American Law.** (3.0 cr.; prereq soph or jr or sr; fall, every year) Introductory course covers legislative, judicial, executive power, federalism, constitutional rights of free speech, religion, due process, equal protection, torts, contracts. The litigation process and conflict of laws is also covered. Interpret legal materials, do legal research, write legal memos.

**LAW 3100. Lawyers in Film.** (2.0 cr.; spring, every year) Influence Hollywood has had on how society perceive lawyers, legal profession. Evaluate popular media, identify/evaluate ethical issues. Research/write paper on law or ethics topic depicted in film/television programs studied.

**LAW 3100H. Lawyers in Film.** (2.0 cr.; A-F or Audit; spring, every year) Examines influence Hollywood has had on how lawyers/society perceive lawyers, legal profession, ethical standards of legal profession by critiquing depictions of lawyers/professional ethics portrayed in film/television. Evaluate popular media, identify/evaluate ethical issues, gain understanding of role in society played by lawyers/legal system.

**Linguistics (LING)**

**LING 1701. Language and Society.** (4.0 cr.; fall, spring, every year) Role of language in human social interaction; linguistic indicators of social status and attitudes; language and sex roles; linguistic ecology; language planning for multilingual communities; implications for education and public policy.

**LING 1904. Freshman Seminar (IP).** (3.0 cr. [max 6.0 cr.]; prereq Fr; fall, offered periodically) Topics specified in Class Schedule and Course Guide.

**LING 1905. Freshman Seminar.** (3.0 cr. [max 6.0 cr.]; prereq Fr; fall, spring, offered periodically) Topics specified in Class Schedule.

**LING 1907W. Freshman Seminar.** (3.0 cr. [max 6.0 cr.]; prereq freshman; fall, offered periodically) Topics specified in Course Guide.

**LING 1909W. Freshman Seminar.** (3.0 cr. [max 6.0 cr.]; A-F or Audit; prereq freshman; fall, spring, offered periodically) Topics specified in Class Schedule.

**LING 1910W. Freshman Seminar.** (3.0 cr. [max 6.0 cr.]; prereq Freshman; fall, spring, offered periodically) Topics specified in Class Schedule.

**LING 3001. Introduction to Linguistics.** (4.0 cr.; = LING 5001, LING 3001H; fall, spring, summer, every year) Scientific study of human language. Methods, questions, findings, and perspectives of modern linguistics. Components of the language system (phonetics/phonology, syntax, semantics/pragmatics); language acquisition; language/social variables; language/cognition; language change; language processing; language/public policy.

**LING 3001H. Honors: Introduction to Linguistics.** (4.0 cr.; A-F only; = LING 5001, LING 3001; prereq Honors student or #; spring, every year) Phonetics, phonology, morphology, syntax, semantics/pragmatics, historical-comparative linguistics. Language acquisition. Language/cognition. Language processing/neurolinguistics. Language/society.

**LING 3051H. Honors: Thesis.** (3.0 cr.; A-F only; prereq Linguistics honors candidate, #; fall, spring, every year) Supervised planning and research for honors thesis to be completed in 3052.

**LING 3052V. Honors: Thesis.** (3.0 cr.; A-F only; prereq 3051; spring, every year) Supervised research, writing, and revision for honors thesis begun in 3051.

**LING 3101W. Languages of the World.** (3.0 cr.; prereq 3001 or 3001H or 5001 or #; fall, every year) Survey of language families of the world. Classifying languages genetically/typologically. Historical relationships among languages.

**LING 3601. Historical Linguistics.** (3.0 cr.; = [LING 5601]; prereq 3001 or #; spring, every year) Historical change in phonology, syntax, semantics, and lexicon. Linguistic reconstruction. Genetic relationship among languages.

**LING 3721. Bilingualism.** (3.0 cr.; = [LING 5721]; prereq 1701 or 3001 or 3001H or 5001; fall, offered periodically) Sociolinguistic theory/methods in study of bilingualism. Language ecology in multilingual societies. Language and language behavior in bilingual individuals. Language in ethnic conflict. Implications for public policy/planning.

**LING 4002. Linguistic Analysis.** (3.0 cr.; prereq 3001 or 3001H or 5001 or #; fall, spring, every year) Techniques for analyzing phonological, morphological, and syntactic data from a variety of languages. Discovering, stating, and justifying generalizations. Comparing diverse languages.

**LING 4201. Syntax I.** (3.0 cr.; = [LING 5201]; prereq 3001 or 3001H or 5001 or #; spring, every year) How words are organized into phrases/sentences. Basic units of a sentence. How these units are structured. How languages may be the same, or different, in syntax.

**LING 4202. Syntax II.** (3.0 cr.; = [LING 5202]; prereq 4201 or 5201; fall, every year) Syntactic theory. Principles and Parameters (P&P) approach to grammar. Focuses on Minimalist Program (MP).
LING 4302W. Phonology I. (3.0 cr.; =LING 5302; prereq 3001 or 3001H or 5001 or #; spring, every year) How sounds are organized/patterned in human languages. Foundation in phonological theory/problem-solving for advanced work in phonology and other fields in linguistics. Analyzing data, presenting written solutions.

LING 4303. Phonology II. (3.0 cr.; =LING 5303; prereq Ling 4302W; fall, every year) Continues work of Ling 4302W with emphasis on critical reading of current phonological literature. Phonological phenomena in the context of new developments in the field. Optimality Theory and the phonology-morphology interface.

LING 4901W. Major Project Seminar. (3.0 cr.; S-N only; prereq Ling major; [jr or sr]; fall, spring, every year) Revision/expansion of a paper completed for a linguistics course.

LING 5001. Introduction to Linguistics. (4.0 cr.; =LING 3001, LING 3001H); prereq grad or #; fall, spring, summer, every year) Phonetics, phonology, morphology, syntax, semantics, and historical-comparative linguistics; language learning and psychology of language; linguistic universals; language in society.

LING 5105. Field Methods in Linguistics I. (4.0 cr.; prereq [[4201 or 5201], [4302W or 5302]] or #; fall, every year) Techniques for obtaining/analyzing linguistic data from unfamiliar languages through direct interaction with native speaker.

LING 5106. Field Methods in Linguistics II. (4.0 cr.; prereq [5105, grad major] or #; spring, every year) Techniques for obtaining/analyzing linguistic data from unfamiliar languages through direct interaction with a native speaker.

LING 5201. Syntactic Theory I. (3.0 cr.; =LING 4201; prereq 3001 or 3001H or 5001 or #; fall, every year) Concepts/issues in current syntactic theory.

LING 5202. Syntactic Theory II. (3.0 cr.; =LING 4202; prereq 4201 or 5201; spring, every year) Modern syntactic theory. Syntactic phenomena in various languages. Syntactic argumentation, development of constraints on grammar formalisms.

LING 5205. Semantics. (3.0 cr.; prereq [4201 or 5201] or #; fall, spring, every year) Analysis of sentence meaning. Semantic properties. Relations such as analyticity, entailment, quantification, and genericity. Philosophical background, formal techniques of semantic analysis, how sentence meaning depends on word meaning, syntax, and context. The role of semantics in grammatical theory.

LING 5206. Linguistic Pragmatics. (3.0 cr.; prereq [4201 or 5201] or #; spring, every year) Analysis of linguistic phenomena in relation to beliefs and intentions of language users; speech act theory, conversational implicature, presupposition, information structure, relevance theory, discourse coherence.

LING 5302. Phonological Theory I. (3.0 cr.; =LING 4302W; prereq 3001 or 3001H or 5001 or #; fall, every year) How sounds are organized/patterned in human languages. Phonological theory/problem-solving for advanced work in linguistics. Analyzing data. Presenting written solutions to problem sets.

LING 5303. Phonological Theory II. (3.0 cr.; =LING 4303; prereq 4302W or 5302 or #; spring, every year) Phonology of human languages. Reading papers in the literature. Doing research in phonology.

LING 5461. Conversation Analysis. (3.0 cr.; =COMM 5461; prereq 3001 or 5001 or #; fall, offered periodically) Discourse processes. Application of concepts through conversation analysis.

LING 5462. Field Research in Spoken Language. (3.0 cr.; =COMM 5462; prereq 3001 or 5001 or #; spring, offered periodically) Transcribing/analyzing talk and movement related to talk. Applying concepts to recorded conversations.

LING 5501. Introduction to Language Acquisition. (3.0 cr.; prereq 3001 or 3001H or 5001 or #; summer, every year) First/second language acquisition.

LING 5601. Historical Linguistics. (3.0 cr.; =LING 3601; prereq 3001 or 3011H or 5001; spring, every year) Historical change in phonology, syntax, semantics, and lexicon. Linguistic reconstruction. Genetic relationship among languages.

LING 5801. Introduction to Computational Linguistics. (3.0 cr.; prereq [4201 or 5201] or programming experience or #; spring, even years) Methods/issues in computer understanding of natural language. Programming languages, their linguistic applications. Lab projects.

LING 5900. Topics in Linguistics. (1.0-4.0 cr. [max 12.0 cr.]; fall, spring, every year) Topics vary. See Class Schedule.

LING 5931. Morphology and Syntax of Contemporary English. (3.0 cr.; prereq 3001 or 3001H or 5001 or #; fall, spring, offered periodically) Linguistic analysis of word/sentence structure of contemporary English. Focuses on data from recorded/written texts.

LING 5993. Directed Study. (1.0-3.0 cr. [max 10.0 cr.]; fall, spring, summer, every year) Directed study for Linguistics. Prereq instr consent, dept consent, college consent.

MGMT 1001. Contemporary Management. (3.0 cr.; A-F only; prereq Carlson School fr or soph; fall, spring, every year) How/why organizations differ in form/purpose in complex environments/technologies. Managerial challenges related to international management, social responsibility. Models of effective leadership/teampwork.

MGMT 1001H. Honors: Contemporary Management. (3.0 cr.; A-F only; prereq [Fr or soph] honors; fall, spring, every year) How/why organizations differ in their forms/purposes in relation to complex/changing environments/technologies. Challenges related to international management and social responsibility. Models of effective leadership/teampwork.

MGMT 1005. Corporate Responsibility and Ethics. (3.0 cr.; A-F only; prereq Carlson School student; fall, spring, every year) Identify/apply ethical principles to resolution of moral challenges in management. Understanding place of business/corporation in society.

MGMT 1005H. Corporate Responsibility and Ethics. (3.0 cr.; A-F only; prereq Honors student; spring, every year) Identify/apply ethical principles to resolution of moral challenges in management. Understanding place of business/corporation in society.

MGMT 3001. Fundamentals of Management. (3.0 cr.; A-F or Audit; fall, spring, summer, every year) Aspects/characteristics of organizations, their members. Why people/groups feel/belong as they do. Processes/methods that improve behavior/attitudes/effectiveness of members. Member/manager skills. Guest speakers, group presentations, films.

MGMT 3004. Business Strategy. (3.0 cr.; A-F only; =MGMT 4004W; prereq CSOM, soph or jr; fall, spring, every year) Business strategy. How business firms set and pursue their goals. Key categories of strategic issues and concepts/frameworks managers use to analyze and address those issues. Attention to specific firms and situations.

MGMT 3010. Introduction to Entrepreneurship. (4.0 cr.; A-F or Audit; fall, spring, every year) Fundamentals of entrepreneurship. Career paths, including new business start-ups, franchising, acquisitions (including family business succession), corporate venturing, and entre-preneural services. Legal structures for new business formation. Aspects of business law/ethics.

MGMT 3033W. Business Communication. (3.0 cr.; A-F or Audit; =IBUS 3033W; prereq Fr composition, CSOM upper-div, at least 60 cr; fall, spring, summer, every year) Written/oral communication skills for effective participation in contemporary organizations. From basic principles to communication strategy. Communication technology. Cases, simulations of "real-world" situations. Student small groups meet with instructor three times...
for presentation coaching/feedback. Recitation times are arranged with instructor at start of semester.

MGMT 3040. Understanding the International Environment of Firms: International Business. (2.0 cr.; A-F or Audit; prereq 1001 or 1001H or 3001; fall, spring, every year)

Theories, frameworks, tools, and facts for understanding the environment of firms in international competition. Main world-level economic flows (trade, investment, finance). How country-industry-level economic, political, and sociocultural factors influence behavior/functions of firms in international competition.

MGMT 3480. Topics: Natural Resources. (3.0 cr.; A-F only; fall, spring, offered periodically)

Individual topics related to natural resources.

MGMT 3602. Topics: Environmental Regulations. (3.0 cr.; A-F only; = [ESPM 5602, ESPM 3602]; spring, every year)

Concepts/issues relating to industrial ecology and industry as they are influenced by current standards/regulations at local, state, and national levels.

MGMT 3603. Topics: Environmental Issues. (3.0 cr.; A-F only; = [ESPM 3603]; prereq [MATH 1142 or [MATH 1271, MATH 1272]]; [APEC 1101 or ECON 1101 or 3261W]; fall, every year)

Concepts/issues relating to inventory, subsequent analysis of production systems. Production system from holistic point of view, using term commonly used in industrial ecology: "metabolic system."

MGMT 3604. Topics: Environmental Issues. (3.0 cr.; A-F only; fall, every year)

Environmental problems such as climate change, ozone depletion, and loss of biodiversity.

MGMT 3900. International Business Communication. (3.0 cr.; A-F only; spring, every year)

Impact of culture and communication on business interactions. How to adapt and respond to intercultural interactions. Business culture and cross-cultural communication in a business context rather than on general country or regional cultural issues.

MGMT 4000. Issues in Nonprofit Management. (4.0 cr.; A-F only; prereq Sr nonprofit major or #; spring, every year)

Capstone course. Students choose project with nonprofit organizations in local community. Readings/discussions tie managerial theory to experiences. Issues that involve intersection of for-profit/not-for-profit economies. Primarily undergraduate class. Opportunities for selected grad students.

MGMT 4002. Managerial Psychology. (4.0 cr.; A-F or Audit; fall, spring, summer, every year)

Behavioral principles, methods, and skills that underlie and compose dimensions of managerial competence and contribute to managers' effectiveness in preventing and solving problems within and between individuals and groups; development of human resource skills management needs based partially on experiential exercises.

MGMT 4004W. Business Policy: Strategy Formulation and Implementation. (3.0 cr.; A-F or Audit; = [MGMT 3004]; prereq 3040, 90 cr, completion of business core courses; fall, spring, summer, every year)

Integrative perspective on overall direction of the enterprise involving both choice of products and markets and selection of organization structures and management styles; case analysis involving the identification of key issues, evaluation of options, and making recommendations under conditions of uncertainty and incomplete information.

MGMT 4008. Entrepreneurial Management. (4.0 cr.; A-F only; prereq & [3010 or IBUS 3010]; fall, spring, every year)

Management of a new venture after founding. Internal/external challenges of managing a startup organization. Working with resource constraints and understanding how business models may change over time.

MGMT 4040. Negotiation Strategies. (4.0 cr.; A-F only; spring, every year)

Securing agreements between two or more parties who are interdependent and seeking to maximize their own outcomes. Behavior of individuals, groups, and organizations in competitive situations.

MGMT 4050. Management of Innovation and Change. (2.0 cr.; A-F or Audit; = [IBUS 4050]; prereq 1001, [3001 or 3010]; fall, spring, offered periodically)

Applying theories/research on how new organizational programs, products, technologies are developed/implemented. Diagnostic skills. How innovation unfolds.

MGMT 4080W. Applied Technology Entrepreneurship. (4.0 cr.; spring, every year)

Team projects based on commercializable technologies or innovations. Teams present their ideas to investors and industry professionals. Students are encouraged to submit their business plans to Minnesota Cup.

MGMT 4100. Topics in Management. (2.0-4.0 cr. [max 8.0 cr.]; A-F only; prereq #; fall, spring, offered periodically)

Topics vary.

MGMT 4101. Independent Study in Strategic Management and Organization. (1.0-4.0 cr.; A-F or Audit; prereq # or %; fall, spring, offered periodically)

Students contract with faculty on independent studies.

MGMT 4170W. New Business Feasibility and Planning. (4.0 cr.; A-F only; prereq 3010; fall, spring, every year)

New-business-opportunity identification/development. Students conduct feasibility analysis, create formal business plan, gather feasibility data, and contact potential customers, suppliers, and other primary sources.

MGMT 4171W. Entrepreneurship in Action I. (4.0 cr.; A-F only; prereq 3010, [4008 or &4008]; completed coursework in business core, CSOM upper division, approved application; fall, every year)

Two-semester course. In fall, students identify a business opportunity, develop concept, determine resources required, and launch the business. In spring, students implement business plan, manage business, and determine exit strategy.

MGMT 4172. Entrepreneurship in Action II. (4.0 cr.; A-F only; prereq 4171; spring, every year)

Second of two-semester sequence. In fall, students identify business opportunity, develop concept, determine resources required, and launch business. In spring, students implement business plan, manage business, and determine exit strategy.

MGMT 4500. Senior Seminar in International Business. (2.0 cr.; A-F only; prereq CSOM Sr, completed semester abroad, IB major or minor; fall, spring, every year)

International business capstone. Topics related to doing business globally. Opportunity to integrate study abroad/coursework experiences.

MGMT 5019. Business, Natural Environment, and Global Economy. (2.0 cr.; A-F only; = [ESPM 5019]; prereq MBA student; fall, every year)

Resource deployment policies that affect the natural environment. Sustainability. Local/global environmental threats, how government policies address these issues. Business strategies/practices that produce "win-win" outcomes.

MGMT 5480. Topics in Natural Resources. (3.0 cr.; A-F only; spring, offered periodically)

Specific topic for each offering.

Management of Technology (MOT) Institute of Technology

MOT 4001. Leadership, Professionalism and Business Basics for Engineers. (2.0 cr.; A-F only; fall, spring, every year)

Elements of business, environment in which technology/business operate. Classes of 15 to 20 students.

MOT 4010. Management of Science and Technology in the Middle East, Global Seminar. (3.0 cr.; A-F only; spring, every year)

Middle East global seminar. Including 8 weeks of classroom learning prior to May departure. Technology areas such as solar energy, water desalination, security technology, alternative fuels, and biomedical devices.

MOT 5001. Technological Business Fundamentals. (2.0 cr.; A-F only; prereq Degree seeking or non-degree graduate students; fall, every year)

MOT 5002. Creating Technological Innovation. (2.0 cr.; A-F only; prereq Degree seeking or non-degree graduate students; spring, every year)

Course provides students with techniques to create new ideas, and lead an organization to bring them successfully to market. It will include examples of the dynamics of technological industries, and technology strategies. Topics include effective practices to generate ideas, processes to move them to market, and intellectual property. Students will work in teams to develop a strategy to commercialize a new technology.

MOT 5003. Technological Business Planning Workshop. (1.0 cr. [max 2.0 cr.]; A-F only; prereq Degree seeking or non-degree graduate students. Student must also enroll for MOT 5001 or MOT 5002.; fall, spring, every year)

Applies lessons of 5001 or 5002 directly to technology of the student's choosing, possibly thesis topic. Aspects of strategic technology plan or business plan, culminating in presentation of plan. Must be taken in parallel with 5001 or 5002.

MOT 5224. Introduction to Technological Leadership and Management: Assessing Emerging and Pivotal Technologies. (1.0 cr.; A-F only; fall, every year)

Selected emerging technologies expected to play key roles in future industrial development.

MOT 5991. MOT Independent Study. (1.0-3.0 cr. [max 1.0 cr.]; S-N or Audit; prereq MOT grad student;)

Independent study in MOT-related topic.

Managerial Communications
(MCOM)
Curtis L. Carlson School of Management

MCOM 5400. Managerial Communications for the HR Professional. (2.0 cr.; A-F only; prereq HRIR student; fall, spring, every year)

Memo writing, oral presentations, and team communication required of HR professional. Emphasizes hands-on, experiential learning, including videotaping.

MCOM 5500. Enhancing Your Executive Image in Business Communications. (2.0 cr. [max 4.0 cr.]; A-F only; prereq MBA student; fall, every year)

Techniques to project executive presence in all business communications.

MCOM 5510. Persuasive Writing in Business. (2.0 cr.; A-F only; prereq MBA student;)

Writing to motivate/affect change. Form/content. Techniques of persuasion. Producing polished text. Writing with power.

MCOM 5530. Strategies and Skills for Managerial Presentations. (2.0 cr.; A-F only; prereq MBA student;)


Manufacturing Operations Management (MOM)
College of Continuing Education

MM 3001. Manufacturing in a Global Economy. (3.0 cr.; A-F or Audit; fall, spring, every year)

How global economy has transformed manufacturing sector. Systems, quality engineering, process improvement, supply-chain management, product/systems innovation, regulatory affairs, technology use to manage change.

MM 3205. Engineering for Manufacturing Operations. (3.0 cr.; A-F or Audit; prereq 30 cr; fall, spring, every year)

Foundational mechanical, electrical, industrial, and manufacturing engineering concepts/techniques essential to manufacturing operations management. Collaborating with other functional departments in enterprise to develop and maintain effective/efficient manufacturing operations. Production strategies for quality, safety, and time/cost efficiency. Allocation of resources, productivity, cost analysis.

MM 3305. 3D Printing and Additive Manufacturing. (3.0 cr.; A-F or Audit; prereq [3001, 40111 or #; fall, spring, every year)

Overview of different types of 3D printing technology/operational requirements for setting up/running innovative manufacturing program using additive manufacturing (3D printing) rather than traditional subtractive manufacturing. Basics of process.

MM 4011. Design of Manufacturing Systems and Simulations. (3.0 cr.; A-F or Audit; prereq 3001 or manufacturing experience; spring, every year)

Flow lines, assembly systems, cellular manufacturing, flexible manufacturing, automated systems, facility layout, scheduling, batch sizing, group technology, bottleneck management. Modeling/analysis tools, including computer simulation/operations.

MM 4012. Manufacturing Processes and Technology. (3.0 cr.; A-F or Audit; prereq 3001 or manufacturing experience; spring, every year)

Overview and modeling of commonly used core manufacturing processes. Process descriptions, process capabilities and performance, process models relating process parameters to part/process characteristics, process and quality control methods consistent with ISO9001 requirements.

MM 4035. Global Supply Chain Management. (3.0 cr.; A-F or Audit; prereq 4102 or ABUS 4102 or professional experience; fall, every year)


MM 4039. Manufacturing Outsourcing Decisions. (2.0 cr.; A-F or Audit; spring, every year)

Strategies to evaluate/make business decisions related to outsourcing product or manufacturing process. How to assess risks associated with outsourcing. How to maintain control of key supply chain factors for delivery of quality/value.

MM 4045. Regulated Industry Compliance. (3.0 cr.; A-F or Audit; prereq 3001 or manufacturing experience; spring, every year)

High tech industry compliance with government regulations, using medical tech sector: agencies, regulations/standards, compliance strategy, challenges, processes/controls, costs/risk/ethics, tracking/analysis/reporting. Product development and compliance systems for design, regulatory, quality, facilities/equipment, materials, packaging/labeling.

MM 4102. Manufacturing Operations. (3.0 cr.; A-F or Audit; prereq 3001, 45 cr; fall, every year)


MM 4201. Quality Engineering and Process Improvement. (3.0 cr.; A-F or Audit; prereq Statistics, 45 cr; fall, every year)

Principles and historical foundations of total quality. Best practices of high-performing quality organizations. Role of leadership and strategic planning. How to implement continuous improvement in manufacturing processes. Baldridge criteria, ISO 9000 standards, Lean Six Sigma.

MM 4311. Sustainable Lean Manufacturing. (2.0 cr.; A-F or Audit; prereq 3001, 45 cr; fall, spring, every year)


MM 4501. Capstone. (3.0 cr.; A-F or Audit; prereq MM major or minor or certificate or #; spring, every year)

Capstone project in consultation with faculty adviser/instructor. Independent investigation of manufacturing subject/challenge.

MM 4550. Special Topics in Manufacturing. (1.0 cr. [max 3.0 cr.]; A-F or Audit; fall, spring, every year)

Seminar. Timely issues/themes in manufacturing.

MM 4596. Internship. (1.0-4.0 cr. [max 12.0 cr.]; A-F or Audit; prereq [MM major or minor or certificate or #]; %; fall, spring, summer, every year)

Internship project in consultation with faculty adviser. Internship is hands-on learning experience in professional manufacturing setting.
MT 3111. Elements of Microelectronic Manufacturing. (3.0 cr.; A-F only; prereq Completion of physics, chemistry, [college algebra or precalculus] with grade of at least C-, 45 sem cr; spring, every year) Common micro fabrication processes, how they are applied to CMOS manufacturing.  

MT 3112. Elements of Micro and Nano Manufacturing Laboratory. (1.0 cr.; A-F only; prereq &3111; spring, every year) Basic process steps to make top-down micro-/nano-scaled structures. Oxidation, photolithography, electron beam lithography, chemical vapor deposition, etching, rapid thermal annealing, wet chemical/plasma etching. Students build test chip containing various micro-mechanical structures.  

MT 3121. Thin Films Deposition. (3.0 cr.; A-F only; prereq Physics, chemistry, [college algebra or precalculus], 45 cr; spring, summer, every year) Thin film materials such as metals/oxides. Photolithography, methods of deposition. HV/UHV range. Vacuum evaporation, sputtering, chemical vapor deposition.  

MT 3131. Introduction to Materials Characterization. (4.0 cr.; A-F only; prereq Completion of physics, chemistry, [college algebra or precalculus] with grade of at least C-, 45 sem cr; spring, every year) Four methods: electron beam microscopy, optical microscopy/FITR, proximal probe techniques, x-ray/ion beam scattering. Principles for, and information from, each method.  

MT 3141. Principles and Applications of Bionanotechnology. (4.0 cr.; A-F only; prereq Completion of physics, chemistry, [college algebra or precalculus] with grade of at least C-, 45 sem cr; spring, every year) Introduction to protein, lipid, and nucleic biochemistry. Biomolecule design, production using recombinant DNA technology. Use in nanodevices and nano-materials. Applications of biological molecules in bionanotechnology. Effects of Brownian motion. Biomolecular surfaces forces. Biomolecule structure alterations due to molecular interaction. Self-assembly.  

MT 3142. Nanoparticle Technology and Engineering Laboratory. (1.0 cr.; A-F only; prereq Completion of physics, chemistry, [college algebra or precalculus] with grade of at least C-, 45 sem cr; spring, every year) Overview of challenges and tools for measuring properties of nanoaerosols. Optical particle counters, condensation particle counters, differential mobility analysis, electrosprays, atomizers, single-particle mass spectrometers.  

Introduction to terms, concepts, and skills for analyzing marketing problems. Factors outside the organization affecting its product, pricing, promotion, and distribution decisions. Cases from actual organizations.  

MKTG 3010. Marketing Research. (4.0 cr.; A-F or Audit; prereq [3001 or &3011], [SCO 2550 or equiv statistics course]; fall, spring, every year) Methods for collecting/analyzing data to solve marketing problems. Research design, secondary/primary data collection, sample design, data analysis.  

MKTG 3040. Buyer Behavior. (4.0 cr.; A-F or Audit; prereq 3001, [3010 or &3010]; fall, spring, every year) Application of behavioral sciences to buyer behavior. Perception, attitudes, learning, persuasion, motivation, decision-making, social/cultural influences, managerial implications.  

MKTG 4030. Sales Management. (4.0 cr.; A-F or Audit; prereq 3001, 3010, 3040; fall, spring, every year) Hiring, motivating, performance enhancement. Customer relationship management, data analysis, quantitative methods. Developing metrics to evaluate individual/group performance in attaining an organization's strategic goals.  

MKTG 4050. Integrated Marketing Communications. (4.0 cr.; A-F or Audit; prereq 3001, 3010, 3040; fall, spring, every year) Managing/integrating communication aspects of marketing. Advertising, sales promotion, public relations. Setting objectives, selecting media. Measuring effectiveness. Sales promotion techniques. Issues in global IMC.  

MKTG 4060. Marketing Channels. (4.0 cr.; A-F or Audit; prereq 3001, 3010, 3040; fall, spring, every year) Design/management of channels of distribution in consumer/industrial settings. Interrelationships between marketing institutions in channels of distribution. Logistics, supply chain strategies.  

MKTG 4080W. Marketing Strategy. (4.0 cr.; A-F or Audit; prereq 3001, 3010, 3040, 12 cr in marketing, sr; fall, spring, every year) Determining product markets where organizations should compete based on ability to create/maintain competitive advantage. External environment of business. Constructing/evaluating global marketing strategies. Largely case-based.  

MKTG 4082W. Brand Management. (4.0 cr.; A-F only; prereq 3001, 3010, 3040; fall, spring, every year) Brand asset management. Measuring brand knowledge. Building/leveraging brands. Managing brands globally.  

MKTG 4092H. Globalization, Culture, and Brands. (2.0 cr.; A-F only; spring, every year) How companies can take advantage of seismic changes/leverage cultural equity for growing businesses. Broad theoretical foundation for understanding impact of culture on business decisions, particularly for devising marketing strategies aimed at creating iconic brands that can resonate with multi-cultural consumers.  

MBT 5200. Tax Accounting Methods and Periods. (4.0 cr.; A-F or Audit; prereq ACCT 5135, MBT student; fall, every year) Rules affecting timing of income and deductions for tax purposes. Examination of cash and accrual accounting methods on an overall basis and with respect to individual items of income and deductions; rules for changing accounting methods and periods; annual accounting and transactional concepts, including the claim of right doctrine, the Arrowsmith doctrine, and the tax benefit rule.  


MBT 5223. Tax-exempt Organizations. (2.0 cr.; A-F or Audit; prereq ACCT 5135, MBT student; fall, every year) Tax law/issues concerning Section 501(c) (3) and other tax-exempt organizations. Qualification, procedures. Unrelated business income, private foundations (including intermediate sanctions), joint ventures.  

MBT 5226. Negotiation Techniques in Taxation. (2.0 cr.; A-F or Audit; summer, every year) Hands-on approach. Applications from facilitating business sales, mergers, and acquisitions, to representing client's position before IRS, to controlling TV remote. Negotiation process: planning, pre-negotiation preparation, strategy development.  


MBT 5323. Mergers and Acquisitions I. (2.0 cr.; A-F or Audit; prereq 5230, MBT student; fall, every year) Different types of acquisitions, dispositions, reorganizations, and spin-offs involving C corporations. Tax consequences of acquisition to corporations/shareholders involved. Use of 338 elections, limitations on acquired net operating losses/credits, use of covenants not to compete, consulting agreements, deferred payment terms, treatment of transaction costs.  

MBT 5333. Tax Aspects of Consolidated Returns. (2.0 cr.; A-F or Audit; prereq 5230, MBT student; spring, every year)
Courses listed in this catalog are current as of October, 15th 2014. For up-to-date information, visit www.catalogs.umn.edu.

**MBT 5335. Taxation of the Small Business Corporation.** (2.0 cr.; A-F or Audit; prereq 5230, MBT student; spring, summer, every year)

Federal income taxation of S corporations. Election eligibility; termination of status; treatment of income and deduction items; distributions, basis of stock and debt. Compensation arrangements in closely held corporations; fiscal year issues; personal service corporations; advantages of C corporations vs. S corporations; corporation liquidation and redemption rules; S corporation's built-in gains tax.

**MBT 5340. Taxation of Partners and Partnerships.** (2.0 cr.; A-F or Audit; prereq Acct 5135, MBT student; spring, summer, every year)

Reviews tax consequences associated with formation, operation, and dissolution of a partnership.

**MBT 5346. ASC 740 Computations and Analysis.** (2.0 cr.; A-F or Audit; prereq 5230, MBT student; fall, every year)


**MBT 5348. Advanced ASC 740 Concepts.** (2.0 cr.; A-F or Audit; prereq 5346, MBT student; fall, odd years)

Examination of topics under ASC 740 Accounting for Income Taxes. Share-based awards, uncertain tax positions, valuation allowances, business combinations, foreign operations, interim period tax calculations. Process design/perspective of stakeholders of income tax accounting.

**MBT 5350. Wealth Transfer I (Estates and Gifts).** (2.0 cr.; A-F or Audit; prereq ACCT 5135, MBT student; fall, spring, summer, every year)


**MBT 5353. Trusts and Estates.** (2.0 cr.; A-F or Audit; prereq ACCT 5135, MBT student; fall, spring, every year)


**MBT 5360. State and Local Taxation.** (2.0 cr.; A-F or Audit; prereq Acct 5135, MBT student; spring, every year)

Examines state levying of individual income, corporate income, property, sales, and excise taxes. Tax problems of businesses with multistate operations.

**MBT 5363. Compensation and Benefits.** (2.0 cr.; A-F or Audit; prereq ACCT 5135, MBT student; spring, every year)

Federal income taxation of executive compensation, relevant fringe benefit programs. Benefit programs other than qualified retirement plans. Salary continuation, stock options, non-profit organization plans, health/welfare plans.

**MBT 5370. Taxation of Property Transactions.** (2.0 cr.; A-F or Audit; prereq Acct 5135, MBT student; fall, spring, every year)

Determining realized gain or loss and recognized gain or loss, and tax treatment of that gain or loss on property dispositions. Consequences of property transactions including depreciation, depletion, basis, and capital gains problems.

**MBT 5380. Tax Aspects of International Business I.** (2.0 cr.; A-F or Audit; prereq 5230, MBT student; fall, spring, every year)

Multinational business operations/transactions involving foreign income. Tax consequences of transactions with/by foreign organizations/companies.

**MBT 5381. Tax Aspects of International Business II.** (2.0 cr.; A-F or Audit; prereq 5380, MBT student; fall, spring, every year)

Foreign tax credit, Subpart F planning opportunities, international structuring (joint ventures, use of entity classification regulations). Transfer pricing, foreign currency, Legislative, regulatory, and judicial developments.

**MBT 5382. Transfer Pricing.** (2.0 cr.; A-F or Audit; prereq [5230, 5380] or equiv; summer, every year)

Transfer pricing requirements facing multinational companies. Tax requirements of the United States and other countries that have adopted the "arm's-length standard" or the transfer pricing guidelines adopted by the Organization for Economic Cooperation and Development. Regulations, methods, economic models, pricing policies, transaction accounting, and management of audits of managing transfer prices within a multinational company.

**MBT 5420. Current Topics in Taxation.** (1.0-4.0 cr.; A-F or Audit; prereq ACCT 5135, MBT student; fall, spring, summer, every year)

Tax research/compliance, other tasks. Students submit summary paper.

**MBT 5500. Business, Government, and Economic Tax Policy.** (2.0 cr.; A-F only; prereq 5230, MBT student; spring, every year)


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**Master of Development Practice (MDP)**

Academic Affairs, Senior Vice President

**MDP 5001. Ways of Knowing and Sustainable Livelihoods.** (2.0 cr.; A-F or Audit; prereq Grad MDP major or #; fall, every year)

Complexities of interdisciplinary study of development and a range of diverse ways of knowing the field of development studies and sustainability. Approaches practiced by physical, biological, social sciences, and humanities scholars. "Ways of knowing" in different cultures/groups and from a variety of situated perspectives. Key issues and concepts and key methodological challenges facing us as we engage in interdisciplinary and international development study and practice. Sustainable livelihoods. Team taught when possible by faculty from biological, social sciences, and humanities, or at minimum will include guest lecturers who can offer a range of disciplinary perspectives on questions of development.

**MDP 5002. Research Methods for Sustainable Livelihoods.** (4.0 cr.; A-F only; prereq MDP grad student or #; spring, every year)

Research/writing skills to support work in international development. Discussion of basic qualitative research methods/data analysis. Qualitative/quantitative data, collaborative research/analysis. Relationship between research/policy.

**MDP 5003. Field Study Pre-Departure Seminar.** (1.0 cr.; Student Option No Audit; prereq MDP grad student or #; spring, every year)

Preparation for international field experience. Identify arrangements for summer field experience in consultation with faculty leader of seminar/MDP advisers. Feedback on colleagues' plans.

**MDP 5100. International Field Seminar.** (1.0 cr.; A-F only; prereq MDP grad student or #; fall, every year)

Debrief/identifying important learning from field experiences. Complete final report on field project. Build upon skills in peer review/feedback development in 5003.

**MDP 5200. Capstone Workshop in Development Practice.** (1.0-2.0 cr. [max 3.0 cr.]; A-F or Audit; prereq MDP grad student or #; fall, spring, every year)

Learning from field experiences. Analytical/practical skills developed in academic training. Apply skills/experiences to "real world" problem provided by local or international development-focused organization. Reflective practice.

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**Materials Science (MATS)**

Institute of Technology
MATS 1001. Advances in Chemical Engineering and Materials Science. (1.0 cr.; S-N or Audit; preq = CHEM 1001; Recommended for chemical engineering, materials science/engineering majors; fall, every year) Introduction to chemical engineering, materials science/engineering. Practical examples of important advances in both fields. Design problems, career opportunities. Lectures, demonstrations, interactive exercises.


MATS 2002. Introduction to the Science of Engineering Materials Laboratory. (1.0 cr.; A-F only; preq [2001 or 20201], IT student; fall, spring, summer, every year) Lab experiments dealing with mechanical properties of engineering materials. Elastic modulus, tensile strength, creep, impact strength, fracture.


MATS 3011. Introduction to Materials Science and Engineering. (3.0 cr.; preq CHEM 1061, CHEM 1065, [MATH 1272 or MATH 1372], PHYS 1302, CSE student; fall, spring, every year) Builds progressively from electrons to atoms to bonding to crystal structures. Defects, X-ray diffraction, phase diagrams. Microstructure as basis for understanding mechanical/electrical properties. Metals, polymers, ceramics, semiconductors, composites.

MATS 3012. Metals and Alloys. (3.0 cr.; A-F or Audit; preq [3011, [Mats or ChEn upper div]] or #; fall, every year) Structure of metals/ alloys. Crystal structure/defects (point defects, dislocations, grain boundaries). Microstructure. Properties of metals, especially mechanical properties.


MATS 3041. Industrial Assignment I. (2.0 cr.; A-F only; preq [CHEN 3041]; preq Mats upper div; completion of required courses in MatS program through fall sem of 3rd yr, GPA of at least 2.80, regis in co-op program; fall, spring, summer, every year) Industrial work assignment in engineering co-op program. Formal report on technical project related to industrial work.

MATS 3045. Materials Science and Engineering Industrial Internship. (1.0 cr. [max 2.0 cr.]; A-F only; preq MatS Upper Division. GPA of at least 2.8; fall, spring, summer, every year) Industrial internship, three to eight months. Formal report on technical project related to industrial work.


MATS 3851W. Materials Properties Lab. (4.0 cr.; A-F or Audit; preq [3801, 4013, Mats upper div] or %; spring, every year) Characterization of properties of engineering materials. Mechanical, electrical, optical, magnetic, thermal properties. Relationship between properties, materials structure. Specimen preparation. Data collection/analysis, including statistical analysis. Laboratory notebook/report writing.

MATS 4041. Industrial Assignment II. (2.0 cr.; A-F only; preq [4041]; preq 3041, GPA of at least 2.80, registration in co-op program; fall, spring, summer, every year) Industrial assignment in engineering co-op program. Application of materials science principles to engineering design problems in an industrial work environment. Formal written report and presentation.

MATS 4212. Ceramics. (3.0 cr.; A-F or Audit; preq [3011, 4001 or CHEN 3101], Mats or ChEn upper div or #; fall, every year) Crystal structures, non-crystalline (glass) structures, microstructure. Ceramic phase relationships: binary/ternary diagrams. Ceramic properties: thermal, mechanical, electrical, magnetic, optical. Computer applications.

MATS 4214. Polymers. (3.0 cr.; A-F or Audit; preq [3011, 4001 or CHEN 4101], upper div MatS or ChEn or #; spring, every year) Polymer structure-property relations: structure/ morphology of crystalline/amorphous state. Crystallization kinetics. Vitrification and glass transition. Mechanical properties, failure, permeability, optical/electrical properties, polymer composites, effect of processing on properties.

MATS 4221. Materials Performance. (4.0 cr.; A-F only; preq 3012, AEM 3031, Upper div MatS; fall, every year) Thermal/mechanical processing to control properties/other applications. Analysis of costs/performance, failure in metallurgical structures by use of fracture mechanics methodology.

MATS 4223W. Polymer Laboratory. (2.0 cr.; preq [CHEM 4223W, CHEM 4223W]; preq 4214 or CHEM 4214 or CHEM 4241 or MATS 4241 or #; spring, every year) Synthesis, characterization, and physical properties of polymers. Free radical, condensation, emulsion, anionic polymerization. Infrared spectroscopy/gel permeation chromatography. Viscoelasticity, rubber elasticity, crystallization.


MATS 4400. Senior Design Project. (3.0 cr.; A-F only; preq [MATS 4402]; preq Sr MatS major; spring, every year) Work in teams to apply expertise in materials science/engineering toward a specific project. With mentor from industry or faculty member guidance, each team defines a problem/follows design steps that culminate in a product design.

MATS 4401. Senior Design Thesis I. (2.0 cr.; A-F only; preq = 4400; MatS senior, %, GPA of at least 3.00, project approval by faculty adviser; fall, every year) First semester of a 2-semester thesis project. Research and design work directed by faculty member in Department of Chemical Engineering and Materials Science. Written reports are due at midsemester and end of semester. At least one research presentation must be given.

MATS 4402. Senior Design Thesis II. (2.0 cr.; A-F only; preq = 4401; spring, every year) Second of 2-semester thesis project. Students continue thesis design project, write thesis, and give final presentation. Lecture portion meets concurrently with 4400.

MATS 4511W. Corrosion and Electrochemistry of Corrosion. (4.0 cr.; A-F or Audit; preq Mats 3011 or #, upper div CSE or grad; fall, offered periodically) Electrochemical thermodynamics, electrochemical kinetics, theory of aqueous
corrosion, theory of high temperature oxidation; specific topics include general corrosion, passivation, pitting, galvanic protection/ corrosion, environmental degradation of mechanical properties, corrosion of electronic components, growth of oxide scales by diffusion, materials selection and design. Computers used to collect lab data.

**MATS 4512. Corrosion and Electrochemistry of Corrosion. (4.0 cr.; prereq Mats 3011 or #, upper div CSE or grad; fall, spring, offered periodically)**

Electrochemical thermodynamics, electrochemical kinetics, theory of aqueous corrosion, theory of high temperature oxidation; specific topics include general corrosion, passivation, pitting, galvanic protection/ corrosion, environmental degradation of mechanical properties, corrosion of electronic components, growth of oxide scales by diffusion, materials selection and design. Computers used to collect lab data.

**MATS 4591. Independent Study in Materials Science.** (1.0-3.0 cr. [max 6.0 cr.]; Student Option No Audit; prereq Upper div mat sci; fall, spring, summer, every year)

Library, theoretical, laboratory or design studies of scientific or engineering topics in materials science for an individual student. Course content and credits by arrangement with professor. Design credits available if arranged with professor. May be used for upper division Honors Program experience if arranged with professor.

**MATS 4593. Directed Study in Materials Science.** (1.0-4.0 cr. [max 6.0 cr.]; A-F only; prereq upper div MatS; fall, spring, summer, every year)

This course can take two forms: (a) Library, theoretical or design studies of scientific or engineering topics in materials science for an individual or a small group of students. Course content and credits by arrangement with professor. Design credits available if arranged with professor. (b) Special topics course offered only once, e.g., by a visiting professor.

**MATS 4594. Directed Research in Materials Science.** (1.0-3.0 cr. [max 6.0 cr.]; Student Option No Audit; prereq Upper div mat sci; fall, spring, summer, every year)

Research studies of scientific or engineering topics in materials science for an individual or small group of students. Course content and credits by arrangement with professor. Design credits available if arranged with professor. May be used for upper division Honors Program experience if arranged with professor.

**MATS 5353. Electron Microprobe Theory and Practice.** (3.0 cr.; [ESCI 5353]; prereq [One yr chem, one yr physics] or #; spring, offered periodically)

Characterizing solid materials with electron beam instrumentation, including reduction of X-ray data to chemical compositions.

**MATS 5517. Electron Microscopy.** (3.0 cr.; A-F or Audit; spring, offered periodically)

Transmission electron microscope, scattering and diffraction, electron sources, lenses, apertures and resolution, specimen preparation, diffraction patterns, kikuchi diffraction, planar defects, strain fields, high resolution imaging, X-ray spectrometry.

**MATS 5531. Electrochemical Engineering.** (3.0 cr.; [CHEN 5531]; prereq Mats 3011 or #, upper div CSE or grad; fall, offered periodically)

Fundamentals of electrochemical engineering. Topics include electrochemical mass transfer electrokinetics, thermodynamics of cells, modern sensors, formation of thin films and microstructured materials. Computer-based problems will be assigned.

**MATS 5771. Colloids and Dispersions.** (3.0 cr.; A-F or Audit; prereq Physical chemistry; fall, every year)

Preparation, stability, coagulation kinetics, or colloidal solutions. DLVO theory, electokinetic phenomena. Properties of micelles, other microstructures.

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**Mathematics (MATH) Institute of Technology**

**MATH 1001. Excursions in Mathematics.** (3.0 cr.; prereq 3 yrs high school math or placement exam or [grade of at least C- in PSTL 731 or 732]; fall, spring, every year)

Introduction to the breadth and nature of mathematics and the power of abstract reasoning, with applications to topics that are relevant to the modern world, such as voting, fair division of assets, patterns of growth, and opinion polls.

**MATH 1031. College Algebra and Probability.** (3.0 cr.; [MATH 1051, PSTL 1006]; prereq 3 yrs high school math or satisfactory score on placement exam or grade of at least C- in [PSTL 731 or 732]; fall, spring, summer, every year)

Graphs of equations/functions, transformations of graphs; linear, quadratic, polynomial, and rational functions, with applications; inverses/composition of functions; exponential and logarithmic functions, with applications; basic probability rules, conditional probability, binomial probabilities.

**MATH 1038. College Algebra and Probability Subsidu.** (1.0 cr.; A-F or Audit; prereq 1051 or 1151 or 1155; fall, spring, summer, every year)

For students who need probability/ permutations/combinations portion of 1031. Meets with 1031, has same grade/work requirements.

**MATH 1051. Precalculus I.** (3.0 cr.; [PSTL 1006, MATH 1031]; prereq 3 yrs high school math or satisfactory score on placement test or grade of at least C- in [PSTL 731 or 732]; fall, spring, summer, every year)

Graphs of equations/functions, transformations of graphs; linear, quadratic, polynomial, and rational functions, with applications; zeros of polynomials; inverses and composition of functions; exponential and logarithmic functions, with applications; coverage beyond that found in the usual 3 years of high school math.

**MATH 1052. Precalculus II.** (3.0 cr.; [MATH 1155]; prereq Satisfactory score on placement exam or grade of at least C- in [1031 or 1051]; fall, spring, summer, every year)

Graphs of equations and functions; polynomial and rational functions; inverses and composition of functions; exponentials and logarithms; trig functions, graphs, identities; graphs; complex numbers, complex plane, DeMoivre's Theorem; conic sections; systems of linear equations and inequalities, with applications; arithmetic and geometric sequences and series.

**MATH 1241. Calculus and Dynamical Systems in Biology.** (4.0 cr.; prereq [4 yrs high school math including trig or satisfactory score on placement test or grade of at least C- in [1151 or 1155]; CBS student; fall, spring, every year)

Differential/integral calculus with biological applications. Discrete/continuous dynamical systems. Models from fields such as ecology/ evolution, epidemiology, physiology, genetic networks, neuroscience, and biochemistry.

**MATH 1271. Calculus I.** (4.0 cr.; [MATH 1281, MATH 1371, MATH 1471, MATH 1571H]; prereq 4 yrs high school math including trig or satisfactory score on placement test or grade of at least C- in [1151 or 1155]; fall, spring, summer, every year)

Differential calculus of functions of a single variable, including polynomial, rational, exponential, and trig functions. Applications, including optimization and related rates problems. Single variable integral calculus, using anti-derivatives and simple substitution. Applications may include area, volume, work problems.

**MATH 1272. Calculus II.** (4.0 cr.; [MATH 1472, MATH 1252, MATH 1372, MATH 1282, MATH 1527H]; prereq [1271 or equiv] with grade of at least C-; fall, spring, summer, every year)

Techniques of integration. Calculus involving transcendental functions, polar coordinates.
Taylor polynomials, vectors/curves in space, cylindrical/spherical coordinates.

**MATH 1371. CSE Calculus I.** (4.0 cr.; =MATH 1281, MATH 1271, MATH 1471, MATH 1571H; prereq CSE or pre-bioproduct & biosys engn (PRE), background in [precalculus, geometry, visualization of functions/graphs]; #; familiarity with graphing calculators recommended; fall, spring, every year) Differential and integral calculus of single-variable functions, basics of integration of single-variable functions. Applications: max-min, related rates, area, curve-sketching. Use of calculator, cooperative learning.

**MATH 1372. CSE Calculus II.** (4.0 cr.; =MATH 1472, MATH 1252, MATH 1282, MATH 1572H; MATH 1272; prereq Grade of at least C- in [1371 or equiv]; CSE or pre-Bioproduct/Biosys Engr; spring, every year) Techniques of integration. Calculus involving transcendental functions, polar coordinates, Taylor polynomials, vectors/curves in space, cylindrical/spherical coordinates. Use of calculators, cooperative learning.

**MATH 1474. Honors Calculus IIB for Secondary Students.** (3.0 cr.; prereq 1473H; spring, every year) Accelerated honors sequence. Linear Algebra from geometric viewpoint. First-order systems of differential equations.

**MATH 1571H. Honors Calculus I.** (4.0 cr.; A-F only; =MATH 1281, MATH 1371, MATH 1271, MATH 1471); prereq Honors student and permission of University Honors Program; fall, every year) Differential/integral calculus of functions of a single variable. Emphasizes hard problem-solving rather than theory.

**MATH 1572H. Honors Calculus II.** (4.0 cr.; A-F only; =MATH 1472, MATH 1252, MATH 1372, MATH 1282, MATH 1272); prereq 1571H; honors student, permission of University Honors Program; spring, every year) Continuation of 1571. Infinite series, differential calculus of several variables, introduction to linear algebra.

**MATH 2001. Actuarial Science Seminar.** (1.0 cr.; S-N or Audit; prereq 1272 or equiv; spring, every year) Actuarial science as a subject and career. Guest lectures by actuaries. Resume preparation and interviewing skills. Review and practice for actuarial exams.

**MATH 2066. Elementary Differential Equations.** (1.0-4.0 cr.; ) Not taught: merely provides credit for transfer students who have taken a sophomore-level differential equations class that does not contain enough linear algebra to qualify for credit for 2243.

**MATH 2142. Elementary Linear Algebra.** (1.0-4.0 cr. [max 1.0 cr.]; A-F or Audit; ) Not taught: merely provides credit for transfer students who have taken a sophomore-level linear algebra course that does not contain enough differential equations to qualify for credit for 2243.

**MATH 2243. Linear Algebra and Differential Equations.** (4.0 cr.; =MATH 2373, MATH 2574H, MATH 2471); prereq [1272 or 1282 or 1372 or 1572] w/grade of at least C-; fall, spring, summer, every year) Linear algebra: basis, dimension, matrices, eigenvalues/eigenvectors. Differential equations: first-order linear, separable; second-order linear with constant coefficients; linear systems with constant coefficients.

**MATH 2263. Multivariable Calculus.** (4.0 cr.; =MATH 2573H, MATH 3251, MATH 2374, MATH 2473); prereq [1272 or 1372 or 1572] w/grade of at least C-; fall, spring, summer, every year) Derivative as linear map. Differential/integral calculus of functions of several variables, including change of coordinates using Jacobians. Line/surface integrals. Gauss, Green, Stokes Theorems.


**MATH 2373. CSE Linear Algebra and Differential Equations.** (4.0 cr.; =MATH 2574H, MATH 2243, MATH 2471); prereq [1272 or 1282 or 1372 or 1572] w/grade of at least C-, CSE or pre-BioProd/Biosys Engr; fall, spring, every year) Linear algebra: basis, dimension, eigenvalues/eigenvectors. Differential equations: linear equations/systems, phase space, forcing/resonance, qualitative/numerical analysis of nonlinear systems, Laplace transforms. Use of computer technology.

**MATH 2374. CSE Multivariable Calculus and Vector Analysis.** (4.0 cr.; =MATH 2573H, MATH 3251, MATH 2473, MATH 2263); prereq [1272 or 1282 or 1372 or 1572] w/grade of at least C-, CSE or pre-BioProd/Biosys Engr; fall, spring, every year) Derivative as linear map. Differential/integral calculus of functions of several variables, including change of coordinates using Jacobians. Line/surface integrals. Gauss, Green, Stokes theorems. Use of computer technology.

**MATH 2474. Advanced Topics for Secondary Students.** (3.0 cr.; prereq 2473H; spring, every year) Topics may include linear algebra, combinatorics, advanced differential equations, probability/statistics, numerical analysis, dynamical systems, topology/geometry. Emphasizes concepts/explorations.

**MATH 2573H. Honors Calculus III.** (4.0 cr.; A-F only; =MATH 3251, MATH 2374, MATH 2473, MATH 2263); prereq Math 1572H, honors student and permission of University Honors Program; fall, every year) Integral calculus of several variables. Vector analysis, including theorems of Gauss, Green, Stokes.

**MATH 2574H. Honors Calculus IV.** (4.0 cr.; A-F only; =MATH 2373, MATH 2243, MATH 2471); prereq 2573H, honors student and permission of University Honors Program; spring, every year) Advanced linear algebra, differential equations. Additional topics as time permits.

**MATH 3283W. Sequences, Series, and Foundations: Writing Intensive.** (4.0 cr.; =MATH 2283); prereq [[&2243 or &2263 or &2373 or &2374] w/grade of at least C-; fall, spring, every year) Introduction to reasoning used in advanced mathematics courses. Logic, mathematical induction, real number system, general/multivariate/recursively defined sequences, convergence of infinite series/sequences, Taylor's series, power series with applications to differential equations, Newton's method. Writing-intensive component.

**MATH 3584H. Honors Calculus IV: Advanced Placement.** (5.0 cr.; prereq [2583 or equiv]; IT Honors office approval; ) Advanced linear algebra, differential equations. Introduction to complex analysis.

**MATH 3592H. Honors Mathematics I.** (5.0 cr.; A-F only; prereq %; for students with mathematical talent; fall, every year) First semester of three-semeester sequence. Focuses on multivariable calculus at deeper level than regular calculus offerings. Rigorous introduction to sequences/series. Theoretical treatment of multivariable calculus. Strong introduction to linear algebra.

**MATH 3593H. Honors Mathematics II.** (5.0 cr.; A-F or Audit; prereq 3592H or #; spring, every year) Second semester of three-semeester sequence. Focuses on multivariable calculus at deeper level than regular calculus offerings. Rigorous introduction to sequences/series. Theoretical treatment of multivariable calculus. Strong introduction to linear algebra.

**MATH 4065. Theory of Interest.** (4.0 cr.; A-F only; prereq 1272 or 1372 or 1572; fall, spring, every year) Time value of money, compound interest and general annuities, loans, bonds, general cash flows, basic financial derivatives and their valuation. Primarily for students who are interested in actuarial mathematics.

**MATH 4067W. Actuarial Mathematics in Practice.** (3.0 cr.; A-F only; prereq 4065, ACCT 2050, ECON 1101, ECON 1102; spring, every year) Real world actuarial problems that require integration of mathematical skills with knowledge from other disciplines such as economics, statistics, and finance. Communication and interpersonal skills are enhanced by teamwork/presentations to the practitioner actuaries who co-instruct.

**MATH 4113. Topics in Elementary Mathematics I.** (4.0 cr.; prereq [Grade of
MATH 4116. Topics in Elementary Math II: Short Course. (2.0 cr.; A-F or Audit; prereq Grade of at least C- in 4113; ) Probability/Statistics, vector geometry, real/complex numbers. Meets during first half of semester only. Grading standard one-third higher than 3116.

MATH 4118. Topics in Elementary Mathematics II. (4.0 cr.; prereq Grade of at least C- in 4113; spring, every year) Probability/statistics, vector geometry, real/complex numbers, finite fields building on previously learned modular arithmetic, trees. Grading standard one-third higher than 3118.

MATH 4152. Elementary Mathematical Logic. (3.0 cr.; =MATH 5165; prereq one soph math course or #; spring, every year) Propositional logic. Predicate logic: notion of a first order language, a deductive system for first order logic, first order structures, Godel's completeness theorem, axiom systems, models of formal theories.

MATH 4242. Applied Linear Algebra. (4.0 cr.; =MATH 4457; prereq 2243 or 2373 or 2573; fall, spring, summer, every year) Systems of linear equations, vector spaces, subspaces, bases, linear transformations, matrices, determinants, eigenvalues, canonical forms, quadratic forms, applications.

MATH 4281. Introduction to Modern Algebra. (4.0 cr.; prereq 2283 or 3283 or #; ) Equivalence relations, greatest common divisor, prime decomposition, modular arithmetic, groups, rings, fields, Chinese remainder theorem, matrices over commutative rings, polynomials over fields.

MATH 4428. Mathematical Modeling. (4.0 cr.; prereq 2243 or 2373 or 2573; spring, every year) Modeling techniques for analysis/decision-making in industry. Optimization (sensitivity analysis, Lagrange multipliers, linear programming). Dynamical modeling (steady-states, stability analysis, eigenvalue methods, phase portraits, simulation). Probabilistic methods (probability/statistical models, Markov chains, linear regression, simulation).

MATH 4512. Differential Equations with Applications. (3.0 cr.; prereq 2243 or 2373 or 2573; fall, spring, every year) Laplace transforms, series solutions, systems, numerical methods, plane autonomous systems, stability.

MATH 4567. Applied Fourier Analysis. (4.0 cr.; prereq 2243 or 2373 or 2573; fall, spring, every year) Fourier series, integral/transform. Convergence. Fourier series, transform in complex form. Solution of wave, heat, Laplace equations by separation of variables. Sturm-Liouville systems, finite Fourier, fast Fourier transform. Applications. Other topics as time permits.

MATH 4603. Advanced Calculus I. (4.0 cr.; prereq [2243 or 2373], [2263 or 2374] or 2574 or #; fall, spring, summer, every year) Axioms for the real numbers. Techniques of proof for limits, continuity, uniform convergence. Rigorous treatment of differential/ integral calculus for single-variable functions.

MATH 4604. Advanced Calculus II. (4.0 cr.; prereq 4603 or 5615 or #; spring, every year) Sequel to MATH 4603. Topology of n-dimensional Euclidean space. Rigorous treatment of multivariable differentiation and integration, including chain rule, Taylor's Theorem, implicit function theorem, Fubini's Theorem, change of variables, Stokes' Theorem.

MATH 4653. Elementary Probability. (4.0 cr.; prereq [2263 or 2374 or 2573]; [2283 or 2574 or 3283] recommended; fall, spring, every year) Probability spaces, distributions of discrete/continuous random variables, conditioning. Basic theorems, calculational methodology. Examples of random sequences. Emphasizes problem-solving.

MATH 4707. Introduction to Combinatorics and Graph Theory. (4.0 cr.; prereq 2243, [2283 or 3283]; fall, spring, every year) Existence, enumeration, construction, algorithms, optimization. Pigeonhole principle, bijective combinatorics, inclusion-exclusion, recursions, graph modeling, isomorphism. Degree sequences and edge counting. Connectivity, Eulerian graphs, trees, Euler's formula, network flows, matching theory. Mathematical induction as proof technique.

MATH 4990. Topics in Mathematics. (1.0-4.0 cr.; max 12.0 cr.;) Equivalence relations, greatest common divisor, prime decomposition, modular arithmetic, groups, rings, fields, Chinese remainder theorem, matrices over commutative rings, polynomials over fields.

MATH 4992. Directed Reading. (1.0-4.0 cr.) Directed study. May consist of paper on a specialized area of math or original computer program or other approved project. Covers some math that is new to student. At least two drafts of paper given to instructor for feedback before final version. Student keeps journal of preliminary work on project. Scope/topic vary with instructor.

MATH 5067. Actuarial Mathematics I. (4.0 cr.; prereq 4065, [one sem 4xxx or 5xxx] probability or statistics course); fall, every year) Future lifetime random variable, survival function. Insurance, life annuity, future loss random variables. Net single premium, actuarial present value, net premium, net reserves.

MATH 5068. Actuarial Mathematics II. (4.0 cr.; prereq 5067; spring, every year) Multiple decrement insurance, pension valuation. Expense analysis, gross premium, reserves. Problem of withdrawals. Regulatory reserving systems. Minimum cash values. Additional topics at instructor's discretion.

MATH 5075. Mathematics of Options, Futures, and Derivative Securities I. (4.0 cr.; prereq Two yrs calculus, basic computer skills; fall, every year) Mathematical background (e.g., partial differential equations, Fourier series, computational methods, Black-Scholes theory, numerical methods--including Monte Carlo simulation). Interest-rate derivative securities, exotic options, risk theory. First course of two-course sequence.

MATH 5076. Mathematics of Options, Futures, and Derivative Securities II. (4.0 cr.; A-F or Audit; prereq 5075; spring, every year) Mathematical background such as partial differential equations, Fourier series, computational methods, Black-Scholes theory, numerical methods (including Monte Carlo simulation), interest-rate derivative securities, exotic options, risk theory.

MATH 5165. Mathematical Logic I. (4.0 cr.; =MATH 4152; prereq 2283 or 3283 or Phil 5201 or CSci course in theory of algorithms or #; fall, every year) Theory of computability: notion of algorithm, Turing machines, primitive recursive functions, recursive functions, Kleene normal form, recursion theorem. Propositional logic.


MATH 5251. Error-Correcting Codes, Finite Fields, Algebraic Curves. (4.0 cr.; prereq 2 or 2373 or 2573), [2283 or 2574 or 3283]; fall, every year) Information theory: channel models, transmission errors. Hamming weight/distance. Linear codes/fields, check bits. Error processing: linear codes, Hamming codes, binary Golay codes. Euclidean algorithm. Finite fields, Boser-Chaudhuri-Hocquenghem codes, polynomial codes, Goppa codes, codes from algebraic curves.

MATH 5285H. Honors: Fundamental Structures of Algebra I. (4.0 cr.; prereq [2243 or 2373 or 2573], [2283 or 2574 or 3283]; fall, every year) Review of matrix theory, linear algebra. Vector spaces, linear transformations over abstract fields. Group theory, including normal subgroups, quotient groups, homomorphisms, class equation, Sylow's theorems. Specific examples: permutation groups, symmetry groups of geometric figures, matrix groups.

MATH 5286H. Honors: Fundamental Structures of Algebra II. (4.0 cr.; prereq 5285; fall, spring, every year) Ring/module theory, including ideals, quotients, homomorphisms, domains (unique factorization, euclidean, principal ideal), fundamental theorem for finitely generated modules over euclidean domains, Jordan canonical form. Introduction to field theory, including finite fields, algebraic transcendental extensions, Galois theory.

MATH 5335. Geometry I. (4.0 cr.; prereq [2243 or 2373 or 2573], [2263 or 2374 or 2574]; fall, every year) Advanced two-dimensional Euclidean geometry from a vector viewpoint. Theorems/problems about triangles/circles, isometries, connections with Euclid's axioms. Hyperbolic geometry, how it compares with Euclidean geometry.

MATH 5336. Geometry II. (4.0 cr.; prereq 5335; spring, every year) Projective geometry, including: relation to Euclidean geometry, finite geometries, fundamental theorem of projective geometry. N-dimensional Euclidean geometry from a vector viewpoint. Emphasizes N=3, including: polyhedra, spheres, isometries.

MATH 5345H. Honors: Introduction to Topology. (4.0 cr.; A-F only; prereq [2263 or 2374 or 2573], [2283 or 2574 or 3283]; fall, every year) Rigorous introduction to general topology. Set theory, Euclidean/metric spaces, compactness connectedness. May include Urysohn metrization, Tychonoff theorem or fundamental group/covering spaces.

MATH 5378. Differential Geometry. (4.0 cr.; prereq [2263 or 2374 or 2573], [2243 or 2373 or 2574], [2283 or 3283] recommended; spring, every year) Basic geometry of curves in plane and in space, including Frenet formula, theory of surfaces, differential forms, Riemannian geometry. MATH 5385. Introduction to Computational Algebraic Geometry. (4.0 cr.; prereq [2263 or 2374 or 2573], [2243 or 2373 or 2574]; fall, every year) Geometry of curves/sheaves defined by polynomial equations. Emphasizes concrete computations with polynomials using computer packages, interplay between algebra and geometry. Abstract algebra presented as needed.


MATH 5447. Theoretical Neuroscience. (4.0 cr.; prereq 2243 or 2373 or 2574; fall, every year) Nonlinear dynamical system models of neurons and neuronal networks. Computation by excitatory/inhibitory networks. Neural oscillations, adaptation, bursting, synchrony. Memory systems.

MATH 5467. Introduction to the Mathematics of Image and Data Analysis. (4.0 cr.; prereq [2243 or 2373 or 2573], [2283 or 2574 or 3283 or #]; [2263 or 2374], 4567 recommended; spring, every year) Background theory/experience in wavelets. Inner product spaces, operator theory. Fourier transforms applied to Gabor transforms, multi-scale analysis, discrete wavelets, self-similarity. Computing techniques.

MATH 5485. Introduction to Numerical Methods I. (4.0 cr.; prereq [2243 or 2373 or 2573], [2283 or 2574 or 3283 or #]; [2263 or 2374], 4567 recommended; spring, every year) Solution of nonlinear equations in one variable. Interpolation, polynomial approximation. Methods for solving linear systems, eigenvalue problems, systems of nonlinear equations.


MATH 5490. Topics in Applied Mathematics. (4.0 cr. [max 12.0 cr.]; fall, spring, offered periodically) Topics vary by instructor. See class schedule.

MATH 5525. Introduction to Ordinary Differential Equations. (4.0 cr.; prereq [2243 or 2373 or 2573], [2283 or 2574 or 3283]; fall, spring, offered periodically) Ordinary differential equations, solution of linear systems, qualitative/numerical methods for nonlinear systems. Linear algebra background, fundamental matrix solutions, variation of parameters, existence/uniqueness theorems, phase space. Rest points, their stability. Periodic orbits, Poincare-Bendixon theory, strange attractors.

MATH 5535. Dynamical Systems and Chaos. (4.0 cr.; prereq [2243 or 2373 or 2573], [2263 or 2374 or 2574]; fall, spring, every year) Dynamical systems theory. Emphasizes iteration of one-dimensional mappings. Fixed points, periodic points, stability, bifurcations, symbolic dynamics, chaos, fractals, Julia Mandelbrot sets.


MATH 5587. Elementary Partial Differential Equations I. (4.0 cr.; prereq [2243 or 2373 or 2573], [2263 or 2374 or 2574]; fall, every year) Emphasizes partial differential equations w/physical applications, including heat, wave, Laplace's equations. Interpretations of boundary conditions. Characteristics, Fourier series, transforms, Green's functions, images, computational methods. Applications include wave propagation, diffusions, electrostatics, shocks.

MATH 5588. Elementary Partial Differential Equations II. (4.0 cr.; A-F or Audit; prereq [[2243 or 2373 or 2573], [2263 or 2374 or 2574], 5587 or #]; spring, every year) Heat, wave, Laplace's equations in higher dimensions. Green's functions, Fourier series, transforms. Asymptotic methods, boundary layer theory, bifurcation theory for linear/nonlinear PDEs. Variational methods. Free boundary problems. Additional topics as time permits.

MATH 5594H. Honors Mathematics - Topics. (4.0 cr. [max 12.0 cr.]; A-F or Audit; prereq [5393H with grade of at least B, experience in writing proofs] or %; intended for mathematically-talented students with proven achievement in theoretical mathematics courses; fall, offered periodically) Topics vary depending on interests of instructor. Theoretical treatment of chosen topic.

MATH 5615H. Honors: Introduction to Analysis I. (4.0 cr.; prereq [[2243 or 2373], [2263 or 2374], [2283 or 3283]] or #]; spring, every year) Axiomatic treatment of real/complex number systems. Introduction to metric spaces: convergence, connectedness, compactness. Convergence of sequences/series of real/complex numbers, Cauchy criterion, root/ratio tests. Continuity in metric spaces. Rigorous treatment of differentiation of single-variable functions, Taylor's Theorem.

MATH 5616H. Honors: Introduction to Analysis II. (4.0 cr.; prereq 5615; spring, every year) Rigorous treatment of Riemann-Stieltjes integration. Sequences/series of functions,

MATH 5651. Basic Theory of Probability and Statistics. (4.0 cr.; prereq [2263 or 2374 or 2573], [2243 or 2573]; [2283 or 2574 or 3283] recommended; Credit will not be granted if credit has been received for: Stat 4101, Stat 5101; fall, spring, every year)

Logical development of probability, basic issues in statistics. Probability spaces, random variables, their distributions/expected values. Law of large numbers, central limit theorem, generating functions, sampling, sufficiency, estimation.

MATH 5652. Introduction to Stochastic Processes. (4.0 cr.; prereq 5651 or Stat 5101; fall, spring, every year)

Random walks, Markov chains, branching processes, martingales, queuing theory, Brownian motion.

MATH 5654. Prediction and Filtering. (4.0 cr.; prereq 5651 or Stat 5101; spring, every year)


MATH 5705. Enumerative Combinatorics. (4.0 cr.; prereq [2243 or 2373 or 2573], [2263 or 2283 or 2374 or 2574 or 3283]; fall, spring, every year)

Basic enumeration, bijections, inclusion-exclusion, recurrence relations, ordinary/exponential generating functions, partitions, Polya theory. Optional topics include trees, asymptotics, listing algorithms, rook theory, involutions, tableaux, permutation statistics.

MATH 5707. Graph Theory and Non-enumerative Combinatorics. (4.0 cr.; prereq [2243 or 2373 or 2573], [2263 or 2283 or 2374 or 2574]; [2283 or 3283 or experience in writing proofs] highly recommended; Credit will not be granted if credit has been received for: 4707; fall, spring, every year)

Basic topics in graph theory: connectedness, Eulerian/Hamiltonian properties, trees, colorings, planar graphs, matchings, flows in networks. Optional topics include graph algorithms, Latin squares, block designs, Ramsey theory.

MATH 5711. Linear Programming and Combinatorial Optimization. (4.0 cr.; prereq 2 sems soph math [including 2243 or 2373 or 2573]; fall, spring, every year)


MATH 5900. Tutorial in Advanced Mathematics. (1.0-6.0 cr. [max 120.0 cr.]; A-F or Audit; fall, spring, summer, every year)

Individually directed study.

MATH 5990. Topics in Mathematics. (4.0 cr. [max 12.0 cr.]; fall, spring, offered periodically)

Topics vary by instructor. See class schedule.

Mathematics Education (MTHE)

MTHE 3101. Mathematics and Pedagogy for Elementary Teachers I. (3.0 cr.; A-F only; prereq [College algebra, elementary FOE student, jr status, or above] or [Stat 5101 or Stats 4101 and jr status]; fall, spring, summer, every year)

Math content knowledge of K-6 in an environment modeling pedagogy for future implementation. Integrated content/methods. Problem solving, connections, communication, reasoning, representation. Functions, proportionality, number, numeration.

MTHE 3102. Mathematics and Pedagogy for Elementary Teachers II. (3.0 cr.; A-F only; prereq 3101, college algebra; fall, spring, summer, every year)

Math content knowledge of K-6 in an environment modeling pedagogy for future implementation. Integrated content/methods. Problem solving, connections, communication, reasoning, representation. Geometry, measurement, probability, statistics.

MTHE 5011. Arithmetic Structures in School Mathematics. (3.0 cr.; prereq Enrollment in math initial licensure program or tcchg exper; summer, every year)

Pedagogy, content, and instructional strategies for teaching arithmetic. Content and issues relevant to the K-8 mathematics curriculum. Instructional materials and technology appropriate for elementary or middle school arithmetic. Credit hours and targeted level vary with particular classes.

MTHE 5021. Algebric Structures in School Mathematics. (3.0 cr.; prereq Tchg exper or #; fall, every year)

Pedagogy, content, and instructional strategies for teaching algebra. Content and issues relevant to the algebra curriculum. Instructional materials and technology appropriate for algebraic. Each offering of the course will focus on either elementary/middle or middle/secondary grade levels.

MTHE 5031. Geometric Structures in School Mathematics. (3.0 cr.; prereq Enrollment in math initial licensure program; spring, every year)

Pedagogy, content, and instructional strategies for teaching school geometry. Content and issues relevant to the geometry curriculum. Instructional materials and technology appropriate for geometry. Each offering will focus on either elementary/middle or middle/secondary grade levels.

MTHE 5100. Topics in Mathematics Education. (1.0-6.0 cr. [max 12.0 cr.]; prereq Ed or grad student; fall, spring, summer, every year)

Issues, materials, and instructional techniques focusing on a single current topic of particular relevance to secondary school and college mathematics teachers.

MTHE 5101. Teaching Elementary School Mathematics. (3.0 cr.; prereq Tchg license or student elem ed MEd or special ed or #; spring, summer, every year)

Modern trends, methods, and materials used to convey mathematical ideas.

MTHE 5155. Rational Number Concepts and Proportionality. (3.0 cr.; prereq Educ student or #; fall, even years)

The relationship between the development of rational number concepts and proportional reasoning skills. Examination of how newer school curricula treat these concepts. Application of materials in the classroom and analysis of results. Reading and responding to current research.

MTHE 5161. Developing Leadership in School Mathematics. (3.0 cr.; prereq Tchg exper or #; )

Current developments in the psychology and pedagogy of mathematics education as related to the evolving nature of mathematics education objectives. Emerging use of technology in the mathematics classroom. Techniques for the development of supervisory abilities. Characteristics of effective staff development.

MTHE 5170. Historical Topics in the Mathematics Classroom. (1.0-3.0 cr.; )

Historical underpinnings of school mathematics content and methodology. Cross-cultural contributions in the development of mathematical ideas. Development of lessons, activities, and materials for school use.

MTHE 5171. Teaching Problem Solving. (3.0 cr.; spring, summer, offered periodically)

Investigation of fundamental concepts and principles of problem solving, reasoning, and proof. Emphasis on activities and applications appropriate for junior and senior high classes. Pedagogical experiences to prepare teachers to teach problem solving, reasoning, and proof in classrooms.

MTHE 5172. Teaching Probability and Statistics. (3.0 cr.; fall, odd years)

Investigation of fundamental concepts and principles of probability and statistics. Emphasis on activities and applications appropriate for junior and senior high school classes. Pedagogical experiences to prepare teachers to integrate quantitative literacy accurately and effectively in classrooms.

MTHE 5305. Middle School Mathematics Methods. (2.0 cr.; A-F only; prereq Elem ed licensure student; fall, every year)

The unique needs of middle school students in the mathematics classroom. Mathematics content and pedagogical skills. Adolescent development/psychology. Field placement in a middle school mathematics classroom.

MTHE 5314. Teaching and Learning Mathematics. (3.0 cr.; prereq Math Ed or MEd or CI MEd or grad student or #; fall, every year)
ME 3222. Design and Manufacturing II. (4.0 cr.; A-F or Audit; prereq [3221 or &3222], [SCI 1113 or equiv], ME upper div; fall, spring, summer, every year) Selection of standard mechanical components such as bearings, gears, and fasteners. Analysis/synthesis of motion in machines. Displacement, velocity, and acceleration of mechanisms. Machine design project: Apply lecture topics to develop new machines that fulfill customer specifications.

ME 3281. System Dynamics and Control. (4.0 cr.; A-F or Audit; prereq AEM 2021, [Math 2243 or Math 2373], ME upper div; fall, spring, summer, every year) Dynamics of mechanical, electrical, thermal, fluid, and hybrid systems. System response using Laplace transform and numerical integration. Fourier transform and convolution. Transfer functions and frequency response. Introduction to classical control.


ME 3331. Thermal Sciences I. (3.0 cr.; A-F only; prereq Chem 1021, Phys 1301, CSE student; fall, spring, summer, every year) Properties, equations of state, processes, cycles for reversible/irreversible thermodynamic systems. Modes of energy transfer. Equations for conservation of mass, energy, entropy balances. Application of thermodynamic principles to modern engineering systems.

ME 3332. Thermal Sciences II. (3.0 cr.; A-F only; prereq Math 2243, 3331, ME upper div; fall, spring, summer, every year) Mass, momentum conservation in solid systems. Fluid statics, Bernoulli equation. Control volume analysis, dimensional analysis, internal/external viscous flow. Momentum/energy considerations. Introduction to boundary layers.

ME 3333. Thermal Sciences III. (3.0 cr.; A-F only; prereq 3332, ME upper div; fall, spring, summer, every year) Mechanisms of heat transfer. Conduction, convection, radiation. Boundary layer analysis using moment/energy equations. Applications such as fans, heat exchangers, electronics cooling, bioheat transfer, energy conversion technologies, phase change energy storage/boiling.

ME 3990. Curricular Practical Training. (1.0 cr. [max 2.0 cr.]; S-N only; prereq ME major; fall, spring, summer, every year) Industrial work assignment involving advanced mechanical engineering technology. Reviewed by faculty member. Final report covering work assignment.

ME 4031W. Basic Mechanical Measurements Laboratory. (4.0 cr.; A-F or Audit; prereq IE 4521, upper div ME; fall, spring, summer, every year) Experimental methods, statistical estimates of experimental uncertainty, calibration, signal conditioning, selected transducers for mechanical measurements, data acquisition/processing. Temperature, pressure, humidity, stress-strain, force, velocity, flow/radiative properties.

ME 4042. Industrial Assignment II. (2.0 cr.; A-F or Audit; prereq ME upper div, enrolled in ME co-op program; fall, spring, summer, every year) Industrial work assignment in engineering intern program. Evaluation based on student's formal written report covering the quarter's work assignment.

ME 4043W. Industrial Assignment II. (4.0 cr.; A-F only; prereq 3041; fall, spring, summer, every year) Solution of system design problems that require developing criteria, evaluating alternatives, and generating a preliminary design. Final report emphasizes design communication and describes design decision process, analysis, and final recommendations.

ME 4044. Industrial Assignment III. (2.0 cr.; A-F only; prereq ME upper div, registration in ME co-op program; fall, spring, summer, every year) Industrial work assignment in engineering co-op program. Evaluation based on student's formal written report covering semester work assignment.

ME 4054W. Design Projects. (4.0 cr.; A-F or Audit; prereq 2011, 3221, 3222, 3281, 3331, 3332, 3333, 4031W, AEM 2021, AEM 3031, EE 3055, ME upper div; fall, spring, summer, every year) Students work in teams and undertake single, substantial design project. Design problems are open-ended. Product design process. Teams give formal presentation of progress at mid-semester design review, show completed work at design show.

ME 4080. Topics in Mechanical Engineering. (1.0-4.0 cr. [max 8.0 cr.]; prereq ME upper div; fall, every year) Topics vary each semester.

ME 4081H. Mechanical Engineering Honors Thesis I. (2.0 cr.; A-F or Audit; prereq ME upper div honors student; #; fall, spring, summer, every year) Unstructured research course enabling honors students to do independent research supervised by faculty. Selection of suitable topics according to individual interests and faculty approval. Thesis and oral defense.

ME 4082H. Mechanical Engineering Honors Thesis II. (2.0 cr.; A-F or Audit; prereq
university honors student, #; fall, spring, summer, every year)
Unstructured research course enabling honors students to do independent research supervised by faculty. Selection of suitable topics according to individual interests and faculty approval. Thesis and oral defense.

ME 4090. Advanced Engineering Problems. (1.0-4.0 cr.; prereq ME upper div, #; fall, spring, summer, every year) Independent research project with faculty adviser in mechanical engineering, typically related to adviser's research interests. Student contacts adviser to develop project description well before project's start date.

ME 4131W. Thermal Environmental Engineering Laboratory. (4.0 cr.; A-F or Audit; prereq 3332, 3333, 4031W, [ME upper div or grad student]; fall, spring, every year) Experiments in psychrometrics, refrigeration, air conditioning, solar energy, indoor air quality, and other topics related to refrigeration, building heating/cooling, and indoor air quality.

ME 4231. Motion Control Laboratory. (4.0 cr.; A-F or Audit; prereq 3281, 4031W, ME upper div; fall, spring, every year) Microprocessor programming, digital filters, frequency response testing, modeling of electromechanical systems, closed loop velocity and position control, programmable logic controllers, factory automation, open loop position control of a vibratory system using input shaping, closed loop position control using pole placement.


ME 4331. Thermal Energy Engineering Laboratory. (4.0 cr.; A-F or Audit; prereq 3331, 3332, 3333, 4031W, [ME upper div or grad student]; fall, spring, every year) Measurement/analysis of heat transfer in single phase, multiphase, reacting environments. Experimental measurements relevant to thermal/fluid systems, statistical design of experiments/uncertainty analysis. Heat exchange.

ME 4431W. Energy Conversion Systems Laboratory. (4.0 cr.; A-F or Audit; prereq 3333, 4031W, [ME upper div or grad student]; fall, spring, every year) Analyze operation/control of engines, power plants, heating/ventilation systems.

Performance characteristics of devices, measurement techniques. Interpretation of experimental data. Presentation of results.

ME 5070. Topics in Mechanical Engineering. (1.0-4.0 cr. [max 8.0 cr.]; prereq CSE upper div or grad student; fall, spring, every year) Specialized topics within areas of mechanical engineering. Emphasis on topics of current interest. Topics vary each semester.

ME 5101. Vapor Cycle Systems. (4.0 cr.; A-F or Audit; prereq CSE upper div or grad student; summer, offered periodically) Vapor compression and absorption refrigeration systems; heat pumps; vapor power cycle analysis, regeneration, reheat, compound cycle modifications, combinations gas turbine–vapor cycle systems.

ME 5103. Thermal Environmental Engineering. (4.0 cr.; A-F or Audit; prereq 3331 or 3332, 3333, CSE upper div or grad; fall, every year) Thermodynamic properties of moist air; psychrometric charts; HVAC systems; solar energy; human thermal comfort; indoor air quality; heating and cooling loads in buildings.

ME 5105. HVAC System Design. (4.0 cr.; A-F or Audit; prereq 5103, [CSE upper div or grad student]; spring, offered periodically) Design procedures used for heat exchangers, cooling towers, hydronic systems, and air handling systems. HVAC system design for a commercial building.

ME 5113. Aerosol/Particle Engineering. (4.0 cr.; A-F or Audit; prereq CSE upper div or grad student; fall, every year) Kinetic theory, definition, theory and measurement of particle properties, elementary particle mechanics, particle statistics; Brownian motion and diffusion, coagulation, evaporation and condensation, sampling and transport.

ME 5116. Cleanroom Technology and Particle Monitoring. (4.0 cr.; A-F or Audit; prereq CSE upper div or grad student; summer, offered periodically) Fundamentals of cleanroom technology for microelectronics manufacturing; airborne and liquid-borne particulate contaminants; particle monitors: optical and condensation particle counters, wafer surface scanner, microscopy; filter performance and testing; cleanroom design and operation; high purity systems; particle detection in processing equipment.


ME 5221. Computer-Assisted Product Realization. (4.0 cr.; A-F or Audit; prereq 3221, AEM 3031, CSci 1113, MatS 2001; fall, spring, every year) Injection molding with emphasis on design of manufacturing processes. Tooling design and specification of processing conditions using computer-based tools; process simulation software and computer-controlled machine tools. Simultaneous process and part design. Production of tooling and parts. Part evaluation.

ME 5223. Materials in Design. (4.0 cr.; prereq 3221, ME upper division or grad student; fall, every year) Fundamental properties of engineering materials. Fabrication, treatment, physical/corrosive properties. Failure mechanisms, cost/value analysis as related to material selection/specification.

ME 5228. Introduction to Finite Element Modeling, Analysis, and Design. (4.0 cr.; A-F or Audit; prereq 3221, AEM 3031, CSci 1113 or equiv, CSE upper div or grad; fall, spring, every year) Finite elements as principal analysis tool in computer-aided design (CAD); theoretical issues and implementation aspects for modeling and analyzing engineering problems encompassing stress analysis, heat transfer, and flow problems for linear situations. One-, two-, and three-dimensional practical engineering applications.

ME 5241. Computer-Aided Engineering. (4.0 cr.; A-F or Audit; prereq 3222, CSci 1113 or equiv, CSE upper div or grad; fall, spring, every year) Apply computer-aided engineering to mechanical design. Engineering design projects and case studies using computer-aided design and finite element analysis software; design optimization and computer-aided engineering software; graphical presentation of results.

ME 5243. Advanced Mechanism Design. (4.0 cr.; A-F or Audit; prereq CSE upper div or grad, 3222 or equiv, basic kinematics and dynamics of machines; knowledge of CAD packages such as Pro-E recommended; summer, offered periodically) Analytical methods of kinematic, dynamic, and kinetoelastodynamic analysis and synthesis of mechanisms. Computerized design for function, path, and motion generation based on Burmeister theory.


ME 5248. Vibration Engineering. (4.0 cr.; prereq CSE upper div or grad, 3281; summer, offered periodically) Apply vibration theory to design; optimize isolators, detuning mechanisms, viscoelastic suspensions and structures. Use modal analysis methods to describe free vibration of complex systems, relating to both theoretical and test procedures.
ME 5281. Analog and Digital Control. (4.0 cr.; prereq 3281; spring, every year) Continuous and discrete time feedback control systems. Frequency response, stability, poles and zeros; transient responses; Nyquist and Bode diagrams; root locus; lead-lag and PID compensators, Nicolas-Ziegler design method. Digital implementation aliasing; computer-aided design and analysis of control system.

ME 5286. Robotics. (4.0 cr.; A-F or Audit; prereq [3281 or equiv], [upper div ME or AEM or CSci or grad student]; spring, every year) Manipulator forward/inverse kinematics, homogeneous transformations, coordinate frames, Jacobian/velocity control, task primitives/programming, computational issues. Determining path trajectories. Reaction forces, manipulator dynamics/control. Vehicle kinematics, dynamics, and guidance. Lab project demonstrates concepts.


ME 5351. Computational Heat Transfer. (4.0 cr.; A-F or Audit; prereq 3333, CSE upper div or grad student; fall, spring, every year) Numerical solution of heat conduction/analogueous physical processes. Develop/use computer program to solve complex problems involving steady/unsteady heat conduction, flow/heat transfer in ducts, flow in porous media.

ME 5446. Introduction to Combustion. (4.0 cr.; A-F or Audit; prereq 3331, 3332, 3333, CSE upper div or grad student; fall, every year) Thermodynamics, kinetics, energy and mass transport, pollutants in reacting systems. Reactors, laminar and turbulent flames. Ignition, quenching, and flame stability. Diffusion flames. Combustion in reciprocating engines, furnaces, and turbines, with emphasis on internal combustion engine performance and emissions.

ME 5461. Internal Combustion Engines. (4.0 cr.; A-F or Audit; prereq CSE upper div or grad student, C or better in [3332, 3333] or 3324; spring, every year) Basic spark ignition and diesel engine principles, air, fuel-air and actual engine cycles, cycle modeling, combustion and emissions, knock phenomena, air flow and volumetric efficiency, mixture requirements, ignition requirements and performance. Lectures/complementary labs.

ME 5462. Gas Turbines. (4.0 cr.; A-F or Audit; prereq 3331, 3332, 3333, CSE upper div or grad student; fall, spring, offered periodically) Gas turbine cycles, regeneration, recuperation, reheat, intercooling, combined cycle plants, and thermochemical regeneration. Axial and radial flow compressors and turbines; combustor designs, energy analysis, emissions, and noise. Turbojet, fanjet, turboprop engine performance. Stationary power plants, vehicular propulsion, hybrid vehicles.

ME 5465. Energy-Resources, Technology and Society. (4.0 cr.; A-F or Audit; prereq 3333, [CSE upper division or grad]; fall, spring, every year) Scientific/technological underpinnings described/analyzed for 21st Century. Energy systems analysis, energy conversion technologies, availability analysis, renewable/non-renewable resources, environmental impacts, societal impacts of energy use patterns/energy policies.

ME 5666. Modern Thermodynamics. (4.0 cr.; A-F only; prereq 3331 or equiv; fall, spring, every year) Applications of thermodynamics to natural phenomena. Multiscale approach. Student group projects, with undergrads and grad students in same group. Three hours/week classroom instruction, one hour/week project discussion. Project presentations at weeks 8 and 14 are webcast.

MDI 5002. Medical Device Center Practicum I. (2.0 cr.; A-F only; prereq Grad MDI student; fall, spring, summer, every year) First of three part series of practicum courses for MDI program. Focus on teaching innovation, from engineering/business perspective. Cross-functional development of concepts/processes.

MDI 5003. Medical Device Center Practicum II. (2.0 cr.; A-F only; prereq Grad MDI student; fall, spring, summer, every year) Second of three part series of practicum courses for MDI program. Clinical Environment in which products for MDI program. Focus on teaching innovation, from engineering/business perspective. Cross-functional development of concepts/processes.

MDI 5004. Clinical Foundations of Medical Device Innovation. (3.0 cr.; A-F only; prereq MDI grad student; fall, spring, every year) Introduction to medical device function and design/development, marketing, legal, and regulatory environments. MDI program. Focus on teaching innovation, from engineering/business perspective. Cross-functional development of concepts/processes.
development, communication with functional managers, corporate executives/investors.

MDI 5050. Innovation Leadership and Human Dynamics. (2.0 cr.; A-F only; prereq Grad MDI student; fall, spring, summer, every year)
Develop confidence/capability to transition from technical experts to leaders of multi-disciplinary innovation teams/projects. Explore mindset, skill set/tool set needed to lead/manage oneself/project teams, lead change initiatives. Conflict management, effective communication, leveraging diverse strengths.

Medical Industry Leadership Institute (MILI)
Curtis L. Carlson School of Management

MILI 5589. Medical Technology Evaluation and Market Research. (2.0 cr.; A-F only; spring, every year)
Hands-on experience in creating a value proposition for new medical technologies. Leadership pathways in medical technology, insurance, and delivery industries. Personal input from industry leaders: United Health Group, Medtronic, and Mayo Clinic.

MILI 5990. The Healthcare Marketplace. (2.0 cr. [max 3.0 cr.]; A-F only; = [MILI 6990]; fall, spring, every year)
Physician services, hospital services, insurance, long-term care, pharmaceuticals and medical devices, and information technology. Lectures, discussions, and presentations from healthcare business leaders.

MILI 5995. Medical Industry Valuation Laboratory. (2.0 cr.; A-F only; prereq #; fall, spring, summer, every year)
Interdisciplinary student teams create rapid production market analysis of promising medical technologies/services to determine potential for success in market. Exposure to University innovations, venture firms, inventors.

MILI 5999. Independent Study. (1.0-8.0 cr.; A-F only; fall, spring, summer, every year)
Independent study.

Medical Laboratory Sciences Program (MLSP)
Academic Health Center Shared

MLSP 1010. Introduction to Medical Laboratory Science. (1.0 cr.; S-N only; fall, spring, summer, every year)
Introduction to medical laboratory sciences. Primary disciplines in field/areas of specialty practice. Career pathways explored in hospital laboratories, public health, research.

MLSP 5011W. Professional Issues in the Health Care Community. (2.0 cr.; A-F only; prereq Admission into MLS Program or #; spring, summer, every year)
History, disciplines, scope of practice, regulatory/licensure issues, medical ethics, inter-professional practice. Introduction to basic education theory, instructional design for laboratory practitioners.

MLSP 5012. Foundations in Interprofessional Communication and Collaboration. (1.0 cr.; A-F only; prereq Admission into MLS Program; fall, every year)
Interprofessional approach to health care. Online discussion topics. Directed group activities. Personal/professional image, teamwork, self/peer assessment, health professions, professional identity/integrity, relationships between professions/those they serve.

MLSP 5013. Scholarly Inquiry and Analysis in Medical Laboratory Sciences. (1.0 cr.; A-F only; prereq Admission into MLS program or #; fall, summer, every year)
Review concepts of scientific inquiry. Major steps of research project. How to select topics, evaluate literature, construct/test working hypothesis. Analyze/interpret data, report results. Quantitative, qualitative, mixed methods research design.

MLSP 5014W. Laboratory Operations and Management in Health Care Systems. (2.0 cr.; A-F only; prereq Admission into MLS program or #; fall, summer, every year)
Theory/practice of fiscal/personnel management for laboratory professionals. Includes introduction to laboratory information systems, legal aspects of test reporting. Government regulatory, certification, licensure, medical ethics of health care, accreditation policies.

MLSP 5111. Concepts of Diagnostic Microbiology. (3.0 cr.; A-F only; prereq [MICB 3301 or equivalent], [BIOC 3021 Biochemistry or equivalent] or #; fall, every year)
Presentation of medically significant human bacterial/yeast diseases. Epidemiology, physiology, pathogenic interactions between man/microorganism. Laboratory regulations, morphological characteristics, laboratory testing, mechanisms of antimicrobial therapy/resistance.

MLSP 5112. Application of Diagnostic Microbiology Principles. (2.0 cr.; A-F only; prereq Admission to MLS program; fall, every year)
Application in identification/treatment of microorganisms causing human diseases. Emphasis on aerobic/anaerobic bacteria, mycobacteria, yeast from various body sites. Specimen processing, culture workup, conventional microscopy, molecular/immunological techniques.

MLSP 5113. Advanced Concepts in Diagnostic Microbiology. (3.0 cr.; A-F only; prereq 5111 or #; spring, every year)
Physiology/pathogenic interactions between man/microorganism. Epidemiology, prevention, recovery, conventional, immunological, molecular identification methods/treatment of microorganisms involved in human diseases.

MLSP 5211. Fundamentals in Hematology & Hemostasis. (3.0 cr.; A-F only; prereq PHSL 3051 or #; fall, every year)

MLSP 5212. Application of Hematology & Hemostasis Principles. (1.0 cr.; A-F only; prereq &5211 and admission to MLS program; fall, every year)
Theory, performance, application of common hematology/hemostatic diagnostic procedures. Interpretation/correlation of laboratory findings. Venipuncture, cell counting, white blood cell differential, red/white blood cell morphology interpretation, coagulation studies.

MLSP 5213. Diagnostic Hematology. (3.0 cr.; A-F only; prereq [5211, 5212] or #; spring, every year)
Blood/bone marrow in assessment of hemotologic function/disease. Major focus on normal development/differentiation, abnormal changes found in disease. Cytochemical stains, flow cytometry, cytogenetics, molecular diagnostics.

MLSP 5214. Advanced Hematology Morphology. (1.0 cr.; A-F only; prereq [5211, 5212, &5213] or #; spring, every year)
Blood/bone marrow in assessment of hemotologic function/presence of disease. Major focus on normal development/differentiation, abnormal changes in pathologic conditions. Cytochemical stains, flow cytometry, cytogenetics, molecular diagnostics.

MLSP 5311. Fundamental Biomedical Laboratory Techniques. (4.0 cr.; A-F only; prereq 8 credits General Chemistry, 6 credits Organic Chemistry, 3 credits Biochemistry; spring, summer, every year)
Principles of good laboratory practice, experimental design/standard operating procedures, laboratory technical skills, safety, process control. Analytical techniques include colorimetry, chromatography, electrochemical, immunologic, nucleic acid techniques.

MLSP 5312. Body Fluid Analysis. (2.0 cr.; A-F only; prereq 8 credits General Chemistry, 6 credits Organic Chemistry, 3 credits Biochemistry, Successful completion of 5311 with grade of C or higher; fall, every year)
Formation of urine/body fluids, changes that occur in disease, testing used for diagnosis/treatment. Correlation of test results with clinical information discussed. Laboratory skills in body fluid analysis introduced.

MLSP 5313. Chemical Analysis in Health and Disease. (3.0 cr.; A-F only; prereq 8 credits General Chemistry, 6 credits Organic Chemistry, 3 credits Biochemistry; spring, every year)

MLSP 5511. Principles of Immunobiology. (3.0 cr.; A-F only; prereq PHSL 3051 or #; fall, every year)
Immune system function, immunologic/serologic testing. Immunologic techniques utilized in various clinical laboratory settings.

MLSP 5513. Transfusion Medicine Principles and Methods. (3.0 cr.; A-F only; prereq [5511, upper level genetics course] or #; spring, every year)


**MLSP 5701. Clinical Experience in Microbiology.** (2.0 cr.; S-N only; prereq Advanced standing in MLS program; fall, spring, summer, every year) Gain practical experience, apply technical competencies learned on campus to microbiology laboratory. Develop entry-level competencies/assist in making transition to clinical practitioner. Guided by clinical preceptors/university faculty.

**MLSP 5702. Clinical Experience in Hematology and Hemostasis.** (2.0 cr.; S-N only; prereq Advanced standing in MLS program; fall, spring, summer, every year) Gain practical experience/apply technical competencies learned on campus to Hematology laboratory. Designed to develop entry-level competencies/assist students in making transition to clinical practitioner. Course guided by clinical preceptors/university faculty.

**MLSP 5703. Clinical Experience in Clinical Chemistry and Urinalysis.** (2.0 cr.; S-N only; prereq Advanced standing in MLS program; fall, spring, summer, every year) Gain practical experience/apply technical competencies learned on campus to Chemistry laboratory. Designed to develop entry-level competencies/assist student in making transition to clinical practitioner. Course guided by clinical preceptors/university faculty.

**MLSP 5704. Clinical Experience in Transfusion Medicine.** (2.0 cr.; S-N only; prereq Advanced standing in MLS program; fall, spring, summer, every year) Gain practical experience/apply technical competencies learned on campus to Transfusion Medicine lab. Designed to develop entry-level competencies/assist in making transition to clinical practitioner. Course guided by clinical preceptors/university faculty.

**MLSP 5801. Advanced Practicum Experience in Specialty Disciplines.** (1.0 cr.; S-N only; prereq Advanced standing in MLS program; fall, spring, summer, every year) Advanced practicum experience. Restricted enrollment. Students can select variety of specialty sub-disciplines of MLS including cytogenetics, flow cytometry, molecular diagnostics, toxicology, virology, education, management, research, public health, bone marrow tissue transplantation.

**Medical Physics (MPHY)**

**Medical School**

**MPHY 5138. Research Seminar.** (1.0-5.0 cr.; S-N or Audit; fall, every year) Topics introduce techniques/goals of biophysical sciences and medical physics. Lectures/demonstrations.

**MPHY 5139. Seminar and Journal Club.** (1.0 cr. [max 2.0 cr.]; S-N or Audit; spring, every year) Current research/topics related to goals/methods of biophysical sciences and medical physics. Lectures/discussions.

**MPHY 5170. Basic Radiological Physics.** (3.0 cr.; =TRAD 7170; prereq; fall, every year) Theoretical/experimental aspects of radiological physics. Physical properties of various ionizing radiations, interactions of ionizing radiations with matter, methods of radiation dose measurement.

**MPHY 5171. Medical and Health Physics of Imaging I.** (3.0 cr.; =TRAD 7171; prereq 5170 or #; fall, every year) Physics of diagnostic imaging: specification/quantification of image quality, X-ray production, image receptors, magnetic resonance imaging, radiation exposure and protection. Special imaging techniques, including mammography, computed tomography, and direct digital image capture.

**MPHY 5172. Radiation Biology.** (3.0 cr.; TRAD 7172; prereq 5170 or #; fall, every year) Effects of ionizing radiation on cells, tissues, and organisms. Biochemical/physiological bases of radiation effects. Biological rationale for radiation therapy practices.

**MPHY 5173. Medical and Health Physics of Radiation Therapy.** (3.0 cr.; =TRAD 7173; prereq 5170 or #; spring, every year) Measurements of radiation quality, output, and depth dose distributions for clinical use. Treatment parameter calculation. Beam modification and shaping. Treatment planning for fixed field and rotational therapy in external beam, intracavitary, and interstitial therapy. Computer applications in treatment planning. Principles/criteria for radiation protection.

**MPHY 5174. Medical and Health Physics of Imaging II.** (3.0 cr.; =TRAD 7174; prereq 5170 or #; spring, every year) Physics of diagnostic imaging. Ultrasound, theoretical/experimental applications of radionuclides in medicine and biology. Counting statistics and imaging systems associated with radiopharmaceuticals, radiation dosimetry, and safety in nuclear medicine.

**MPHY 5177. Radiation Therapy Physics Lab: Radiation Physics Basics.** (3.0 cr.; A-F only; prereq 5170 or 5173 or #; spring, every year) This course provides students hands-on experience with Hardware/software used in radiation therapy clinic for physics measurements.

**Medicinal Chemistry (MEDC)**

**College of Pharmacy**

**MEDC 5185. Principles of Biomolecular Simulation.** (3.0 cr.; prereq Chem 3502 or #; Molecular simulation for students in medicinal chemistry, pharmaceutics, biochemistry, and chemical physics.

**MEDC 5245. Introduction to Drug Design.** (3.0 cr.; A-F or Audit; =CHEM 5245, PHAR 6245) Concepts that govern design/discovery of drugs. Physical, bioorganic, medicinal chemical principles applied to explain rational design, mechanism of action drugs.

**MEDC 5494. Advanced Methods in Quantitative Drug Analysis.** (2.0 cr.; A-F or Audit; fall, spring, offered periodically) Quantitative methods (HPLC, GC, TLC, immunoassays) for analysis of drugs/metabolites in biological fluids. Advanced techniques such as capillary electrophoresis, supercritical fluid chromatography, GC-MS, LC-MS, tandem mass spectrometry. Chromatographic theory/statistical approaches to method validation.

**MEDC 5495. Vistas in Medicinal Chemistry Research.** (1.0 cr.; S-N or Audit; fall, every year) Selected topics of contemporary interest in medicinal chemistry.

**MEDC 5710. General Principles of Medicinal Chemistry.** (2.0 cr.; A-F or Audit; prereq MedC grad student or #) Fundamental principles of enzyme inhibitors, combinatorial chemistry and library design, drug receptor interactions and signal transduction mechanisms, and molecular modeling.

**Medieval Studies (MEST)**

**College of Liberal Arts**

**MEST 1002. Medieval Tales and their Modern Echoes.** (3.0 cr.; =MEST 3002, HIST 1102, HIST 3102) Knights of the Round Table, dragon-slayers, magic djinn, pilgrims in Hell. How these stories have been retold in modern fiction, film, and the arts. Texts from Europe and other regions of globe.

**MEST 1200. Topics.** (3.0-4.0 cr.; spring, offered periodically) See Course Guide for specific topic titles.

**MEST 1905. Freshman Seminar.** (3.0 cr.; A-F or Audit; prereq Fr; fall, spring, offered periodically) Topics specified in Class Schedule.

**MEST 3002. Medieval Tales and their Modern Echoes.** (3.0 cr.; =HIST 1102, HIST 3102, MEST 1002) Knights of the Round Table, dragon-slayers, magic djinn, pilgrims in Hell. How these stories have been retold in modern fiction, film, and the arts. Texts from Europe and other regions of globe.
MICB 3301. Biology of Microorganisms. (3.0 cr.; A-F or Audit; =MICB 3301, VBS 2032, 2032 or [Biol 4003 or BIOL 4004] or #; spring, summer, every year) Taxonomy, anatomy, physiology, biochemistry, pathogenesis, immunology, ecology of microbes. Molecular structure in relation to bacterial function/disease. Includes lab.

MICB 3303. Biology of Microorganisms. (3.0 cr.; A-F only; =MICB 3301, VBS 2032, BIOL 3022; prereq [Biol 1002 or BIOL 1009 or BIOL 2003], [CHEM 2301 or BIOC 2331]; fall, spring, summer, every year) Taxonomy, anatomy, physiology, biochemistry, pathogenesis, immunology, ecology of microbes. Molecular structure in relation to bacterial function/disease. Includes lab.

MICB 4111. Microbial Physiology and Diversity. (3.0 cr.; prereq [2022 or VPB 2022 or Biol 2032 or VPB 2032 or VBS 2032 or 3301 or Biol 3031], [BioC 3021 or Biol 3021 or BioC 4331]; fall, every year) Structural/functional organization of bacteria/archaea. Energy metabolism utilizing light, inorganic/organic chemicals. Cell morphologies, roles/assembly of surface structures. Growth/survival mechanisms in various extreme environments. Adaptation to changing conditions by development of specialized cells/structures, altering metabolic patterns.

MICB 4131. Immunology. (3.0 cr.; [VPM 4311]; prereq [2022 or VPB 2022 or Biol 2032 or VPB 2032 or VBS 2032 or 3301 or MicB 3301], [BioC 3021 or Biol 3021 or BioC 4331]; fall, every year) Molecular, genetic, cellular bases for humoral/cell-mediated immunity. Innate immunity. Antigen recognition by B/T lymphocytes. Interactions between lymphocytes/other cells of immune system. Cytokines. Immunoregulation. Key aspects of clinical immunology.


MICB 4225W. Advanced Laboratory: Microbial Genetics. (3.0 cr.; A-F only; prereq 3301, BIOL 4003; fall, every year) Yeast is used as model organism for microbial molecular genetic principles such as selection of mutants, meiotic mapping, mitotic recombination, and gene replacement. Hands-on experimentation.

MICB 4793W. Directed Studies: Writing Intensive. (1.0-7.0 cr.; S-N or Audit; prereq #; no more than 7 cr of [4793, 4974, 4993, 4994] may count toward major requirements; fall, spring, summer, every year) Individual study on selected topics or problems. Emphasizes readings, use of scientific literature.

MICB 4794W. Directed Research: Writing Intensive. (1.0-7.0 cr.; max 15.0 cr.; S-N or Audit; prereq #; %; no more than 7 cr of [4793, 4974, 4993, 4994] may count toward major requirements; fall, spring, summer, every year) Lab or field investigation of selected areas of research.

MICB 4993. Directed Studies. (1.0-6.0 cr.; max 36.0 cr.; S-N only; prereq 3301, %; fall, spring, summer, every year) Individual study on selected topics or problems. Emphasizes selected readings, scientific literature.

MICB 4994. Directed Research. (1.0-7.0 cr. max 28.0 cr.; S-N or Audit; prereq 3301, #; fall, spring, summer, every year) Lab or field investigation of selected areas of research.
Mil 103. MS I Zero Credit Lead Lab. (0.0 cr.; A-F only; prereq &1101; fall, every year) Army ROTC leadership and personal development lab.

Mil 104. MS I Zero Credit Lead Lab. (0.0 cr.; A-F only; prereq &1102; spring, every year) Army ROTC leadership and personal development lab.

Mil 203. MS II Zero Credit Lead Lab. (0.0 cr.; A-F only; prereq &1201; fall, every year) Army ROTC leadership and personal development lab.

Mil 204. MS II Zero Credit Lead Lab. (0.0 cr.; A-F only; prereq &1202; spring, every year) Army ROTC leadership and personal development lab.

Mil 303. MS III Zero Credit Lead Lab. (0.0 cr.; A-F only; prereq Completion of basic courses, &3301; fall, every year) Army ROTC leadership and personal development lab.

Mil 304. MS III Zero Credit Lead Lab. (0.0 cr.; A-F only; prereq Completion of basic courses, &3302; spring, every year) Army ROTC leadership and personal development lab.

Mil 403. MS IV Zero Credit Lead Lab. (0.0 cr.; A-F only; prereq Completion of basic courses, &3401; fall, every year) Army ROTC leadership and personal development lab.

Mil 404. MS IV Zero Credit Lead Lab. (0.0 cr.; A-F only; prereq Completion of basic courses, &3402; spring, every year) Army ROTC leadership and personal development lab.

Mil 1003. Military Science I Leadership Lab. (1.0 cr.; A-F only; prereq &1201; fall, every year) Basic skills. Preview advanced course. Team-building leadership skills.

Mil 1005. Military Science III Leadership Lab. (1.0 cr.; prereq Enrollment in 3130; fall, every year) Involves leadership responsibilities for the planning, coordination, execution, and evaluation of various training and activities with Basic Course students and for the ROTC program. Students develop, practice, and refine leadership skills by serving and being evaluated in a variety of responsible positions.

Mil 1007. Military Science IV Leadership Lab. (1.0 cr.; prereq Enrollment in 3140; fall, every year) Involves leadership responsibilities for the planning, coordination, execution, and evaluation of various training and activities with Basic Course students and for the ROTC program. Students develop, practice, and refine leadership skills by serving and being evaluated in a variety of responsible positions.

Mil 1101. Leadership and Personal Development. (1.0 cr.; A-F only; fall, every year) Introduces cadets to the personal challenges and competencies that are critical for effective leadership. Cadets learn how the personal development of life skills such as critical thinking, goal setting, time management, physical fitness, and stress management relate to leadership, officership, and the Army profession.

Mil 1102. Introduction to Tactical Leadership. (1.0 cr.; A-F only; spring, every year) Leadership fundamentals such as setting direction, problem-solving, listening, presenting briefs, providing feedback, and using effective writing skills. Cadets explore dimensions of leadership attributes and core leader competencies in the context of practical, hands-on, and interactive exercises.

Mil 1104. MS I One Credit Lead Lab. (1.0 cr.; A-F only; prereq &1102; spring, every year) Army ROTC leadership and personal development lab.

Mil 1201. Innovative Team Leadership. (2.0 cr.; A-F only; prereq &lab; fall, every year) Explores the dimensions of creative and innovative tactical leadership strategies and styles by examining team dynamics and two historical leadership theories that form the basis of the Army leadership framework (trait and behavior theories). Cadets practice aspects of personal motivation and team building in the context of planning, executing, and assessing team exercises and participating in leadership labs.

Mil 1202. Foundations of Tactical Leadership. (2.0 cr.; A-F only; prereq Must enroll in lab.; spring, every year) Examines the challenges of leading tactical teams in the complex contemporary operating environment (COE). Highlights dimensions of terrain analysis, patrolling, and operation orders. Further study of the theoretical basis of the Army Leadership Requirements Model explores the dynamics of adaptive leadership in the context of military operations.

Mil 1203. MS II One Credit Lead Lab. (1.0 cr.; A-F only; prereq &1201; fall, every year) Army ROTC leadership and personal development lab.

Mil 1204. MS II One Credit Lead Lab. (1.0 cr.; A-F only; prereq &1202; spring, every year) Army ROTC leadership and personal development lab.

Mil 3301. Adaptive Tactical Leadership. (3.0 cr.; A-F only; prereq Two yrs of ROTC or equiv established by U.S. Army, must see Army ROTC dept officials, &lab; fall, every year) Challenges cadets to study, practice, and evaluate adaptive leadership skills as they are presented with challenging scenarios related to squad tactical operations. Cadets receive systematic and specific feedback on their leadership attributes and actions. Based on such feedback, as well as their own self-evaluations, cadets continue to develop their leadership and critical thinking abilities.

Mil 3302. Applied Team Leadership. (3.0 cr.; A-F only; prereq Two yrs of ROTC or equiv established by U.S. Army, must see Army ROTC dept officials, &lab; spring, every year) Uses increasingly intense situations applying team leadership challenges to build cadet awareness and skills in leading tactical operations at the small unit level. Cadets review aspects of full spectrum operations, conduct military briefings, and develop proficiency in the operation orders process.

Mil 3303. MS III One Credit Lead Lab. (1.0 cr.; A-F only; prereq Completion of basic courses, &3301; fall, every year) Army ROTC leadership and personal development lab.

Mil 3304. MS III One Credit Lead Lab. (1.0 cr.; A-F only; prereq Completion of basic courses, &3302; spring, every year) Army ROTC leadership and personal development lab.

Mil 3401. Developing Adaptive Leaders. (3.0 cr.; A-F only; prereq Completed all other military courses or Army equiv, &lab; fall, every year) Cadets learn duties and responsibilities of an Army staff officer and apply the military decision making process, Army writing style, and the Army’s principles of training and training management cycle during weekly training meetings to plan, execute, and assess battalion training events. Cadets learn about the special trust proposed by the U.S. Constitution to Army officers—a trust above and beyond other professions.

Mil 3402. Leadership in a Complex World. (3.0 cr.; A-F only; prereq Completion of all other military courses or Army equiv, &lab; spring, every year) Explores dynamics of leading in complex situations of current military operations in the contemporary operation environment (COE). Cadets examine differences in customs and courtesies, principles of war, and rules of engagement in the face of international terrorism and aspects of interacting with non-government organizations, civilians on the battlefield, and host nation support.

Mil 3403. MS IV One Credit Lead Lab. (1.0 cr.; A-F only; prereq Completion of basic courses, &3401; fall, every year) Army ROTC leadership and personal development lab.

Mil 3404. MS IV One Credit Lead Lab. (1.0 cr.; A-F only; prereq Completion of basic courses, &3402; spring, every year) Army ROTC leadership and personal development lab.

Mil 3501. Marksmanship Training Programs. (2.0 cr.; A-F only; fall, spring, every year) Uses a laser-simulated Army rifle to train on how to fire weapons accurately. Students learn...
MIL 3970. Military History. (3.0 cr.; A-F only; fall, spring, every year) General overview of all wars fought by United States from the 18th century Revolutionary War to today's War on Terror. Military tactics as well as war's impact on society. Two exams, two papers to write, readings.

Mortuary Science (MORT)

MORT 3005. History of Funeral Service. (2.0 cr.; A-F or Audit; fall, spring, summer, every year) Development of funeral practices from a historical perspective with emphasis on ethnic and cultural groups that have had an impact on contemporary funeral service.

MORT 3012W. Organization and Management of Funeral Business. (3.0 cr.; A-F only; prereq Mortuary science major; fall, spring, every year) How to create an entrepreneurial marketing strategy and business plan for a small funeral business. Various forms of ownership. Financial requirements, risk management, human resources management. Theory supplemented with practical information, real-life experiences.

MORT 3014. Funeral Service Rules and Regulations. (2.0 cr.; A-F only; prereq Mortuary science major; fall, spring, summer, every year) Licensing/government regulations, compliance with regulations of state/federal regulatory agencies, cemetery and crematory rules and regulations, and Federal Trade Commission Funeral Practice Rule for the funeral industry.

MORT 3016. Funeral Service Marketing and Merchandising. (3.0 cr.; A-F or Audit; prereq Mortuary science major; fall, spring, every year) Introduction to key elements of funeral service merchandising/marketing. How to manage delivery process. Theory supplemented with contemporary product offerings, merchandising techniques.


MORT 3021W. Funeral Service Psychology. (3.0 cr.; A-F only; prereq Introductory course in general psychology; fall, spring, every year) Principles of psychology/counseling related to funeral service. Grief, bereavement, mourning, aftercare, crisis intervention.


MORT 3048. Microbiology and Pathology for Funeral Service. (4.0 cr.; A-F only; prereq General biology course with lab; fall, spring, every year) Basic principles of microbiology/pathology for funeral service, including bacteriology, rickettsiology, virology, protozoology, mycology, methods of transmission of infectious disease. Control procedures for protection of public health as related to funeral practice. Scientific focus on causes of disease, mechanisms of disease development, pathways by which morphologic changes occur.

MORT 3049. Microbiology. (2.0 cr.; A-F or Audit; prereq General biology course w/ lab. Students who have already taken a microbiology course are exempt from this course.; fall, spring, summer, every year) Basic principles of microbiology. Bacteriology, rickettsiology, virology, protozoology, mycology. Methods of transmission of infectious diseases. Control procedures for protection of public health as related to funeral service practice.

MORT 3050. Pathology. (3.0 cr.; A-F only; prereq General biology course w/ lab; fall, spring, every year) Scientific focus on causes of disease, mechanisms of disease development, and pathways by which morphologic changes occur.
MORT 3051. Restorative Art. (2.0 cr.; A-F only; prereq [3171 or &3171], &3061, mortuary science major; fall, spring, every year)
Theories, principles, and techniques related to process of preparing human remains for viewing.

MORT 3061. Embalming Theory. (3.0 cr.; A-F only; prereq [3171 or &3171], &3051, mortuary science major; fall, spring, every year)
Process of chemically treating human remains to reduce presence/growth of microorganisms, to temporarily inhibit organic decomposition, and to restore decedent's physical appearance.

MORT 3065. Embalming Chemistry. (2.0 cr.; A-F only; prereq Intro course in general chemistry; fall, spring, summer, every year)

MORT 3090. Independent Study Project. (1.0-15.0 cr.; max 30.0 cr.; prereq Mortuary science major; fall, spring, summer, every year)
Independent study contracted between instructor, program director, and student.

MORT 3091W. Independent Study in Funeral Service. (1.0-4.0 cr.; prereq Mortuary science major; fall, spring, summer, every year)
Students complete a project supervised by a faculty member. Credit(s) is negotiated with the faculty member based on the size and scope of the project. Students must demonstrate that the project has value within the major.

MORT 3151. Restorative Art Laboratory. (1.0 cr.; max 2.0 cr.; A-F only; prereq [3171 or &3171], &3051, mortuary science major; fall, spring, every year)
Principles/techniques for restorative art. Modeling facial features with clay or wax. Use of restorative techniques. Cosmetic application on human remains.

MORT 3161. Embalming Laboratory. (1.0 cr.; max 2.0 cr.; A-F only; prereq [3171 or &3171], &3061, mortuary science major; fall, spring, every year)
Practices/procedures of chemically preserving/restoring human remains.

MORT 3171. Human Anatomy Laboratory. (2.0 cr.; A-F or Audit; prereq 4 cr of biology, 3 cr of human anatomy; fall, every year)

MORT 3370. Death and Dying Across Cultures and Religions. (3.0 cr.; A-F only; fall, every year)
How people of differing racial, ethnic, and cultural backgrounds understand meaning of death. How disposition of human remains occurs.

MORT 3379. Clinical Funeral Service Rotation. (1.0-4.0 cr.; max 12.0 cr.; A-F only; prereq 3021W, 3051, 3061, 3151, 3161, 3171, 3370, mortuary science major; fall, spring, summer, every year)
Practical experience working in clinical settings related to funeral service. What it means to be a funeral director in contemporary American society.

MORT 3380. Funeral Service Practicum. (8.0 cr.; S-N or Audit; prereq Mortuary science major who has completed all other coursework; fall, spring, summer, every year)
Practical experience during one academic term in a funeral home as assigned by the program.

Moving Image Studies (MIMS)
College of Liberal Arts

MIMS 5002. Advanced Film Analysis. (0.0-4.0 cr.; A-F only; prereq Grad student status; spring, every year)
Application of textual analysis to the reading of a film. Students work collaboratively to discern and interpret all component aural/visual elements of what the film says and how it says it.

MIMS 5910. Topics in Moving Image Studies. (2.0-4.0 cr.; max 8.0 cr.; A-F only; fall, spring, every year)
Special topics in moving image studies.

Multidisciplinary Studies (MDS)
College of Continuing Education

MDS 3001W. Introduction to Multidisciplinary Studies. (3.0 cr.; A-F only; prereq Admitted to multidisciplinary studies; fall, spring, summer, every year)
University study at a major research institution, its history/theory and expectations/outcomes. Students design their degree and select areas/courses. Institutional/student perspectives.

MDS 3093. Directed Study. (1.0-15.0 cr.; A-F only; prereq #; fall, spring, summer, every year)
Independent, directed study.

MDS 3101. Project Development. (1.0 cr.; max 5.0 cr.; A-F only; prereq 3001W, MDS major, adviser referral, permission number, basic computer/internet skills; fall, spring, summer, every year)
Development, completion, approval of MDS project proposal. Steps/skills of academic project design/development including academic research/writing. Library data base searching methods/citation styles.

MDS 3201. Project Registration 1. (3.0 cr.; A-F only; prereq 3001W, MDS major, C- or above in 3101, approved project proposal, permission number, basic computer/internet skills; fall, spring, summer, every year)
Complete project developed in MDS 3101 by conducting research, accomplishing project outcome(s), securing narrative evaluation from project adviser/evaluator.

MDS 3202. Project Registration 2. (3.0 cr.; A-F only; prereq 3001W, MDS major status, C- or above in 3101, approved project proposal, permission number, basic computer/internet skills; fall, spring, summer, every year)
Complete project developed in MDS 3101 by conducting research, accomplishing project outcome(s), securing narrative evaluation from project adviser/evaluator.

Museum Studies (MST)
College of Design

MST 5011. Museum History and Philosophy. (3.0 cr.; A-F or Audit; prereq #; fall, every year)
Historical and philosophical roots of museum development in Europe and North America from the Renaissance to modern day museums and history centers. Emerging philosophical issues faced by museums today.

MST 5012. Museum Practices. (3.0 cr.; A-F or Audit; prereq Grad student or #; spring, every year)
Practical aspects of museum work. Standards, practices, responsibilities, issues, all set in greater museum context. Curatorial/educational duties, collections management, security, funding, boards, public relations, installation, budgeting.

MST 5020. Internship. (1.0-6.0 cr.; max 32.0 cr.; S-N or Audit; prereq 5011, 5012, %; fall, spring, summer, every year)
Students arrange to perform a professional-level task in a museum of good standing under close supervision of a member of the museum's professional staff. Instructor must approve a work plan and report.

Music (MUS)
College of Liberal Arts

MUS 440. Chamber Ensemble Registration. (0.0 cr.; No Grade Associated; fall, spring, summer, every year)
Registration mechanism for chamber ensembles.

MUS 901. Junior Recital. (0.0 cr.; A-F or Audit; prereq Music major, & applied music, #, %; fall, spring, summer, every year)
Preparation for junior recital. Student will be supervised by major applied instructor.

MUS 951. Senior Recital. (0.0 cr.; A-F or Audit; prereq Music major, & applied music, #, %; fall, spring, summer, every year)
Preparation for senior recital. Student will be supervised by major applied instructor.

MUS 1001. Fundamentals of Music. (3.0 cr.; prereq For non-music majors; fall, spring, summer, every year)
Study of music notation and fundamental concepts underlying musical structure. Intervals, clefs, chords, scales, cadences, harmonic analysis; rhythm and meter. Emphasis on active participation: playing the piano, singing, clapping rhythms, aural perception. Weekly lab assignments in vocal and piano performance.
MUS 1013. Rock I: The Historical Origins and Development of Rock Music to 1970. (3.0 cr.; A-F or Audit; fall, summer, every year) Musical, cultural, historical, social, and political evolution of rock music, from its traceable antecedents in mid-19th century America through the early 1970s. Emphasizes manner in which African, European, and other ethnic traditions combined in a uniquely American manner.


MUS 1021. Introduction to Music. (3.0 cr.; =MUS 3021); fall, spring, summer, every year) Survey of European/American "art," "popular" music in context of those cultures. Aural analyses of musical styles/forms.

MUS 1051. Class Piano for Nonmusic Majors I. (2.0 cr.; Student Option No Audit; fall, spring, summer, every year) For nonmusic majors with little or no keyboard background. Functional skills such as reading, harmonizing, playing by ear and improvising, along with basic technique and study of elementary solo and ensemble repertoire.

MUS 1052. Class Piano for Non Music Majors II. (2.0 cr.; Student Option No Audit; fall, spring, every year) For nonmusic majors with little or no keyboard background. Functional skills such as reading, harmonizing, playing by ear and improvising, along with basic technique and study of elementary solo and ensemble repertoire.

MUS 1151. Piano: Class Lessons I. (2.0 cr.; A-F or Audit; fall, every year) Functional skills such as reading, transposing, harmonizing, improvising, and playing by ear. Keyboard theory, technique, and repertoire.

MUS 1152. Piano: Class Lessons II. (2.0 cr.; A-F or Audit; spring, every year) Functional skills such as reading, transposing, harmonizing, improvising, and playing by ear. Keyboard theory, technique, and repertoire.

MUS 1155. Keyboard Skills I. (2.0 cr.; A-F or Audit; fall, every year) Reading, transposing, harmonizing, improvising, playing by ear. Keyboard theory, technique, music learning skills.

MUS 1260. Voice Class. (2.0 cr. [max 4.0 cr.]; prerequisite Basic musicianship for learning and performing simple songs; fall, spring, every year) The fundamentals of speech and singing including information about the vocal instrument, the vocal process, vocal technique, and how to learn and perform three simple songs.

MUS 1471. Guitar: Class Lessons I. (2.0 cr.; A-F or Audit; fall, spring, every year) Fundamentals for the beginning guitarist; progressive development of skills. Basic strumming techniques, harmonizations in basic keys. Students must furnish acoustic guitar.

MUS 1472. Guitar: Class Lessons II. (2.0 cr.; A-F or Audit; prerequisite 1471 or #; spring, every year) Fundamentals for the beginning guitarist; progressive development of skills. Advanced strumming techniques, bass runs, finger-picking strums. Students must furnish acoustic guitar.

MUS 1501. Theory and Analysis of Tonal Music I. (2.0 cr.; A-F or Audit; prerequisite; fall, summer, every year) Common-practice tonal harmony, part-writing, music analysis in various contexts.

MUS 1502. Theory and Analysis of Tonal Music II. (2.0 cr.; A-F or Audit; prerequisite [1501, 1511 with grade of at least C-] or diagnostic test administered by School of Music; spring, summer, every year) Develop basic music vocabulary. Chromatic harmonic, contrapuntal/voice leading principles in common-practice music (Corelli to Brahms). Analyze chromatic progressions/contrapuntal functions in a variety of textures/styles. Proficiency in keyboard skills.

MUS 1511. Ear-Training and Sight-Singing I. (1.0 cr.; A-F or Audit; prerequisite; fall, summer, every year) Introduction to foundations of ear-training/sight-singing.

MUS 1512. Ear-Training and Sight-Singing II. (1.0 cr.; A-F or Audit; prerequisite [1501, 1511 with grade of at least C-] or diagnostic exam administered by School of Music; [music major or #]; spring, summer, every year) Develop basic music vocabulary. Chromatic harmonic, contrapuntal/voice leading principles in common-practice music (Corelli to Brahms). Analyze chromatic progressions, rhythms, melodies, contrapuntal functions. Proficiency in keyboard skills.

MUS 1801W. Music, Society, and Cultures. (3.0 cr.; A-F or Audit; prerequisite [Music major or #], permission number; fall, every year) Study rural, urban, tribal musics throughout world with interdisciplinary methods of humanities/social sciences. World-wide distribution of musical creativity with audio/video documentation.

MUS 1804. World Music. (3.0 cr.; spring, every year) Musical practice/measuring around the world and in our backyard. World music styles/perspectives in cultural context. Lectures, in-class music making, guest artists, videos, listening.

MUS 1902. Topics: Freshman Seminar. (3.0 cr.; A-F or Audit; prerequisite freshman; fall, spring, offered periodically) Topics specified in Class Schedule.

MUS 1904. Freshman Seminar. (3.0 cr.; max 6.0 cr.; A-F only; prerequisite Fr; fall, spring, offered periodically) Topics vary.

MUS 1905. Topics: Freshman Seminar. (3.0 cr.; A-F or Audit; prerequisite freshman; fall, spring, every year) Topics specified in Class Schedule.

MUS 1907W. Topics: Freshman Seminar. (3.0 cr.; A-F or Audit; prerequisite freshman; spring, every year) Topics specified in Class Schedule.

MUS 1908W. Topics: Freshman Seminar. (3.0 cr.; max 6.0 cr.; A-F or Audit; prerequisite; fall, offered periodically) Topics specified in Class Schedule.

MUS 1909W. Topics: Freshman Seminar. (3.0 cr.; A-F or Audit; prerequisite; fall, spring, offered periodically) Topics specified in Class Schedule.

MUS 1910W. Topics: Freshman Seminar. (3.0 cr.; A-F or Audit; prerequisite freshman; fall, spring, offered periodically) Topics specified in Class Schedule.

MUS 3021. Introduction to Music. (3.0 cr.; =MUS 1021); fall, spring, summer, every year) Survey of European and American "art" and "popular" music in the context of those cultures; aural analyses of musical styles and forms.

MUS 3029. American Music Cultures. (3.0 cr.; fall, every year) Explore folk, country, gospel, blues, polka, klezmer, powwow, mariachi, and salsa to understand the ways in which ethnic identities coalesce and find expression in sound. Music cultures of nationally prominent European-, African-, Asian-, and Latin-American ethnic groups, and local communities in the Twin Cities metropolitan area.


MUS 3200. Campus Singers. (2.0 cr. [max 16.0 cr.]; fall, spring, every year) Campus Singers is a non-auditioned ensemble and open to all members of the University community, including students, faculty, staff, and alumni. The Campus Singers sing diverse repertoire from various periods/cultures.

MUS 3230. Chorus. (1.0-2.0 cr. [max 16.0 cr.]; prerequisite Choral and/or instrumental music background, audition; #; fall, spring, every year)
Includes the University Women's Chorus, Men's Chorus, Concert Choir, and Choral Union. Choirs participate in a variety of programs exploring both Western and non-Western repertoire from the Middle Ages through the 20th century. Concerts include touring, and collaborative campus and community performances.

MUS 3241. Vocal Literature (German Lieder) and Pedagogy. (1.0 cr.; A-F or Audit; prereq [Vocal performance or accompanying major], 2 yrs music theory/history; fall, offered periodically)


MUS 3242. Vocal Literature (French Melodie) and Pedagogy. (1.0 cr.; A-F or Audit; prereq [Vocal music or accompanying major], 2 yrs of music theory/history; spring, offered periodically)


MUS 3261. Italian Diction for Singers. (1.0 cr.; A-F or Audit; prereq Voice or choral music major, & applied voice; fall, every year)

The sounds and symbols of the International Phonetic Alphabet, rules for correct Italian lyric diction, rudimentary Italian grammar, the meanings of Italian musical expressive markings, and Italian words most commonly found in song texts.

MUS 3262. English Diction for Singers. (1.0 cr.; A-F or Audit; prereq Voice or choral music major, & applied voice; spring, every year)

English lyric diction for performance of classical vocal music. Use International Phonetic Alphabet for standard transcriptions of song texts, compile a discography of Britis/h American art songs, perform songs in class, and prepare poetry for oral presentation and improvisation.

MUS 3263. German Diction for Singers. (1.0 cr.; A-F or Audit; prereq Voice or choral music major, & applied voice; fall, every year)

Principles and practice of German lyric diction for classical vocal music. Transcriptions of German Lieder into International Phonetic Alphabet, elementary German grammar and common song vocabulary, 4 to 5 German songs performed in class for critique, and rules for pronunciation.

MUS 3264. French Diction for Singers. (1.0 cr.; A-F or Audit; prereq Voice or choral music major, concurrent enroll in applied voice; spring, every year)

Principles and practice of French lyric diction for classical vocal music. Transcriptions of French mélodie into International Phonetic Alphabet, elementary French grammar and common song vocabulary, 4 to 5 French songs performed in class for critique, and rules for pronunciation.

MUS 3331. Jazz Improvisation I. (2.0 cr.; A-F or Audit; prereq Music major or #; fall, offered periodically)

Rudiments; analysis; improvisation on blues in three major keys and standard American popular jazz compositions from swing era to early bebop; applications of major and minor scales; ear training.

MUS 3340. Jazz Ensemble. (1.0 cr. [max 8.0 cr.]; A-F or Audit; prereq Audition, #; fall, spring, every year)

A 20-member performing organization covering significant jazz compositions and arrangements written specifically for this medium.

MUS 3350. Jazz Combo. (1.0 cr. [max 8.0 cr.]; A-F or Audit; prereq Audition, #; fall, spring, every year)

A performance laboratory class with emphasis on improvisation and learning the jazz vocabulary. A minimum of two public performances is required each semester.

MUS 3400. University and Campus Bands. (2.0 cr. [max 20.0 cr.]; fall, spring, every year)

Lab course.

MUS 3401. Basic Conducting. (2.0 cr.; A-F or Audit; prereq 1502, music major; fall, spring, every year)

Beginning course in basic conducting techniques and role of the conductor.

MUS 3410. University Wind Bands. (1.0 cr. [max 14.0 cr.]; A-F or Audit; prereq Audition, #; fall, spring, every year)

Wind ensemble and symphony bands perform standard and contemporary literature; concerts and tour appearances. Players from all colleges may participate.

MUS 3420. Orchestra. (1.0 cr. [max 8.0 cr.]; A-F or Audit; prereq Audition, #; fall, spring, every year)

Symphony orchestra performs standard repertoire and major works with chorus; concerts and tour appearances. Players from all colleges may participate.

MUS 3430. Campus Orchestra. (2.0 cr. [max 16.0 cr.]; prereq Non-music major or unable to register for University Orchestra; fall, spring, every year)

Orchestra for players who are not music majors or are unable to register for University Orchestra. Standard chamber/string orchestra literature rehearsed/performing.

MUS 3440. Chamber Ensemble. (1.0 cr. [max 8.0 cr.]; A-F or Audit; prereq #; fall, spring, every year)

Performance of chamber music; duos, trios, quartets, quintets, and other ensemble combinations for instruments and voices.

MUS 3480. Marching Band. (2.0 cr. [max 12.0 cr.]; A-F or Audit; prereq #; fall, every year)

A 250-member performing organization open to players from all colleges. Performs at University football games and other athletic functions.

MUS 3490. Athletics Bands. (1.0 cr. [max 16.0 cr.]; A-F or Audit; prereq #; spring, every year)

Athletics bands for men's hockey, men's basketball, and women's sports.

MUS 3501. Theory and Analysis of Tonal Music III. (2.0 cr.; A-F or Audit; prereq [(1501, 1502, 1511, 1512) with grade of at least C-] or diagnostic test administered by School of Music; fall, every year)

Harmony and voice-leading. Diatonic and basic chromatic chords. Form. Analysis of music from 18th/19th centuries.

MUS 3502. Theory and Analysis of Tonal Music IV. (2.0 cr.; A-F or Audit; prereq [(3501, 3511) with grade of at least C-] or diagnostic test administered by School of Music; spring, every year)

Harmony and voice-leading. Chromatic tonal practices. Form, including sonata, rondo, variations, and other standard categories of tonal composition. Analysis of music from 18th/19th centuries.

MUS 3506. Theory and Analysis of American Popular Music. (3.0 cr.; A-F or Audit; prereq [3501, 3511] with a grade of C- or better; fall, odd years)

Analysis of popular songs, primarily those within the Anglo-American tradition, with the strongest focus on the United States. Musical details, techniques, and forms pertaining to popular songs. Larger interpretive, historical, and sociological questions in the context of analyzing specific songs and recordings.

MUS 3508. Review of Tonal Theory. (2.0 cr.; prereq Theory placement exam; fall, every year)

Fast-paced review of 1501, 1502, and 3501. Focuses on diatonic and basic chromatic procedures, part-writing, and analysis.

MUS 3509. Review of Tonal Theory IV. (2.0 cr.; prereq Grad music student or #; fall, every year)


MUS 3511. Ear-Training and Sight-Singing III. (1.0 cr.; A-F or Audit; prereq [(1501, 1511) with grade of at least C-] or diagnostic test administered by School of Music], [music major or #]; fall, every year)


MUS 3512. Ear-Training and Sight-Singing IV. (1.0 cr.; A-F or Audit; prereq [(3501, 3511) with a grade of at least C-] or diagnostic exam administered by School of Music], [music major or #]; spring, every year)


MUS 3518. Review of Ear-Training and Sight-Singing. (1.0 cr.; prereq Theory Placement Exam; fall, every year)
Courses listed in this catalog are current as of December 12, 2014. For up-to-date information, visit www.catalogs.umn.edu


MUS 3601W. History of Western Music I. (3.0 cr.; A-F or Audit; prereq 1502, 3601, music major; #, %; fall, every year) History of European art-music tradition, its social contexts from antiquity to 1700: composers, styles, structures, social institutions.

MUS 3602W. History of Western Music II. (3.0 cr.; A-F or Audit; prereq 1502, 3601, music major; #, %; fall, every year) History of European art-music tradition, its social contexts, from 1700 to 1850. Composers, styles, structures, social institutions.

MUS 3603W. History of Western Music III. (3.0 cr.; A-F or Audit; prereq [3501 3511, 3602] with a grade of at least C-, music major) or #; spring, every year) History of European/American art, popular music traditions, from 1850 to present. Composers, styles, structures, social institutions.

MUS 3950. Topics in Music. (1.0-3.0 cr. [max 15.0 cr.]; fall, spring, offered periodically) Each offering focuses on a single topic. Topics specified in Class Schedule.

MUS 3950H. Topics in Music: Honors. (1.0-3.0 cr. [max 12.0 cr.]; prereq Honors; fall, spring, every year) Focuses on a single topic. Topics specified in Class Schedule.

MUS 3993. Directed Studies. (1.0-4.0 cr. [max 10.0 cr.]; A-F or Audit; fall, spring, summer, every year) Guided individual reading or study. Prereq instr consent, dept consent, college consent.

MUS 3995. Major Project. (1.0 cr.; A-F or Audit; prereq Undergrad music major in B.A. program, %; #, %; fall, spring, summer, every year) Required of music majors in senior year of the B.A. program. Research paper on topic of student's choice in consultation with faculty mentor. Sign up in Undergraduate Studies office one term in advance.

MUS 4502. 18th-Century Counterpoint. (3.0 cr.; A-F or Audit; prereq [3501, 3508] or pass basic skills exam; fall, offered periodically) Harmony and voice-leading. Advanced chromatic practices. Analysis of music from late 19th/early 20th centuries. Ear-training, sight-singing.

MUS 4504. Intensive Theory and Analysis of 20th-Century Music. (2.0 cr.; A-F or Audit; prereq [3502, 3512] or #; fall, summer, every year) Theory/analysis of art music in various styles developed in 20th century.

MUS 4505. Jazz Theory. (3.0 cr.; A-F or Audit; prereq [3501, 3511] with grades of at least C-, fall, every year) Beginning through advanced techniques for chord construction. Extended chords. Nomenclature in jazz idiom.

MUS 4514. Ear-Training and Sight-Singing for 20th-Century Music. (1.0 cr.; A-F or Audit; prereq Completion of [3502, 3512] with grade of at least C-, fall, spring, every year) Developing aural skills relevant to 20th-century Western art music. Focuses on pitch relations, rhythmic techniques, form, and to a lesser degree, timbre and texture.

MUS 4950. Topics in Music. (1.0-3.0 cr. [max 15.0 cr.]; fall, spring, offered periodically) Each offering focuses on a single topic. Topics specified in Class Schedule.

MUS 5101. Piano Pedagogy I. (2.0 cr.; prereq 8 cr in MusA 1301 or MusA 1401 or #; ) Demonstration and discussion of teaching techniques, methods, and materials for group and individual instruction at the elementary, early intermediate, and late intermediate levels.

MUS 5150. Body Awareness in Activity: The Alexander Technique for Musicians. (2.0 cr. [max 8.0 cr.]; fall, spring, every year) Alexander technique with specific applications to music performance. Emphasis on body/mind awareness to promote technical ease and freedom.

MUS 5151. Organ Literature I. (3.0 cr.; A-F or Audit; prereq 3502, 3603, sr or grad or #; ) Organ literature from the 14th century to the mid-18th century. Influence of organ design of various periods and national schools on the literature and its performance.

MUS 5152. Organ Literature II. (3.0 cr.; A-F or Audit; prereq 3502, 3603, sr or grad or #; ) Organ literature of J. S. Bach and of other 19th- and 20th-century composers. Influence of organ design of various periods and national schools on the literature and its performance.

MUS 5160. Instrumental Accompanying Skills and Repertoire. (2.0 cr. [max 4.0 cr.]; A-F or Audit; prereq Accump major; fall, offered periodically) Performance class in accompanying skills particular to orchestral reductions and non-sonata instrumental accompanying. Repertoire to include, but not be limited to, classical and romantic string concerti, and "encore" pieces.

MUS 5180. Organ Literature I. (2.0 cr.; A-F or Audit; prereq grad piano major or #; fall, spring, every years) Literature for piano from late Baroque period to mid-20th century.

MUS 5182. Advanced Piano Literature II. (2.0 cr.; A-F or Audit; prereq grad piano major or #; spring, offered periodically) Literature for piano from late Baroque period to mid-20th century.

MUS 5241. Vocal Literature I. (3.0 cr.; A-F or Audit; prereq [12 cr in MusA 1304, grad music student] or #; fall, offered periodically) Vocal literature of major/minor composers from 17th century to present. Structure, style, performance practice.

MUS 5242. Vocal Literature II. (3.0 cr.; A-F or Audit; prereq 12 cr in MusA 1104 or MusA 1304, grad music major or #; spring, offered periodically) Vocal literature of major and minor composers from 17th century to present; structure, style, and performance practice.

MUS 5250. Opera Workshop and Ensemble. (2.0 cr. [max 16.0 cr.]; A-F or Audit; prereq audition; #, fall, spring, every year) Preparation and performance of operatic arias, choruses, and scenes. Participation in fully staged or workshop productions of music theatre repertoire.

MUS 5271. Diction for Singers I. (2.0 cr.; A-F or Audit; prereq 12 cr in MusA 1304 or grad music major or #; fall, every year) Principles and techniques of singing in English, Italian, Spanish, German, and French. International Phonetic Association alphabet used.

MUS 5272. Diction for Singers II. (2.0 cr.; A-F or Audit; prereq 12 cr in MusA 1304 or grad music major or #; spring, offered periodically) Principles and techniques of singing in English, Italian, Spanish, German, and French. International Phonetic Association alphabet used.

MUS 5275. Vocal Pedagogy I. (3.0 cr.; prereq Sr vocal major or #; spring, every year) Advanced study of mind/body preparations for singing, anatomy, and physiology of the vocal mechanism. Voice use and care, historical and comparative pedagogy, learning theories, models and guidelines for teaching, instructional techniques, and diagnosing and solving vocal problems.

MUS 5276. Vocal Pedagogy II. (3.0 cr.; A-F or Audit; prereq Sr vocal major or #; spring, offered periodically) History of solo vocal performance; selection and preparation of beginning level solo vocal repertoire; development of vocal performance.
skills (interpretation, expression, artistry), recital programming, and vocal career counseling.

MUS 5280. Opera Theatre. (2.0 cr. [max 16.0 cr.]; A-F or Audit; prereq audition, #; fall, every year)

MUS 5331. Jazz Improvisation I. (2.0 cr.; A-F or Audit; prereq Music major or #; summer, offered periodically)
Rudiments, analysis. Improvisation on blues in three major keys and on standard American popular jazz compositions from swing era to early bebop. Applications of major/minor scales. Ear training.

MUS 5333. Post-tonal Theory and Analysis II. (3.0 cr.; A-F only; spring, odd years)
Art music composed since 1945. Develop skills in analyzing and interpreting this literature.

MUS 5336. Jazz Arranging. (3.0 cr.; A-F or Audit; prereq 3502 or #; fall, spring, every year)
Beginning techniques of arranging for jazz combo and jazz ensemble; vocal and instrumental.

MUS 5340. Jazz Ensemble. (1.0 cr. [max 6.0 cr.]; A-F or Audit; prereq audition, #; fall, spring, every year)
A 20-member performing organization covering significant jazz compositions and arrangements written specifically for this medium.

MUS 5400. University and Campus Bands. (1.0 cr. [max 10.0 cr.]; fall, spring, every year)
Lab course.

MUS 5410. University Wind Bands. (1.0 cr. [max 14.0 cr.]; A-F or Audit; prereq audition, #; fall, spring, every year)
Wind ensemble and symphony bands perform standard and contemporary literature; concerts and tour appearances. Players from all colleges may participate.

MUS 5420. Orchestra. (1.0 cr. [max 8.0 cr.]; A-F or Audit; prereq audition, #; fall, spring, every year)
Symphony orchestra performs standard repertory and major works with chorus; concerts and tour appearances. Players from all colleges may participate.

MUS 5423. Suzuki Pedagogy Practicum. (1.0 cr. [max 2.0 cr.]; A-F or Audit; fall, spring, every year)
Supervised teaching of both individual and group lessons. Instructor provides periodic critiques from observation of live or videotaped lessons. Prereq [& 5424 or & 5425], grad music student or instr consent, grad consent.

MUS 5427. Violin Pedagogy I. (2.0 cr.; A-F or Audit; prereq Violin or viola major or #; fall, offered periodically)
Private teaching of violin students at beginning, intermediate, and advanced levels. Discussion and demonstrations of pedagogical techniques.

MUS 5430. Contemporary Music Workshop. (1.0 cr. [max 8.0 cr.]; A-F or Audit; prereq #; fall, spring, every year)
Generation/performance of new chamber works set within context to situate musical works within dynamic field of historical, philosophical, and expressive import.

MUS 5440. Chamber Ensemble. (1.0 cr. [max 8.0 cr.]; A-F or Audit; prereq audition, #; fall, spring, every year)
Performance of chamber music; duos, trios, quartets, quintets, and other ensemble combinations for instruments and/or voices.

MUS 5450. Orchestral Repertoire. (1.0-3.0 cr. [max 9.0 cr.]; A-F or Audit; prereq #; fall, spring, every year)
Investigation of practical and performance problems in standard orchestral repertoire with regard to style and interpretation.

MUS 5460. World Music Ensemble. (1.0-2.0 cr. [max 16.0 cr.]; fall, spring, every year)
Afro-Brazilian/Afro-Caribbean popular repertoires. Samba, bossa nova, salsa, merengue, mambo. Planned master classes/clinics with local artists to complement regularly scheduled rehearsals/performances. No audition required.

MUS 5464. Cello Pedagogy. (2.0 cr.; A-F or Audit; )
Concentrated study of cello teaching methods. Provides students with the strategies for teaching cello privately, develops analytical skills, and increases knowledge of cello repertoire. For practical application in conjunction with string technique course.

MUS 5471. Woodwind Literature and Pedagogy I. (2.0 cr.; A-F or Audit; prereq Music major or #; fall, even years)
A study of the major teaching materials for the five woodwind instruments including methods, duets, and solos used primarily for pedagogical reasons.

MUS 5472. Woodwind Literature and Pedagogy II. (2.0 cr.; A-F or Audit; prereq Music major or #; spring, odd years)
A study of chamber music involving one or more woodwind instruments. May include additional instruments such as piano, strings, and/or voice.

MUS 5480. University Brass Choir. (1.0 cr. [max 8.0 cr.]; prereq audition, #; fall, spring, every year)
The University Brass Choir is an ensemble of 16 brass and percussion players exploring unique literature that spans 400 years. From Banchieri, Diruta, Morley, Zarlino, and others.

MUS 5490. Percussion Ensemble. (1.0 cr. [max 10.0 cr.]; A-F or Audit; prereq #; fall, spring, every year)
Practice and performance of standard and contemporary compositions for percussion instruments in various combinations.

MUS 5491. Percussion Literature I. (2.0 cr.; A-F or Audit; prereq Jr or sr or grad or #; )
Repertoire derived from orchestral and band literature for snare drum, timpani, mallet instruments, and various percussion accessories. Major works of the 20th century written for solo percussion, percussion ensemble, and chamber groups of percussion and non-percussion instruments.

MUS 5492. Percussion Literature II. (2.0 cr.; A-F or Audit; prereq Jr or sr or grad or #; fall, spring, offered periodically)
Repertoire derived from orchestral and band literature for snare drum, timpani, mallet instruments, and various percussion accessories. Major works of the 20th century written for solo percussion, percussion ensemble, and chamber groups of percussion and non-percussion instruments.

MUS 5533. Music Since 1945. (3.0 cr.; A-F only; prereq 4504, #; spring, offered periodically)
Art music composed since 1945. Skills in analyzing and interpreting this literature.

MUS 5541. 16th-Century Counterpoint. (3.0 cr.; A-F or Audit; prereq [3501, 3508] or pass basic skills exam; fall, spring, offered periodically)
Polyphonic counterpoint in modal style of Renaissance. Writing exercises in species counterpoint and in two, three, and four parts. Cantus firmus techniques, mixed values, invertible counterpoint, canon. Representative works by Josquin, Lassus, Palestrina, Victoria, and others. Renaissance treatises by Artusi, Banchieri, Diruta, Morley, Zarlino, and others.

MUS 5550. Class Composition. (2.0 cr. [max 4.0 cr.]; A-F or Audit; prereq [4504, 4514] with C- or better! or #; fall, spring, every year)
Original works in various forms. Development of individual compositional style in a post-tonal idiom. Various forms, performing forces, techniques.

MUS 5561. Orchestration I. (3.0 cr.; A-F or Audit; prereq 3502; fall, every year)
Scoring techniques for ensembles in combination and full orchestra; year-long sequence. Score study of representative works from 18th through 20th centuries.

MUS 5562. Orchestration II. (3.0 cr.; A-F or Audit; prereq 5561; spring, every year)
Scoring techniques for ensembles in combination and full orchestra; year-long sequence. Score study of representative works from 18th through 20th centuries.

MUS 5571. Schenkerian Analysis for Performers. (3.0 cr.; A-F or Audit; prereq 3502; fall, summer, offered periodically)
Theory/analysis of tonal music using principles developed by Henrich Schenker. Basic concepts/notation, their application to excerpts/short pieces from 18th/19th centuries.

**MUS 5573. Analysis of Late-Romantic Orchestral Literature.** (3.0 cr.; A-F or Audit; prereq 3502 or Theory IV Exam or #; [4504 or equiv] recommended; spring, offered periodically) Advanced tonal analysis. Dramatic orchestral music by Wagner, Strauss, Tchaikovsky, Rimsky-Korsakov, Moussorgsky, and Rachmaninoff as focus for projects/discussions related to chromatic harmony, form, and orchestration.

**MUS 5574. Wagner's Ring: Conception, Coherence, Consequence.** (3.0 cr.; A-F or Audit; prereq 3502 or equiv; spring, odd years) Enrich process of listening to Wagner's Ring by providing analytic insight into Wagner's compositional technique and the dramatic, tonal, and motivic structure of the work. Analytic approach broadened with a number of interdisciplinary forays.

**MUS 5571. Introduction to Music Information Technology.** (3.0 cr.; A-F or Audit; prereq Music grad student or #; fall, every year) Principles of acoustics, electronic sound generation/manipulation, digital signal processing techniques. Programming languages for digital sound synthesis. Editing software, MIDI applications.

**MUS 5572. Music Informatics Seminar.** (3.0 cr.; A-F or Audit; prereq 5591 or #; spring, every year) Filtering, formant synthesis, reverberation techniques, additive synthesis. Interactive MIDI applications.

**MUS 5597. Music and Text.** (3.0 cr.; A-F or Audit; fall, every year) Designed for music majors only. Introduction to analysis of music with texts. Song/operatic

**MUS 5600. Resources for Music Research.** (3.0 cr.; A-F or Audit; prereq 3603; fall, spring, summer, every year) Development of skills in identifying, locating, and evaluating resources for research in music. Computer-searching techniques, acquaintance with basic reference sources in the field, preparation of the music research paper.

**MUS 5601. Topics in Opera History.** (3.0 cr. [max 6.0 cr.]; A-F or Audit; prereq Grad music major or #; fall, even years) Study of specific operas. Development of opera in context of other artistic, social, cultural, political events, movements, changes. Periods/countries vary each semester.

**MUS 5602. Topics in Opera History.** (3.0 cr.; A-F or Audit; prereq Grad student in music or #; spring, odd years) Issues of musical style, historical context. Moves chronologically through Bach's career. Relationships between his duties and works he composed. Genesis, function, relationship of a work to genre and performing forces. Lectures, presentations, research/analysis assignments.

**MUS 5647. 20th-Century European/ American Music.** (3.0 cr.; prereq 3603 or equiv, 5501 or equiv; 12 undergraduate cr in music history; spring, offered periodically) Emphasizes major artistic movements, stylistic turning points, social roles of music. Interactions between high art, popular, ethnic musics; contributions of men and woman as composers and performers.

**MUS 5658. History of the Symphony in the 20th Century.** (3.0 cr.; A-F or Audit; prereq 3603, 5501 or #;) History of symphony (and related genres) in Europe and America, ca. 1890 to present. Changing aesthetic concerns, structural, harmonic, and timbral innovations. Sociocultural contexts; analysis and criticism.

**MUS 5668. Beethoven's Symphonies.** (3.0 cr.; A-F or Audit; prereq 3603, #;) Analytical overview of selected movements from Beethoven's 9 symphonies. Principles of sonata analysis (norm and deformation); introduction to wider contexts of interpretation and understanding (generic, expressive, social).

**MUS 5701. Music, Disability, and Society.** (3.0 cr.; A-F only; prereq Grad student in music or #; spring, odd years) Study of intersection of music/disability in culture from perspective of interdisciplinary disability studies. Musician's injuries, "adaptive music" accommodations, participation in music/ music education as human/civil right. Universal Instructional Design pedagogy.

**MUS 5732. Free Jazz: From Structure to Gesture.** (3.0 cr.; A-F only; prereq Grad student in music or #; spring, even years) Discuss musical form of free jazz comprising flow expressivity, collaborative interaction, gestural communication from theoretical/practical point of view. Major representatives such as Ornette Coleman, Cecil Taylor, Archie Shepp, The Art Ensemble of Chicago, John Coltrane. Sound material include classical recordings but also recent free jazz CDs/DVDs.

**MUS 5804. Folk and Traditional Musics: Selected Cultures of the World.** (3.0 cr.; A-F or Audit; prereq 1801 or 1804 or music grad or #;) A study of selected music traditions from 5 to 7 world cultures. Genres, social institutions, concepts, styles, instruments, and usages.

**MUS 5993. Directed Studies.** (1.0-4.0 cr.; max 12.0 cr.; fall, spring, summer, every year) Guided individual reading or study. Prereq instr consent, dept consent, college consent.

**Music Applied (MUSA)**

**MUSA 1104. Voice: Elective (non-major in music).** (2.0-4.0 cr. [max 32.0 cr.]; A-F or Audit; prereq #; fall, spring, every year) Private instruction.

**MUSA 1103. Organ: Elective (non-major in music).** (2.0-4.0 cr. [max 32.0 cr.]; A-F or Audit; prereq #; fall, spring, every year) Private instruction.

**MUSA 1102. Harpsichord: Elective (non-major in music).** (2.0-4.0 cr. [max 32.0 cr.]; A-F or Audit; prereq #; fall, spring, every year) Private instruction.

**MUSA 1101. Piano: Elective (non-major in music).** (2.0-4.0 cr. [max 32.0 cr.]; A-F or Audit; prereq #; fall, spring, every year) Private instruction.

**MUSA 1100. Violin: Elective (non-major in music).** (2.0-4.0 cr. [max 32.0 cr.]; A-F or Audit; prereq #; fall, spring, every year) Private instruction.

**MUSA 1105. Flute: Elective (non-major in music).** (2.0-4.0 cr. [max 32.0 cr.]; A-F or Audit; prereq #; fall, spring, every year) Private instruction.

**MUSA 1107. Cello: Elective (non-major in music).** (2.0-4.0 cr. [max 32.0 cr.]; A-F or Audit; prereq #; fall, spring, every year) Private instruction.

**MUSA 1108. Double Bass: Elective (non-major in music).** (2.0-4.0 cr. [max 32.0 cr.]; A-F or Audit; prereq #; fall, spring, every year) Private instruction.

**MUSA 1109. Oboe: Elective (non-major in music).** (2.0-4.0 cr. [max 32.0 cr.]; A-F or Audit; prereq #; fall, spring, every year) Private instruction.

**MUSA 1102. Clarinet: Elective (non-major in music).** (2.0-4.0 cr. [max 32.0 cr.]; A-F or Audit; prereq #; fall, spring, every year) Private instruction.

**MUSA 1113. Saxophone: Elective (non-major in music).** (2.0-4.0 cr. [max 32.0 cr.]; A-F or Audit; prereq #; fall, spring, every year) Private instruction.

**MUSA 1115. French Horn: Elective (non-major in music).** (2.0-4.0 cr. [max 32.0 cr.]; A-F or Audit; prereq #; fall, spring, every year) Private instruction.

**MUSA 1116. Trumpet: Elective (non-major in music).** (2.0-4.0 cr. [max 32.0 cr.]; A-F or Audit; prereq #; fall, spring, every year) Private instruction.
Private instruction.

**MUSA 1119. Tuba: Elective (non-major in music)**. (2.0-4.0 cr. [max 32.0 cr.]; A-F or Audit; prereq %; fall, spring, every year) Private instruction.

**MUSA 1121. Percussion: Elective (non-major in music)**. (2.0-4.0 cr. [max 32.0 cr.]; A-F or Audit; prereq %; fall, spring, every year) Private instruction.

**MUSA 1123. Guitar: Elective (non-major in music)**. (2.0-4.0 cr. [max 32.0 cr.]; A-F or Audit; prereq %; fall, spring, every year) Private instruction.

**MUSA 1201. Piano: Music Education and BA**. (2.0 cr. [max 16.0 cr.]; A-F only; prereq [Music education or BA applied] major, %; fall, spring, every year) Private instruction.

**MUSA 1203. Organ: Music Education and BA**. (2.0 cr. [max 16.0 cr.]; A-F only; prereq [Music education or BA applied] major, %; fall, spring, every year) Private instruction.

**MUSA 1204. Voice: Music Education and BA**. (2.0 cr. [max 16.0 cr.]; A-F only; prereq [Music education or BA applied] major, %; fall, spring, every year) Private instruction.

**MUSA 1205. Violin: Music Education and BA**. (2.0 cr. [max 16.0 cr.]; A-F only; prereq [Music education or BA applied] major, %; fall, spring, every year) Private instruction.

**MUSA 1206. Viola: Music Education and BA**. (2.0 cr. [max 16.0 cr.]; A-F only; prereq [Music education or BA applied] major, %; fall, spring, every year) Private instruction.

**MUSA 1207. Cello: Music Education and BA**. (2.0 cr. [max 16.0 cr.]; A-F only; prereq [Music education or BA applied] major, %; fall, spring, every year) Private instruction.

**MUSA 1208. Double Bass: Music Education and BA**. (2.0 cr. [max 16.0 cr.]; A-F only; prereq [Music education or BA applied] major, %; fall, spring, every year) Private instruction.

**MUSA 1209. Flute: Music Education and BA**. (2.0 cr. [max 16.0 cr.]; A-F only; prereq [Music education or BA applied] major, %; fall, spring, every year) Private instruction.

**MUSA 1211. Oboe: Music Education and BA**. (2.0 cr. [max 16.0 cr.]; A-F only; prereq [Music education or BA applied] major, %; fall, spring, every year) Private instruction.

**MUSA 1212. Clarinet: Music Education and BA**. (2.0 cr. [max 16.0 cr.]; A-F only; prereq [Music education or BA applied] major, %; fall, spring, every year) Private instruction.

**MUSA 1213. Saxophone: Music Ed and BA**. (2.0 cr. [max 16.0 cr.]; A-F only; prereq [Music education or BA applied] major, %; fall, spring, every year) Private instruction.

**MUSA 1214. Bassoon: Music Education and BA**. (2.0 cr. [max 16.0 cr.]; A-F only; prereq [Music education or BA applied] major, %; fall, spring, every year) Private instruction.

**MUSA 1215. French Horn: Music Education and BA**. (2.0 cr. [max 16.0 cr.]; A-F only; prereq [Music education or BA applied] major, %; fall, spring, every year) Private instruction.

**MUSA 1216. Trumpet: Music Education and BA**. (2.0 cr. [max 16.0 cr.]; A-F only; prereq [Music education or BA applied] major, %; fall, spring, every year) Private instruction.

**MUSA 1217. Trombone: Music Education and BA**. (2.0 cr. [max 16.0 cr.]; A-F only; prereq [Music education or BA applied] major, %; fall, spring, every year) Private instruction.

**MUSA 1218. Euphonium: Music Education and BA**. (2.0 cr. [max 16.0 cr.]; A-F only; prereq [Music education or BA applied] major, %; fall, spring, every year) Private instruction.

**MUSA 1219. Tuba: Music Education and BA**. (2.0 cr. [max 16.0 cr.]; A-F only; prereq [Music education or BA applied] major, %; fall, spring, every year) Private instruction.

**MUSA 1221. Percussion: Music Ed and BA**. (2.0 cr. [max 16.0 cr.]; A-F only; prereq [Music education or BA applied] major, %; fall, spring, every year) Private instruction.

**MUSA 1222. Harp: Music Education and BA**. (2.0 cr. [max 16.0 cr.]; A-F only; prereq [Music education or BA applied] major, %; fall, spring, every year) Private instruction.

**MUSA 1223. Guitar: Music Education and BA**. (2.0 cr. [max 16.0 cr.]; A-F only; prereq [Music education or BA applied] major, %; fall, spring, every year) Private instruction.

**MUSA 1301. Piano: Music Major**. (2.0-4.0 cr. [max 16.0 cr.]; A-F or Audit; prereq Audition, %; fall, spring, summer, every year) Private instruction.

**MUSA 1302. Harpsichord: Music Major**. (2.0-4.0 cr. [max 16.0 cr.]; A-F or Audit; prereq Audition, %; fall, spring, summer, every year) Private instruction.

**MUSA 1303. Organ: Music Major**. (2.0-4.0 cr. [max 16.0 cr.]; A-F or Audit; prereq Audition, %; fall, spring, summer, every year) Private instruction.

**MUSA 1304. Voice: Music Major**. (2.0-4.0 cr. [max 16.0 cr.]; A-F or Audit; prereq Audition, %; fall, spring, summer, every year) Private instruction.

**MUSA 1305. Violin: Music Major**. (2.0-4.0 cr. [max 16.0 cr.]; A-F or Audit; prereq Audition, %; fall, spring, summer, every year) Private instruction.

**MUSA 1306. Viola: Music Major**. (2.0-4.0 cr. [max 16.0 cr.]; A-F or Audit; prereq Audition, %; fall, spring, summer, every year) Private instruction.

**MUSA 1307. Cello: Music Major**. (2.0-4.0 cr. [max 16.0 cr.]; A-F or Audit; prereq Audition, %; fall, spring, summer, every year) Private instruction.

**MUSA 1308. Double Bass: Music Major**. (2.0-4.0 cr. [max 16.0 cr.]; A-F or Audit; prereq Audition, %; fall, spring, summer, every year) Private instruction.

**MUSA 1309. Flute: Music Major**. (2.0-4.0 cr. [max 16.0 cr.]; A-F or Audit; prereq Audition, %; fall, spring, summer, every year) Private instruction.

**MUSA 1311. Oboe: Music Major**. (2.0-4.0 cr. [max 16.0 cr.]; A-F or Audit; prereq Audition, %; fall, spring, summer, every year) Private instruction.

**MUSA 1312. Clarinet: Music Major**. (2.0-4.0 cr. [max 16.0 cr.]; A-F or Audit; prereq Audition, %; fall, spring, summer, every year) Private instruction.

**MUSA 1313. Saxophone: Music Major**. (2.0-4.0 cr. [max 16.0 cr.]; A-F or Audit; prereq Audition, %; fall, spring, summer, every year) Private instruction.

**MUSA 1314. Bassoon: Music Major**. (2.0-4.0 cr. [max 16.0 cr.]; A-F or Audit; prereq Audition, %; fall, spring, summer, every year) Private instruction.

**MUSA 1315. French Horn: Music Major**. (2.0-4.0 cr. [max 16.0 cr.]; A-F or Audit; prereq Audition, %; fall, spring, summer, every year) Private instruction.

**MUSA 1316. Trumpet: Music Major**. (2.0-4.0 cr. [max 16.0 cr.]; A-F or Audit; prereq Audition, %; fall, spring, summer, every year) Private instruction.

**MUSA 1317. Trombone: Music Major**. (2.0-4.0 cr. [max 16.0 cr.]; A-F or Audit; prereq Audition, %; fall, spring, summer, every year) Private instruction.

**MUSA 1318. Euphonium: Music Major**. (2.0-4.0 cr. [max 16.0 cr.]; A-F or Audit; prereq Audition, %; fall, spring, summer, every year) Private instruction.

**MUSA 1319. Tuba: Music Major**. (2.0-4.0 cr. [max 16.0 cr.]; A-F or Audit; prereq Audition, %; fall, spring, summer, every year) Private instruction.

**MUSA 1321. Percussion: Music Major**. (2.0-4.0 cr. [max 16.0 cr.]; A-F or Audit; prereq Audition, %; fall, spring, summer, every year) Private instruction.
MUSA 1323. Guitar: Music Major. (2.0-4.0 cr. [max 16.0 cr.]; A-F or Audit; prereq Audition, %; fall, spring, summer, every year)
Private instruction.

MUSA 1401. Piano: Music Major Secondary (undergraduate). (2.0-4.0 cr. [max 16.0 cr.]; A-F or Audit; prereq Music major, %; fall, spring, every year)
Private instruction.

MUSA 1402. Harpsichord: Music Major Secondary (undergraduate). (2.0-4.0 cr. [max 16.0 cr.]; A-F or Audit; prereq Audition, %; fall, spring, summer, every year)
Private instruction.

MUSA 1403. Organ: Music Major Secondary (undergraduate). (2.0-4.0 cr. [max 16.0 cr.]; A-F or Audit; prereq Audition, %; fall, spring, summer, every year)
Private instruction.

MUSA 1404. Voice: Music Major Secondary (undergraduate). (2.0-4.0 cr. [max 16.0 cr.]; A-F or Audit; prereq Audition, %; fall, spring, summer, every year)
Private instruction.

MUSA 1411. Oboe: Music Major Secondary (undergraduate). (2.0-4.0 cr. [max 16.0 cr.]; A-F or Audit; prereq Audition, %; fall, spring, summer, every year)
Private instruction.

MUSA 1412. Clarinet: Music Major Secondary (undergraduate). (2.0-4.0 cr. [max 16.0 cr.]; A-F or Audit; prereq Audition, %; fall, spring, every year)
Private instruction.

MUSA 1413. Saxophone: Music Major Secondary (undergraduate). (2.0-4.0 cr. [max 16.0 cr.]; A-F or Audit; prereq Audition, %; fall, spring, summer, every year)
Private instruction.

MUSA 1414. Bassoon: Music Major Secondary (undergraduate). (2.0-4.0 cr. [max 16.0 cr.]; A-F or Audit; prereq Audition, %; fall, spring, summer, every year)
Private instruction.

MUSA 1415. French Horn: Music Major Secondary (undergraduate). (2.0-4.0 cr. [max 16.0 cr.]; A-F or Audit; prereq Audition, %; fall, spring, summer, every year)
Private instruction.

MUSA 1416. Trumpet: Music Major Secondary (undergraduate). (2.0-4.0 cr. [max 16.0 cr.]; A-F or Audit; prereq Audition, %; fall, spring, summer, every year)
Private instruction.

MUSA 1417. Trombone: Music Major Secondary (undergraduate). (2.0-4.0 cr. [max 16.0 cr.]; A-F or Audit; prereq Audition, %; fall, spring, summer, every year)
Private instruction.

MUSA 1418. Euphonium: Music Major Secondary (undergraduate). (2.0-4.0 cr. [max 16.0 cr.]; A-F or Audit; prereq Audition, %; fall, spring, summer, every year)
Private instruction.

MUSA 1419. Tuba: Music Major Secondary (undergraduate). (2.0-4.0 cr. [max 16.0 cr.]; A-F or Audit; prereq Audition, %; fall, spring, summer, every year)
Private instruction.

MUSA 1421. Percussion: Music Major Secondary (undergraduate). (2.0-4.0 cr. [max 16.0 cr.]; A-F or Audit; prereq Audition, %; fall, spring, summer, every year)
Private instruction.

MUSA 1423. Guitar: Music Major Secondary (undergraduate). (2.0-4.0 cr. [max 16.0 cr.]; A-F or Audit; prereq Audition, %; fall, spring, summer, every year)
Private instruction.

MUSA 1901. Piano: Music Major Transfer. (2.0-4.0 cr. ; A-F or Audit; prereq Audition, %; fall, spring, summer, every year)
Private instruction for transfer students. One semester only.

MUSA 1902. Harpsichord: Music Major Transfer. (2.0-4.0 cr.; A-F or Audit; prereq Audition, %; fall, spring, summer, every year)
Private instruction for transfer students. One semester only.

MUSA 1903. Organ: Music Major Transfer. (2.0-4.0 cr.; A-F or Audit; prereq Audition, %; fall, spring, summer, every year)
Private instruction for transfer students. One semester only.

MUSA 1904. Voice: Music Major Transfer. (2.0-4.0 cr.; A-F or Audit; prereq Audition, %; fall, spring, summer, every year)
Private instruction for transfer students. One semester only.

MUSA 1905. Violin: Music Major Transfer. (2.0-4.0 cr.; A-F or Audit; prereq Audition, %; fall, spring, summer, every year)
Private instruction for transfer students. One semester only.

MUSA 1906. Viola: Music Major Transfer. (2.0-4.0 cr.; A-F or Audit; prereq Audition, %; fall, spring, summer, every year)
Private instruction for transfer students. One semester only.

MUSA 1907. Cello: Music Major Transfer. (2.0-4.0 cr.; A-F or Audit; prereq Audition, %; fall, spring, summer, every year)
Private instruction for transfer students. One semester only.

MUSA 1908. Double Bass: Music Major Transfer. (2.0-4.0 cr.; A-F or Audit; prereq Audition, %; fall, spring, summer, every year)
Private instruction for transfer students. One semester only.

MUSA 1909. Flute: Music Major Transfer. (2.0-4.0 cr.; A-F or Audit; prereq Audition, %; fall, spring, summer, every year)
Private instruction for transfer students. One semester only.

MUSA 1911. Oboe: Music Major Transfer. (2.0-4.0 cr.; A-F or Audit; prereq Audition, %; fall, spring, summer, every year)
Private instruction for transfer students. One semester only.

MUSA 1912. Clarinet: Music Major Transfer. (2.0-4.0 cr.; A-F or Audit; prereq Audition, %; fall, spring, summer, every year)
Private instruction for transfer students. One semester only.

MUSA 1913. Saxophone: Music Major Transfer. (2.0-4.0 cr.; A-F or Audit; prereq Audition, %; fall, spring, summer, every year)
Private instruction for transfer students. One semester only.

MUSA 1915. French Horn: Music Major Transfer. (2.0-4.0 cr.; A-F or Audit; prereq Audition, %; fall, spring, summer, every year)
Private instruction for transfer students. One semester only.

MUSA 1916. Trumpet: Music Major Transfer. (2.0-4.0 cr.; A-F or Audit; prereq Audition, %; fall, spring, summer, every year)
Private instruction for transfer students. One semester only.

MUSA 1917. Trombone: Music Major Transfer. (2.0-4.0 cr.; A-F or Audit; prereq Audition, %; fall, spring, summer, every year)
Private instruction for transfer students. One semester only.

MUSA 1918. Euphonium: Music Major Transfer. (2.0-4.0 cr.; A-F or Audit; prereq Audition, %; fall, spring, summer, every year)
Private instruction for transfer students. One semester only.

MUSA 1919. Tuba: Music Major Transfer. (2.0-4.0 cr.; A-F or Audit; prereq Audition, %; fall, spring, summer, every year)
Private instruction for transfer students. One semester only.
MUSA 1921. Percussion: Music Major Transfer. (2.0-4.0 cr. : A-F or Audit; prereq Audition, %; fall, spring, summer, every year) Private instruction for transfer students. One semester only.

MUSA 1922. Harp: Music Major Transfer. (2.0-4.0 cr. : A-F or Audit; prereq Audition, %; fall, spring, summer, every year) Private instruction for transfer students. One semester only.

MUSA 1923. Guitar: Music Major Transfer. (2.0-4.0 cr. : A-F or Audit; prereq Audition, %; fall, spring, summer, every year) Private instruction for transfer students. One semester only.

MUSA 2201. Piano: Music Ed and BA. (2.0 cr. [max 16.0 cr.]; A-F only; prereq [Music education or BA applied] major, %; fall, spring, every year) Private instruction.

MUSA 2203. Piano: Music Education and BA. (2.0 cr. [max 16.0 cr.]; A-F only; prereq %; fall, spring, every year) Private instruction.

MUSA 2204. Voice: Music Education and BA. (2.0 cr. [max 16.0 cr.]; A-F only; prereq %; fall, spring, every year) Private instruction.

MUSA 2205. Violin: Music Education and BA. (2.0 cr. [max 16.0 cr.]; A-F only; prereq %; fall, spring, every year) Private instruction.

MUSA 2206. Viola: Music Education and BA. (2.0 cr. [max 16.0 cr.]; A-F only; prereq %; fall, spring, every year) Private instruction.

MUSA 2207. Cello: Music Education and BA. (2.0 cr. [max 16.0 cr.]; A-F only; prereq %; fall, spring, every year) Private instruction.

MUSA 2208. Bass: Music Education and BA. (2.0 cr. [max 16.0 cr.]; A-F only; prereq %; fall, spring, every year) Private instruction.

MUSA 2209. Flute: Music Education and BA. (2.0 cr. [max 16.0 cr.]; A-F only; prereq %; fall, spring, every year) Private instruction.

MUSA 2211. Oboe: Music Education and BA. (2.0 cr. [max 16.0 cr.]; A-F only; prereq %; fall, spring, every year) Private instruction.

MUSA 2212. Clarinet: Music Education and BA. (2.0 cr. [max 16.0 cr.]; A-F only; prereq %; fall, spring, every year) Private instruction.

MUSA 2213. Saxophone: Music Education and BA. (2.0 cr. [max 16.0 cr.]; A-F only; prereq %; fall, spring, every year) Private instruction.

MUSA 2214. Bassoon: Music Education and BA. (2.0 cr. [max 16.0 cr.]; A-F only; prereq %; fall, spring, every year) Private instruction.

MUSA 2215. French Horn: Music Education and BA. (2.0 cr. [max 16.0 cr.]; A-F only; prereq %; fall, spring, every year) Private instruction.

MUSA 2216. Trumpet: Music Education and BA. (2.0 cr. [max 16.0 cr.]; A-F only; prereq %; fall, spring, every year) Private instruction.

MUSA 2217. Trombone: Music Education and BA. (2.0 cr. [max 16.0 cr.]; A-F only; prereq %; fall, spring, every year) Private instruction.

MUSA 2218. Euphonium: Music Education and BA. (2.0 cr. [max 16.0 cr.]; A-F only; prereq %; fall, spring, every year) Private instruction.

MUSA 2219. Tuba: Music Education and BA. (2.0 cr. [max 16.0 cr.]; A-F only; prereq %; fall, spring, every year) Private instruction.

MUSA 2220. Percussion: Music Education and BA. (2.0 cr. [max 16.0 cr.]; A-F only; prereq %; fall, spring, every year) Private instruction.

MUSA 2221. Harp: Music Education and BA. (2.0 cr. [max 16.0 cr.]; A-F only; prereq %; fall, spring, every year) Private instruction.

MUSA 2222. Guitar: Music Education and BA. (2.0 cr. [max 16.0 cr.]; A-F only; prereq %; fall, spring, every year) Private instruction.

MUSA 2301. Piano: Music Major. (2.0-4.0 cr. [max 16.0 cr.]; A-F or Audit; prereq Audition, %; fall, spring, summer, every year) Private instruction.

MUSA 2302. Harpsichord: Music Major. (2.0-4.0 cr. [max 16.0 cr.]; A-F or Audit; prereq Audition, #; fall, spring, summer, every year) Private instruction.

MUSA 2303. Organ: Music Major. (2.0-4.0 cr. [max 16.0 cr.]; A-F or Audit; prereq Audition, %; fall, spring, summer, every year) Private instruction.

MUSA 2304. Voice: Music Major. (2.0-4.0 cr. [max 16.0 cr.]; A-F or Audit; prereq Audition, %; fall, spring, summer, every year) Private instruction.

MUSA 2305. Violin: Music Major. (2.0-4.0 cr. [max 16.0 cr.]; A-F or Audit; prereq Audition, %; fall, spring, summer, every year) Private instruction.

MUSA 2306. Viola: Music Major. (2.0-4.0 cr. [max 16.0 cr.]; A-F or Audit; prereq Audition, %; fall, spring, summer, every year) Private instruction.

MUSA 2307. Cello: Music Major. (2.0-4.0 cr. [max 16.0 cr.]; A-F or Audit; prereq Audition, %; fall, spring, summer, every year) Private instruction.

MUSA 2308. Double Bass: Music Major. (2.0-4.0 cr. [max 16.0 cr.]; A-F or Audit; prereq Audition, %; fall, spring, summer, every year) Private instruction.

MUSA 2309. Flute: Music Major. (2.0-4.0 cr. [max 16.0 cr.]; A-F or Audit; prereq Audition, %; fall, spring, summer, every year) Private instruction.

MUSA 2310. Harpsichord: Elective (non-major in music). (2.0-4.0 cr. [max 16.0 cr.]; A-F or Audit; prereq %; fall, spring, every year) Private instruction.
MUSA 3104. Voice: Elective (non-major in music). (2.0-4.0 cr. [max 16.0 cr.; A-F or Audit; prereq %; fall, spring, every year) Private instruction.

MUSA 3105. Violin: Elective (non-major in music). (2.0-4.0 cr. [max 16.0 cr.; A-F or Audit; prereq %; fall, spring, every year) Private instruction.

MUSA 3106. Viola: Elective (non-major in music). (2.0-4.0 cr. [max 16.0 cr.; A-F or Audit; prereq %; fall, spring, every year) Private instruction.

MUSA 3107. Cello: Elective (non-major in music). (2.0-4.0 cr. [max 16.0 cr.; A-F or Audit; prereq %; fall, spring, every year) Private instruction.

MUSA 3108. Double Bass: Elective (non-major in music). (2.0-4.0 cr. [max 16.0 cr.; A-F or Audit; prereq %; fall, spring, every year) Private instruction.

MUSA 3109. Flute: Elective (non-major in music). (2.0-4.0 cr. [max 16.0 cr.; A-F or Audit; prereq %; fall, spring, every year) Private instruction.

MUSA 3111. Oboe: Elective (non-major in music). (2.0-4.0 cr. [max 16.0 cr.; A-F or Audit; prereq %; fall, spring, every year) Private instruction.

MUSA 3112. Clarinet: Elective (non-major in music). (2.0-4.0 cr. [max 16.0 cr.; A-F or Audit; prereq %; fall, spring, every year) Private instruction.

MUSA 3113. Saxophone: Elective (non-major in music). (2.0-4.0 cr. [max 16.0 cr.; A-F or Audit; prereq %; fall, spring, every year) Private instruction.

MUSA 3114. Bassoon: Elective (non-major in music). (2.0-4.0 cr. [max 16.0 cr.; A-F or Audit; prereq %; fall, spring, every year) Private instruction.

MUSA 3115. French Horn: Elective (non-major in music). (2.0-4.0 cr. [max 16.0 cr.; A-F or Audit; prereq %; fall, spring, every year) Private instruction.

MUSA 3116. Trumpet: Elective (non-major in music). (2.0-4.0 cr. [max 16.0 cr.; A-F or Audit; prereq %; fall, spring, every year) Private instruction.

MUSA 3117. Trombone: Elective (non-major in music). (2.0-4.0 cr. [max 16.0 cr.; A-F or Audit; prereq %; fall, spring, every year) Private instruction.

MUSA 3121. Percussion: Elective (non-major in music). (2.0-4.0 cr. [max 16.0 cr.; A-F or Audit; prereq %; fall, spring, every year) Private instruction.

MUSA 3122. Guitar: Elective (non-major in music). (2.0-4.0 cr. [max 16.0 cr.; A-F or Audit; prereq %; fall, spring, every year) Private instruction.

MUSA 3123. Piano: Music Ed and BA. (2.0 cr. [max 16.0 cr.; A-F only; fall, spring, every year) Private instruction.

MUSA 3125. French Horn: Music Education and BA. (2.0 cr. [max 16.0 cr.; A-F only; fall, spring, every year) Private instruction.

MUSA 3126. Trumpet: Music Education and BA. (2.0 cr. [max 16.0 cr.; A-F only; fall, spring, every year) Private instruction.

MUSA 3127. Trombone: Music Education and BA. (2.0 cr. [max 16.0 cr.; A-F only; fall, spring, every year) Private instruction.

MUSA 3128. Euphonium: Music Education and BA. (2.0 cr. [max 16.0 cr.; A-F only; fall, spring, every year) Private instruction.

MUSA 3129. Tuba: Music Education and BA. (2.0 cr. [max 16.0 cr.; A-F only; fall, spring, every year) Private instruction.

MUSA 3130. Organ: Music Education and BA. (2.0 cr. [max 16.0 cr.; A-F only; fall, spring, every year) Private instruction.

MUSA 3131. Oboe: Music Education and BA. (2.0 cr. [max 16.0 cr.; A-F only; fall, spring, every year) Private instruction.

MUSA 3132. Clarinet: Music Education and BA. (2.0 cr. [max 16.0 cr.; A-F only; fall, spring, every year) Private instruction.

MUSA 3133. Saxophone: Music Education and BA. (2.0 cr. [max 16.0 cr.; A-F only; fall, spring, every year) Private instruction.

MUSA 3134. Bassoon: Music Education and BA. (2.0 cr. [max 16.0 cr.; A-F only; fall, spring, every year) Private instruction.

MUSA 3135. Organ: Music Education and BA. (2.0 cr. [max 16.0 cr.; A-F only; prereq Audition, %; fall, spring, every year) Private instruction.

MUSA 3141. Clarinet: Music Major. (2.0-4.0 cr. [max 24.0 cr.; A-F or Audit; prereq Audition, %; fall, spring, summer, every year) Private instruction.

MUSA 3142. Saxophone: Music Major. (2.0-4.0 cr. [max 24.0 cr.; A-F or Audit; prereq Audition, %; fall, spring, summer, every year) Private instruction.

MUSA 3143. Bassoon: Music Major. (2.0-4.0 cr. [max 24.0 cr.; A-F or Audit; prereq Audition, %; fall, spring, summer, every year) Private instruction.

MUSA 3144. Clarinet: Music Major. (2.0-4.0 cr. [max 24.0 cr.; A-F or Audit; prereq Audition, %; fall, spring, summer, every year) Private instruction.

MUSA 3145. French Horn: Music Major. (2.0-4.0 cr. [max 24.0 cr.; A-F or Audit; prereq Audition, %; fall, spring, summer, every year) Private instruction.

MUSA 3146. Trumpet: Music Major. (2.0-4.0 cr. [max 24.0 cr.; A-F or Audit; prereq Audition, %; fall, spring, summer, every year) Private instruction.

MUSA 3147. Trombone: Music Major. (2.0-4.0 cr. [max 24.0 cr.; A-F or Audit; prereq Audition, %; fall, spring, summer, every year) Private instruction.

MUSA 3148. Euphonium: Music Major. (2.0-4.0 cr. [max 24.0 cr.; A-F or Audit; prereq Audition, %; fall, spring, summer, every year) Private instruction.

MUSA 3149. Tuba: Music Major. (2.0-4.0 cr. [max 24.0 cr.; A-F or Audit; prereq Audition, %; fall, spring, summer, every year) Private instruction.

MUSA 3150. Organ: Music Major. (2.0-4.0 cr. [max 24.0 cr.; A-F or Audit; prereq Audition, %; fall, spring, summer, every year) Private instruction.

MUSA 3151. Oboe: Music Major. (2.0-4.0 cr. [max 24.0 cr.; A-F or Audit; prereq Audition, %; fall, spring, summer, every year) Private instruction.

MUSA 3152. Clarinet: Music Major. (2.0-4.0 cr. [max 24.0 cr.; A-F or Audit; prereq Audition, %; fall, spring, summer, every year) Private instruction.

MUSA 3153. Saxophone: Music Major. (2.0-4.0 cr. [max 24.0 cr.; A-F or Audit; prereq Audition, %; fall, spring, summer, every year) Private instruction.

MUSA 3154. Bassoon: Music Major. (2.0-4.0 cr. [max 24.0 cr.; A-F or Audit; prereq Audition, %; fall, spring, summer, every year) Private instruction.

MUSA 3155. French Horn: Music Major. (2.0-4.0 cr. [max 24.0 cr.; A-F or Audit; prereq Audition, %; fall, spring, summer, every year) Private instruction.

MUSA 3156. Trumpet: Music Major. (2.0-4.0 cr. [max 24.0 cr.; A-F or Audit; prereq Audition, %; fall, spring, summer, every year) Private instruction.

MUSA 3157. Trombone: Music Major. (2.0-4.0 cr. [max 24.0 cr.; A-F or Audit; prereq Audition, %; fall, spring, summer, every year) Private instruction.

MUSA 3158. Euphonium: Music Major. (2.0-4.0 cr. [max 24.0 cr.; A-F or Audit; prereq Audition, %; fall, spring, summer, every year) Private instruction.

MUSA 3159. Tuba: Music Major. (2.0-4.0 cr. [max 24.0 cr.; A-F or Audit; prereq Audition, %; fall, spring, summer, every year) Private instruction.

MUSA 3160. Organ: Music Major. (2.0-4.0 cr. [max 24.0 cr.; A-F or Audit; prereq Audition, %; fall, spring, summer, every year) Private instruction.

MUSA 3161. Oboe: Music Major. (2.0-4.0 cr. [max 24.0 cr.; A-F or Audit; prereq Audition, %; fall, spring, summer, every year) Private instruction.
MUSA 3313. Saxophone: Music Major. (2.0-4.0 cr. [max 24.0 cr.]; A-F or Audit; prereq Audition, %; fall, spring, summer, every year) Private instruction.

MUSA 3314. Bassoon: Music Major. (2.0-4.0 cr. [max 24.0 cr.]; A-F or Audit; prereq Audition, %; fall, spring, summer, every year) Private instruction.

MUSA 3315. French Horn: Music Major. (2.0-4.0 cr. [max 24.0 cr.]; A-F or Audit; prereq Audition, %; fall, spring, summer, every year) Private instruction.

MUSA 3316. Trumpet: Music Major. (2.0-4.0 cr. [max 24.0 cr.]; A-F or Audit; prereq Audition, %; fall, spring, summer, every year) Private instruction.

MUSA 3317. Trombone: Music Major. (2.0-4.0 cr. [max 24.0 cr.]; A-F or Audit; prereq Audition, %; fall, spring, summer, every year) Private instruction.

MUSA 3318. Euphonium: Music Major. (2.0-4.0 cr. [max 24.0 cr.]; A-F or Audit; prereq Audition, %; fall, spring, summer, every year) Private instruction.

MUSA 3319. Tuba: Music Major. (2.0-4.0 cr. [max 24.0 cr.]; A-F or Audit; prereq Audition, %; fall, spring, summer, every year) Private instruction.

MUSA 3321. Percussion: Music Major. (2.0-4.0 cr. [max 24.0 cr.]; A-F or Audit; prereq Audition, %; fall, spring, summer, every year) Private instruction.

MUSA 3322. Harp: Music Major. (2.0-4.0 cr. [max 24.0 cr.]; A-F or Audit; prereq Audition, %; fall, spring, summer, every year) Private instruction.

MUSA 3323. Guitar: Music Major. (2.0-4.0 cr. [max 24.0 cr.]; A-F or Audit; prereq Audition, %; fall, spring, summer, every year) Private instruction.

MUSA 5101. Piano: Elective (graduate non-major in music). (2.0 cr. [max 8.0 cr.]; A-F or Audit; prereq %; fall, spring, every year) Private instruction.

MUSA 5102. Harpsichord: Elective (graduate non-major in music). (2.0 cr. [max 8.0 cr.]; A-F or Audit; prereq %; fall, spring, every year) Private instruction.

MUSA 5103. Organ: Elective (graduate non-major in music). (2.0 cr. [max 8.0 cr.]; A-F or Audit; prereq %; fall, spring, every year) Private instruction.

MUSA 5104. Voice: Elective (graduate non-major in music). (2.0 cr. [max 8.0 cr.]; A-F or Audit; prereq %; fall, spring, every year) Private instruction.

MUSA 5105. Violin: Elective (graduate non-major in music). (2.0 cr. [max 8.0 cr.]; A-F or Audit; prereq %; fall, spring, every year) Private instruction.

MUSA 5106. Viola: Elective (graduate non-major in music). (2.0 cr. [max 8.0 cr.]; A-F or Audit; prereq %; fall, spring, every year) Private instruction.

MUSA 5107. Cello: Elective (graduate non-major in music). (2.0 cr. [max 8.0 cr.]; A-F or Audit; prereq %; fall, spring, every year) Private instruction.

MUSA 5108. Double Bass: Elective (graduate non-major in music). (2.0 cr. [max 8.0 cr.]; A-F or Audit; prereq %; fall, spring, every year) Private instruction.

MUSA 5109. Flute: Elective (graduate non-major in music). (2.0 cr. [max 8.0 cr.]; A-F or Audit; prereq %; fall, spring, every year) Private instruction.

MUSA 5110. Oboe: Elective (graduate non-major in music). (2.0 cr. [max 8.0 cr.]; A-F or Audit; prereq %; fall, spring, every year) Private instruction.

MUSA 5111. Clarinet: Elective (graduate non-major in music). (2.0 cr. [max 8.0 cr.]; A-F or Audit; prereq %; fall, spring, every year) Private instruction.

MUSA 5112. Saxophone: Elective (graduate non-major in music). (2.0 cr. [max 8.0 cr.]; A-F or Audit; prereq %; fall, spring, every year) Private instruction.

MUSA 5113. Organ: Elective (graduate non-major in music). (2.0 cr. [max 8.0 cr.]; A-F or Audit; prereq %; fall, spring, every year) Private instruction.

MUSA 5114. Bassoon: Elective (graduate non-major in music). (2.0 cr. [max 8.0 cr.]; A-F or Audit; prereq %; fall, spring, every year) Private instruction.

MUSA 5115. French Horn: Elective (graduate non-major in music). (2.0 cr. [max 8.0 cr.]; A-F or Audit; prereq %; fall, spring, every year) Private instruction.

MUSA 5116. Trumpet: Elective (graduate non-major in music). (2.0 cr. [max 8.0 cr.]; A-F or Audit; prereq %; fall, spring, every year) Private instruction.

MUSA 5117. Trombone: Elective (graduate non-major in music). (2.0 cr. [max 8.0 cr.]; A-F or Audit; prereq %; fall, spring, every year) Private instruction.

MUSA 5118. Euphonium: Elective (graduate non-major in music). (2.0 cr. [max 8.0 cr.]; A-F or Audit; prereq %; fall, spring, every year) Private instruction.

MUSA 5119. Tuba: Elective (graduate non-major in music). (2.0 cr. [max 8.0 cr.]; A-F or Audit; prereq %; fall, spring, every year) Private instruction.

MUSA 5120. Percussion: Elective (graduate non-major in music). (2.0 cr. [max 8.0 cr.]; A-F or Audit; prereq %; fall, spring, every year) Private instruction.

MUSA 5121. Saxophone: Elective (graduate non-major in music). (2.0 cr. [max 8.0 cr.]; A-F or Audit; prereq %; fall, spring, every year) Private instruction.

MUSA 5122. Clarinet: Elective (graduate non-major in music). (2.0 cr. [max 8.0 cr.]; A-F or Audit; prereq %; fall, spring, every year) Private instruction.
MUED 5415. French Horn: Music Major Secondary (graduate). (2.0-4.0 cr. [max 24.0 cr.]; A-F or Audit; prereq Audition, %; fall, spring, every year) Private instruction.

MUED 5416. Trumpet: Music Major Secondary (graduate). (2.0-4.0 cr. [max 24.0 cr.]; A-F or Audit; prereq Audition, %; fall, spring, every year) Private instruction.

MUED 5417. Trombone: Music Major Secondary (graduate). (2.0-4.0 cr. [max 24.0 cr.]; A-F or Audit; prereq Audition, %; fall, spring, summer, every year) Private instruction.

MUED 5418. Baritone: Music Major Secondary (graduate). (2.0-4.0 cr. [max 24.0 cr.]; A-F or Audit; prereq Audition, %; fall, spring, summer, every year) Private instruction.

MUED 5419. Tuba: Music Major Secondary (graduate). (2.0-4.0 cr. [max 24.0 cr.]; A-F or Audit; prereq Audition, %; fall, spring, every year) Private instruction.

MUED 5421. Percussion: Music Major Secondary (graduate). (2.0-4.0 cr. [max 24.0 cr.]; A-F or Audit; prereq Audition, %; fall, spring, every year) Private instruction.

MUED 5423. Guitar: Music Major Secondary (graduate). (2.0-4.0 cr. [max 24.0 cr.]; A-F or Audit; prereq Audition, %; fall, spring, every year) Private instruction.

Music Education (MUED)
College of Liberal Arts

MUED 1201. Introduction to Music Education. (2.0 cr.; A-F only; prereq Music education major; spring, every year) Framework to work effectively in diverse settings. Field experiences, readings, presentations, instructional technologies. Historical, psychological, and philosophical foundations.

MUED 1801. Introduction to Music Therapy. (2.0 cr.; A-F or Audit; fall, spring, every year) Methods, materials, and applications of music therapy in various clinical settings with emphasis on field observation.

MUED 3011. Music in Childhood. (3.0 cr.; fall, spring, every year) Learning each child's interests, needs, and abilities. Integrate music with other classroom subjects. Written/oral discussions, music making, micro-teaching, lesson presentations. Taught from arts perspective.

MUED 3010. Improvisation and Creativity in the Music Classroom. (2.0 cr.; A-F only; prereq At least C- in MUS 3502, music education major; fall, every year) Emphasizes music-theoretical/sociocultural modes of understanding. Creative practices characteristic of various Western/non-Western forms, including jazz and Minnesota American Indian music. Hybrid workshop format.

MUED 3301. General Music I. (3.0 cr.; A-F or Audit; prereq MUS 3502, MUS 3512, successful completion of soph proficiency exam, music education major; fall, spring, every year) Methods, materials, curriculum development, principles of learning. The child voice. Rhythm, music reading, history, appreciation, listening, creativity, classroom instruments. Applications of technology for elementary school classroom music.

MUED 3302. General Music II. (3.0 cr.; A-F or Audit; prereq 3301 with a grade of at least C-; fall, spring, every year) Methods, materials, curriculum, principles of learning. Teaching students in secondary schools to sing, play, create, listen to, and evaluate music. Interdisciplinary connections, the adolescent voice, guitar instruction, applications of technology. Peerfield teaching.


MUED 3316. Choral Conducting and Methods II. (3.0 cr.; A-F or Audit; prereq 3315 with grade of at least C-, MUS 3502, MUS 3512, [music education major or #]; fall, every year) Choral conducting skills, rehearsal techniques. Interpretation of choral compositions. Methods, materials, and curriculum for school choral ensembles. Diction for singing. Secondary general music methodology.

MUED 3317. Style, Pedagogy, and Diction in the Choral Music Classroom I. (2.0 cr.; A-F only; prereq Music education major, two semesters of applied voice at college level; fall, every year) Vocal styles. Lyric diction, vocal pedagogy. Performance in vocal jazz, musical theater, and classical styles. How to apply style concepts in school setting. SMARTMUSIC software.

MUED 3318. Style, Pedagogy, and Diction in the Choral Music Classroom II. (2.0 cr.; A-F only; prereq Music education major, two semesters of applied lessons at college level; spring, every year) Vocal styles. Lyric diction, vocal pedagogy. Performance in vocal jazz, musical theater, and classical styles. How to apply style concepts in school setting. SMARTMUSIC software.

MUED 3319. Advanced Conducting and Repertoire (Choral). (2.0 cr.; A-F only; prereq 3316, MUS 3401, MUS 3502, MUS 3512, music education major [choral]; fall, every year) Conducting/baton technique, non-verbal communication skills, rehearsal techniques, score study habits. Aural/diagnostic skills necessary to effectively rehearse an...
in instrumental ensemble. Selection of quality, age-appropriate repertoire.

MUED 3802. Guitar I for Music Education and Music Therapy Majors: Developing Group Songleading Skills. (2.0 cr.; A-F only; prereq [Music therapy or music education major], %; fall, every year) How to play standing up, accompany oneself, cue/prompt, move around room while playing, sight-read chords, read tablature. Open chords, tuning, keys that facilitate group singing. Eye contact. Simple 2-5 chords songs. Teaching guitar to novice players.

MUED 3803. Guitar II for Music Education and Music Therapy Majors: Developing Group Songleading Skills. (2.0 cr.; A-F only; prereq 3802 with grade of at least C, [music therapy or music education major], %; spring, every year) Students play guitar, accompany themselves as they sing songs, and role play live music therapy and music education settings. How to play in various styles using open chords and different rhythmic accompaniment.

MUED 3807. Percussion Techniques for Music Therapists. (2.0 cr.; A-F or Audit; spring, every year) Design, implement, and facilitate percussion into music therapy session. Variety of music therapy percussion instruments/how to successfully implement them into clinical practice with children, adolescents, and adults who are differently-abled.

MUED 5350. Student Teaching in Classroom Music. (4.0-8.0 cr.; A-F or Audit; prereq Music ed major, %; fall, spring, every year) Supervised teaching and observing of classroom and general music in elementary, junior high, and senior high schools. Weekly seminar emphasizing classroom management, curriculum development, and administration of music programs.

MUED 5450. Student Teaching in Vocal Music. (4.0-8.0 cr.; A-F or Audit; prereq Music ed major, %; fall, spring, every year) Supervised teaching and observing of vocal music in elementary, junior high, and senior high schools. Weekly seminar emphasizing classroom management, curriculum development, and administration of music programs.

MUED 5550. Student Teaching in Instrumental Music. (4.0-8.0 cr.; A-F or Audit; prereq Music ed major, %; fall, spring, every year) Supervised teaching and observing of instrumental music in elementary, junior high, and senior high schools. Weekly seminar emphasizing classroom management, curriculum development, and administration of music programs.

MUED 5647. Teaching the Percussion Instruments. (2.0 cr.; A-F or Audit; fall, spring, offered periodically) Contemporary approaches for teaching percussion in the schools; development of curricular materials and practice in performance techniques.

MUED 5650. Student Teaching Seminar. (2.0 cr.; A-F or Audit; prereq At least C- in all required [music, music education, professional education] courses; fall, spring, every year) Reflective practice during student teaching. Developing materials for professional employment (e.g., resume, portfolio).

MUED 5664. Teaching Music with Technology. (3.0 cr.; A-F or Audit; fall, spring, offered periodically) Home page development techniques, software/materials, audio/video utilities, research applications.

MUED 5669. Psychology of Music. (3.0 cr.; A-F or Audit; prereq Psy 1001 or Psy 2004 or #; fall, every year) Basic study of the psychology and psychoacoustics of music including hearing, music perception and cognition, values and preferences, musical abilities, musical systems, media music effects, the influence of music on human behavior, and psycho-socio-physiological processes involved in musical behavior.

MUED 5750. Topics in Music Education. (1.0-4.0 cr.; [max 16.0 cr.]; A-F or Audit; prereq Grad student in [music education/therapy or education] or #; fall, spring, summer, every year) Focuses on single topic, specified in Class Schedule.

MUED 5800. Group Music Leadership Skills. (3.0 cr.; A-F or Audit; prereq [Completion of MUS 1151, MUS 1152] or MUS 1155, music therapy major] or #; spring, every year) Role of group music experiences in human development. Relations specific to music therapy. Students develop repertoire of music applications/techniques for various age groups/populations. Standards for group leadership. Precision teaching skills.

MUED 5803. Therapeutic Management in Music Settings. (4.0 cr.; A-F only; prereq [5804, 5805] or #; fall, every year) Cognitive behavioral methodology related to music therapy and music education settings. Prepares students to complete case studies mandated for internship completion set forth by American Music Therapy Association.

MUED 5804. Music Therapy Methods and Procedures I. (4.0 cr.; A-F or Audit; prereq 5800 or #; fall, every year) Methods/procedures for developing basic music therapy competencies/professionalism. Music therapy populations, their clinical needs. How to use music therapy in an evidence-based approach to meet client objectives.

MUED 5805. Music Therapy Methods and Procedures II. (4.0 cr.; A-F only; prereq 5804 or #; spring, every year) Second course in professional sequence for music therapy. Topics include psychotherapy techniques and other music therapy approaches. Practicum in the community, in-class lab.

MUED 5806. Career Preparation. (4.0 cr.; A-F or Audit; prereq 5805 or #; spring, every year) Ethics, grant writing, resume/CV preparation, supervision, board certification, professional responsibilities. Students design evidence-based research-based music therapy program, present their proposals to class/community.

MUED 5807. Psychiatric Music Therapy. (3.0-4.0 cr.; A-F only; prereq Grad music therapy student or #; fall, every year) Psychiatric populations. How music therapy can be implemented as evidence-based practice. Students design original research and role-play music therapy interventions for psychiatric populations. Practicum component on designing music therapy interventions.

MUED 5808. Medical Music Therapy. (3.0-4.0 cr.; A-F only; prereq Grad music therapy major or #; spring, every year) Role/scope of music therapy in medical treatment. Medical diagnoses. How to program appropriate music therapy interventions to address patient needs.

MUED 5855. Music Therapy Internship. (1.0-13.0 cr.; S-N or Audit; prereq Music therapy major; #; fall, spring, every year) Six-month resident internship in music therapy at an affiliated, approved hospital or clinic.

MUED 5991. Independent Study. (1.0-4.0 cr.; [max 8.0 cr.]; A-F or Audit; prereq Music ed or music therapy major or grad, %; fall, spring, summer, every year) Independent study project organized by the student in consultation with the appropriate instructor.

Naval Science (NAV)

Undergraduate Education Administration

NAV 1000. Professional Training in Naval Science. (1.0 cr.; S-N or Audit; prereq enrolled in NROTC; fall, spring, every year) Instruction and training in basic military subjects and professional development, including military leadership, close order drill, marksmanship, honors and ceremonies, personnel inspections, and computer-based war game simulations. Classes and small group seminaries on leadership and ethical issues with case studies.

NAV 1101. Introduction to Naval Science. (3.0 cr.; A-F or Audit; fall, every year) Navy organization, customs and traditions, officer and enlisted rank and rating structures, uniforms and insignia, shipboard duties, seamanship, damage control, and safety. Core values of the naval services, Navy Regulations, and the Uniform Code of Military Justice.

NAV 1102. Seapower and Maritime Affairs. (3.0 cr.; A-F or Audit; spring, every year) Historical influences on development of U.S. Navy, from American Revolution to present. Critical, contemporary issues.

NAV 2000. Professional Training in Naval Science. (1.0 cr.; S-N or Audit; prereq Soph enrolled in NROTC; fall, spring, every year) Instruction and training in basic military subjects and professional development, including military leadership, close order drill,
marksmanship, honors and ceremonies, personnel inspections, and computer-based war game simulations. Classes and small group seminars on leadership and ethical issues with case studies.

NAV 2201. Ship Systems I: Naval Engineering. (3.0 cr.; A-F or Audit; spring, every year)
Detailed study of ship characteristics/types. Design, hydrodynamic forces, stability, compartmentation, propulsion, electrical/auxiliary systems, damage control, administration. Basic concepts of theory/design for steam, gas turbine, diesel, nuclear propulsion.

NAV 2202. Ship Systems II: Science and Technology in Naval Weapons Systems. (3.0 cr.; A-F or Audit; fall, every year)

NAV 3000. Professional Training in Naval Science. (1.0 cr.; S-N or Audit; enrolled in NROTC; fall, spring, every year)
Instruction and training in basic military subjects and professional development, including military leadership, close order drill, marksmanship, honors and ceremonies, personnel inspections, and computer-based war game simulations. Classes and small group seminars on leadership and ethical issues with case studies.

NAV 3301. Navigation I: Piloting and Celestial Navigation. (3.0 cr.; A-F or Audit; fall, every year)
Theory/practice piloting a ship near land. Coordinate systems, chart reading, dead reckoning, fixes, tides, currents, anchoring. Theory based on observance of celestial bodies.

NAV 3302. Navigation II: Seamanship and Ship Operations. (3.0 cr.; A-F or Audit; prereq 3301; spring, every year)
National/international nautical rules of the road, seamanship, tactical maneuvering/signaling, relative motion, vector-analysis, formation tactics, ship employment, ship behavior/characteristics. Application of maneuvering board in solving motion problems.

NAV 3310. Evolution of Warfare. (3.0 cr.; A-F or Audit; fall, offered periodically)
Great military leaders of history. Development of warfare, from dawn of recorded history to present. Focuses on effect of major military theorists, strategists, tacticians, technological developments.

NAV 4000. Professional Training in Naval Science. (1.0 cr. [max 4.0 cr.]; S-N or Audit; prereq Sr enrolled in NROTC; fall, spring, every year)
Instruction and training in basic military subjects and professional development, including military leadership, close order drill, marksmanship, honors and ceremonies, personnel inspections, and computer-based war game simulations. Classes and small group seminars on leadership and ethical issues with case studies.

NAV 4401W. Leadership and Management I. (3.0 cr.; A-F or Audit; fall, every year)

NAV 4402W. Leadership and Ethics. (3.0 cr.; A-F or Audit; prereq NAV 4401W; spring, every year)
Junior officer role. Responsibilities faced as leader, manager, professional officer of Naval Services. Develops specific competencies in areas of leadership, management, professional administration, development. Emphasizes Naval Service ethics, core values.

NAV 4410. Amphibious Warfare. (3.0 cr.; A-F or Audit; fall, every year)
Development of amphibious doctrine, its expansion in Pacific Campaign of World War II. Detailed case studies of Tarawa, Iwo Jima, Okinawa illustrate amphibious planning.

Neurology (NEUR)
Medical School

NEUR 5121. Descriptive Neurology. (2.0 cr.; O-N or Audit; prereq enrolled OT or PT; spring, every year)
Central and peripheral nervous system. Correlation of neuroanatomy, neurophysiology, clinical neurology, and pathology of the nervous system.

NEUR 5230. Cerebrovascular Hemodynamics and Diseases I. (4.0 cr.; A-F only; prereq [PHSL 3051 or PHSL 3063], [MATH 1271 or MATH 1371], [MATH 1272 or MATH 1372], [PHYS 1201W or PHYS 1301W], #) or [grad student, PHSL 5061 or #]; fall, every year)
Principles of cerebrovascular disease/pathophysiology, hemodynamics, diagnostic imaging, and endovascular devices. Bench-to-bedside experiments. Clinical trials, including design constraints and biostatistics.

NEUR 5240. Cerebrovascular Hemodynamics and Diseases II. (4.0 cr.; A-F only; prereq 5230, #; spring, every year)

Neuroscience (NSC)
Medical School

NSC 4185. Itasca Summer Neurobiology Laboratory. (3.0 cr.; A-F or Audit; summer, every year)

NSC 5031W. Perception. (3.0 cr.; prereq Psy 3031 or Psy 3051 or #; fall, offered periodically)
Cognitive, computational, and neuroscience perspectives on visual perception. Color vision, pattern vision, image formation in eye, object recognition, reading, impaired vision. Course is biennial: offered fall of odd years.

NSC 5037. Psychology of Hearing. (3.0 cr.; prereq Psy 3031 or #; fall, spring, every year)
Biological and physical aspects of hearing, auditory psychophysics, theories and models of hearing, perception of complex sounds including music and speech, clinical and other applications.

NSC 5040. Brain Networks: From Connectivity to Dynamics. (4.0 cr.; A-F or Audit; fall, odd years)
Brain networks. Application of emerging science of complex networks to studies of the brain. Network approaches that provide fundamental insights into the integrative nature of brain function and its relation to the brain structure. Organization of brain networks and dynamics at multiple spatial scales, ranging from the microscale of single neurons and synapses, to mesoscale of anatomical cell groupings and their projections, and to the macroscale of brain regions and pathways. Experimental studies, including electrophysiology, voltage-sensitive dye imaging, electroencephalography, magnetoencephalography, and functional magnetic resonance imaging, that allow mapping network elements and structural/functional connectivity between them at different temporal and spatial scales will be considered. Experimental/theoretical perspectives.

NSC 5202. Theoretical Neuroscience: Systems and Information Processing. (3.0 cr.; prereq [3101, 3102W] recommended; spring, every year)

NSC 5203. Basic and Clinical Vision Science. (3.0 cr.; prereq #, fall, odd years)
Basic and clinical vision science.

NSC 5461. Cellular and Molecular Neuroscience. (4.0 cr.; A-F or Audit; prereq NSC grad student or #; fall, every year)
Lectures by team of faculty, problem sets in important physiological concepts, discussion of original research papers.

NSC 5462. Neuroscience Principles of Drug Abuse. (2.0 cr.; [PHCL 5462]; prereq #; spring, offered periodically)
Current research on drugs of abuse, their mechanisms of action, characteristics shared
by various agents, and neural systems affected by them. Offered biennially, spring semester of even-numbered years.

**NSC 5481. Invertebrate Neurobiology.** (3.0 cr.; A-F or Audit; fall, spring, every year) Fundamental principles/concepts underlying cellular bases of behavior and "systems" neuroscience. Particular invertebrate preparations. Offered annually the last 10 weeks of spring semester.

**NSC 5540. Survey of Biomedical Neuroscience.** (2.0 cr.; A-F or Audit; prereq #, intended for members of biomedical community or students with advanced scientific backgrounds; summer, every year) Current topics in biomedical neuroscience, accompanied by supporting, fundamental concepts. Intensive, one week course.

**NSC 5551. Itasca Cell and Molecular Neurobiology Laboratory.** (4.0 cr.; S-N or Audit; prereq Neuroscience grad or #; summer, every year) Intensive lab introduction to cellular and molecular aspects of research techniques in contemporary neurobiology; held at Itasca Biological Station. Electrophysiological investigations of neuronal properties, neuropharmacological assays of transmitter action, and immunohistochemical studies in experimental preparations.

**NSC 5561. Systems Neuroscience.** (4.0 cr.; A-F or Audit; prereq NSc grad student or #; fall, every year) Principles of organization of neural systems forming the basis for sensation/movement. Sensory-motor/neural-endocrine integration. Relationships between structure and function in nervous system. Team taught. Lecture, laboratory.

**NSC 5661W. Behavioral Neuroscience.** (3.0 cr.; A-F or Audit; prereq Grad NSc major or grad NSc minor or #; spring, every year) Neural coding/representation of movement parameters. Neural mechanisms underlying higher order processes such as memorization, memory scanning, and mental rotation. Emphasizes experimental psychological studies in human subjects, single cell recording experiments in subhuman primates, and artificial neural network modeling.

**NSC 5567. Neurobiology of Disease.** (2.0-3.0 cr.; S-N or Audit; [NSU 5667]; prereq #; fall, every year) Basic clinical/pathological features, pathogenic mechanisms. Weekly seminar course.

**NSC 5668. Neurodegeneration and Repair.** (2.0 cr.; prereq #; spring, every year) Pathogenic mechanisms of neuronal death, neurodegenerative disease, neuronal repair. Weekly seminar course.

**Neuroscience Department (NSCI) Medical School**

**NSCI 1001. Fundamental Neuroscience: Understanding Ourselves.** (3.0 cr.; A-F only; fall, spring, every year) Assessing objectively the neuroscience information presented to public at-large across various media outlets. Explaining the potential importance of these discoveries.

**NSCI 1100. Human Neuroanatomy.** (4.0 cr.; fall, every year) Introduction to the nervous system. Structure/function of neurons and the major anatomical parts of the nervous system. Processes that underlie many bodily functions and diseases. Lectures/lab exercises.

**NSCI 3001W. Neuroscience and Society.** (4.0 cr.; A-F only; spring, every year) Ethical implications. Readings, personal reflections, class discussions, debates, and formal writing. Development of logical arguments, writing skills, oral presentation skills, and teamwork. Students present/argue both their own personal views and those of others. What it is like to have altered mentation, i.e. a brain disease or disability. Readings/media reports from primary neuroscience literature as well as philosophy, policy, and law literature and popular media.

**NSCI 3100. Mind and Brain.** (3.0 cr.; A-F or Audit; prereq 1001, 1100, broad neuroscience course recommended; spring, every year) New view of cognition that has recently emerged based on how neuroscience instantiates mental processes in physical process of brain. Topics range from the mechanisms of decision-making, to topics of emotion, memory, imagination, self-control, addiction, morality, consciousness.

**NSCI 3101. Introduction to Neurobiology I: Molecular, Cellular, and Systems.** (3.0 cr.; A-F or Audit; prereq BIOC 3021 or BIOC 4331; fall, every year) Basic principles of cellular/molecular neurobiology. Nervous systems.

**NSCI 3102W. Introduction to Neurobiology II: Perception and Behavior.** (3.0 cr.; A-F or Audit; prereq 3101, grade of at least B+ in 3101 recommended; spring, every year) Organization of neural systems/subsystems underlying sensory/motor aspects of behavior. Writing intensive.

**NSCI 4100. Development of the Nervous System: Cellular and Molecular Mechanisms.** (3.0 cr.; A-F only; prereq BIOC 3021 or BIOC 4331; fall, every year) How nervous system develops. General cellular/molecular mechanisms. Experimental data demonstrating mechanisms.

**NSCI 4105. Neurobiology Laboratory I.** (3.0 cr.; A-F or Audit; prereq 3101; #; fall, every year) Principles, methods, and laboratory exercises for investigating neural mechanisms and examining experimental evidence.

**NSCI 4151. Advanced Topics in Neuroscience.** (3.0 cr.; A-F or Audit; spring, every year) In-depth study of aspects of neurodevelopment, neurochemistry/molecular neuroscience, sensory systems, motor control, and behavioral neuroscience. Primarily for undergraduates majoring in neuroscience or related areas.

**NSCI 4167. Neuroscience in the Community.** (1.0-3.0 cr.; A-F or Audit; prereq #; fall, spring, every year) A service learning experience in which a student is paired with a middle school science teacher who has completed the BrainU program in neuroscience. Student observes and assists in implementing previously developed neuroscience educational activities and designs and implements a new classroom activity to teach concepts of neuroscience to middle school learners.

**NSCI 4793W. Directed Studies: Writing Intensive.** (1.0-6.0 cr. [max 42.0 cr.]; S-N or Audit; prereq #, %; no more than 7 cr of [4793, 4794, 4993, 4994] may count toward major requirements; fall, spring, summer, every year) Individual study of selected topics. Emphasis on readings, use of scientific literature. Writing intensive.

**NSCI 4794W. Directed Research: Writing Intensive.** (1.0-6.0 cr. [max 42.0 cr.]; S-N or Audit; prereq #, %; no more than 7 cr of [4793, 4794, 4993, 4994] may count toward major requirements; fall, spring, summer, every year) Lab or field investigation of selected areas of research. Writing intensive.

**NSCI 4993. Directed Studies.** (1.0-7.0 cr.; S-N or Audit; prereq #, %; max of 7 cr of 4993 and/or 4994 may count toward major requirements; fall, spring, summer, every year) Individual study of selected topics with emphasis on selected readings and use of scientific literature.

**NSCI 4994. Directed Research.** (1.0-6.0 cr. [max 42.0 cr.]; S-N or Audit; prereq #, %; max of 7 cr of 4993 and/or 4994 may count toward major requirements; fall, spring, summer, every year) Lab or field investigation of selected areas of research.

**NSCI 5101. Introduction to Neuroscience for Graduate Students.** (3.0 cr.; A-F or Audit; prereq [BioC 3021 or BioC 4331]; %; intended for grad students outside neuroscience program who require comprehensive intro; fall, spring, every year) Basic principles of cellular/molecular neurobiology and nervous system. A term paper supplements lectures. Multiple-choice exams.

**NSCI 5110. Dental Neuroscience for Graduate Students.** (2.0 cr.; A-F or Audit; prereq 6110; BioC 3021, Biol 4004; #; intended for grad students who require a comprehensive grad-level neuroscience course; spring, every year) Structure/function of human nervous system. Lectures and reading assignments emphasize topics pertinent to dentistry.

**NSCI 5111. Medical Neuroscience for Graduate Students.** (5.0 cr.; A-F or Audit; prereq = 6111; BioC 3021, Biol 4004, #; intended for grad students who require a comprehensive medically-oriented neuroscience course; spring, every year)
Survey of molecular, cellular, and systems neuroscience as related to medicine. Lecture/lab.

NSCI 5913. BrainU 101: Neuroscience in the Classroom. (3.0 cr.; A-F or Audit; prereq [Elementary or middle school or high school or preservice] teacher, #, application; fall, spring, every year)

Two-week summer workshop. Week one focuses on training teachers in neuroscience through lectures, activities, and discussion sessions. Week two focuses on designing inquiry-based classroom investigations based on neuroscience education given during week one. Follow-up activities held during the academic year include BrainU staff/faculty classroom presentations and use of training materials.

NSCI 5916. BrainU 101: Neuroscience in the Classroom. (3.0 cr.; A-F or Audit; prereq #; intended for high school teachers; fall, spring, every year)


Neurosurgery (NSU)

NSU 5667. Neurobiology of Disease. (2.0-3.0 cr.; = [NSC 5667]; fall, every year)

Basic clinical/pathological features, pathogenic mechanisms. Weekly seminar.

Norwegian (NOR)

College of Liberal Arts

NOR 1001. Beginning Norwegian. (5.0 cr.; = [NOR 4001]; fall, spring, summer, every year)

Emphasis on working toward novice-intermediate low proficiency in all four language modalities (listening, reading, speaking, writing). Topics include everyday subjects (shopping, directions, family, food, housing, etc.).

NOR 1002. Beginning Norwegian. (5.0 cr.; = [NOR 4002]; prereq 1001; fall, spring, summer, every year)

Continues the presentation of all four language modalities (listening, reading, speaking, writing) with a proficiency emphasis. Topics include free-time activities, careers, and the Norwegian culture.

NOR 1003. Intermediate Norwegian. (5.0 cr.; = [NOR 4003]; prereq 1002; fall, every year)

Emphasis on intermediate proficiency in listening, reading, speaking, and writing. Contextualized work on grammar and vocabulary is combined with authentic readings and essay assignments.

NOR 1004. Intermediate Norwegian. (5.0 cr.; = [NOR 4004]; prereq 1103; spring, every year)

Emphasis on developing intermediate mid-high proficiency in listening, reading, speaking, and writing. Contextualized work on grammar and vocabulary is supported by work with authentic readings and essay assignments.

NOR 4001. Beginning Norwegian. (2.0 cr.; = [NOR 1001]; prereq 1004 in another language or passing score on LPE or grad student; fall, every year)

Meets concurrently with 1001. See 1001 for description.

NOR 4002. Beginning Norwegian. (2.0 cr.; = [NOR 1002]; prereq 1004 in another language or passing score on LPE or grad student; spring, every year)

Meets concurrently with 1002. See 1002 for description.

NOR 4003. Intermediate Norwegian. (2.0 cr.; = [NOR 1003]; prereq 1004 in another language or passing score on LPE or grad student; fall, every year)

Meets concurrently with 1003. See 1003 for description.

NOR 4004. Intermediate Norwegian. (2.0 cr.; = [NOR 1004]; prereq 1004 in another language or passing score on LPE or grad student; spring, every year)

Meets concurrently with 1004. See 1004 for description.

Nursing (NURS)

School of Nursing

NURS 777. School of Nursing Professional Active Status. (0.0 cr.; No Grade Associated; prereq #; fall, spring, summer, every year)

Limited to first two enrollments during school career.

NURS 1020. Challenge of Nursing. (1.0 cr.; S-N or Audit; fall, every year)


NURS 1030. Nursing Guarantee Student Seminar. (1.0 cr.; prereq Freshman guarantee student; #; fall, every year)

Overview of profession of nursing, including historical roots, current roles/scope, potential future evolution. Explore career opportunities/challenges in nursing.

NURS 1910W. Freshman Seminar. (3.0 cr.; A-F only; fall, every year)

Freshman seminar. Topics vary by term.

NURS 2000. Human Growth and Development: A Life Span Approach. (3.0 cr.; fall, spring, every year)

Theoretical, personal, and culturally determined theories on life span development, from prenatal period through death/dying. Psychoanalytical, behaviorism, cognitive, sociocultural, and epigenetic categories of biosocial, cognitive, and psychosocial domains.

NURS 3115. Health Informatics and Information Technology. (3.0 cr.; A-F only; prereq Undergrad or #; spring, every year)

Health informatics and information technology from consumer, clinical, and public health perspectives. Using information technology to communicate, manage knowledge, mitigate error, and support decision-making.

NURS 3690. Life Span, Growth, and Development I. (2.0 cr.; fall, spring, summer, every year)

Biological/sociological/psychological perspectives of human life span development from prenatal period through young adulthood.

NURS 3691. Life Span, Growth, and Development II. (1.0 cr.; prereq 3690; one general psychology and one general biology course or #; fall, spring, summer, every year)

An introductory, multimedia course that incorporates biological, sociological, and psychological perspectives of human life span development for the period of young adulthood through aging and the death experience.

NURS 3703. Assessment and Beginning Interventions: Nursing Lab I. (3.0 cr.; A-F only; prereq Admitted to Nurs BSN program; fall, every year)

Psychomotor skills/interventions with focus on therapeutic interventions. Experiential learning activities used to build skill in assessment, planning/implementation of select nursing interventions. Theoretical foundations of nursing interventions.

NURS 3705. Nursing Interventions. (2.0 cr.; A-F or Audit; prereq 3703, enrolled in School of Nursing; spring, every year)

Psychomotor skills/interventions with focus on therapeutic interventions. Experiential learning activities used to build skill in assessment, planning, implementation of select nursing interventions.

NURS 3710. Statistics for Clinical Practice and Research. (3.0 cr.; prereq [High school algebra or #]; students enrolled in School of Nursing must take A/F option; fall, every year)


NURS 3800. Nursing Topics. (1.0-4.0 cr.; [max 8.0 cr.]; prereq #; fall, spring, every year)

Topics not included in regular courses.

NURS 3801. Patient Centered Care of Adults and Older Adults I. (3.0 cr.; A-F only; prereq Admitted to Nurs BSN program; fall, spring, every year)

Person-centered evidence based nursing care for adults, including physical/mental health promotion, acute/chronic illness management. Critical analysis of patient needs/planning nursing care.

NURS 3802. Patient Centered Care: Nursing Care of Families I. (3.0 cr.; A-F only; prereq Enrolled in School of Nursing; fall, spring, every year)

Introduction to nursing care of childbearing/childrearing families. Family theory, family-centered care, and family culture in the context of home and community settings.

NURS 3802H. Nursing Care of Families I Honors. (4.0 cr.; A-F only; prereq Enrolled nursing student; fall, spring, every year)

Nursing care of childbearing/childrearing families. Family theory, family-centered care, family culture in the context of home and community settings and therapeutic communication between nurse and patients/families.
NURS 3803. Application of Genetics in Nursing . (2.0 cr.; A-F or Audit; prereq Enrolled in nursing major; spring, every year) Application of genetics to the practice of professional nursing.

NURS 3806. Nurse as Professional. (2.0 cr.; A-F or Audit; prereq Admitted to nursing BSN program; fall, spring, every year) Basic nursing concepts, role development, competencies, therapeutic use of self, and communication skills for person-centered care and professional teamwork; beginning development of own nursing philosophy; career exploration.

NURS 3806H. Nurse as Professional: Honors. (3.0 cr.; A-F only; prereq [Undergrad nursing student, honors] or #; fall, every year) Basic nursing concepts, role development, competencies, therapeutic use of self, communication skills for person centered care/professional teamwork. Develop own nursing philosophy. Explore careers/qualitative research methods while interviewing School of Nursing alumni.

NURS 3999. Clinical Internship. (0.0-3.0 cr.; S-N or Audit; prereq Completed jr yr of baccalaureate nursing program, accepted into approved clinical internship program; summer, every year) Application of nursing theory/research based knowledge in clinical practice.

NURS 4104. Ethical Sensitivity and Reasoning in Health Care. (2.0 cr.; A-F only; prereq Nursing undergraduate student; fall, every year) Developing sensitivity to range/complexity of ethical issues/dilemmas in health care. Ethical principles/theories. Key ethical concepts in addressing morally troubling issues in health care settings.

NURS 4106. Nurse as Collaborator. (1.0 cr.; A-F only; prereq Enrolled in nursing program; fall, every year) Examination of evidence-based teamwork systems and processes to improve communication and collaboration among health care professionals.

NURS 4205V. Honors: Nursing Theory and Research. (3.0 cr.; A-F only; prereq Nursing major; fall, spring, every year) Person-centered evidence based nursing care for adults with complex physical and mental health illnesses. Critical analysis of multiple complex patient needs. Planning nursing care.

NURS 4303. Practicum: Person Centered Care of Adults in Acute Care . (3.0 cr.; A-F only; prereq 3703, 3705, 3801, [3802 or 3802H]; enrolled in nursing; fall, spring, every year) Clinical reasoning is applied to the nursing care of young through older adults in acute care. Evidenced based practice and clinical reasoning to provide person centered care within the health system environment.

NURS 4305. Practicum: Community-based Care of Families Across Life Span. (3.0 cr.; A-F only; prereq 3703, 3705, 3801, [3802 or 3802H]; enrolled Nurs student; fall, spring, every year) Examine an evidence-based teamwork system to improve communication and teamwork skills among health care professionals.

NURS 4312. Patient Centered Care: Nursing Care of Families II . (4.0 cr.; A-F only; prereq 3802, enrolled nursing student; fall, spring, every year) Family centered care theory applied to care of childbearing, childrearing families in acute care setting. High risk pregnancy. Child response to illness/hospitalization.


NURS 4324. Transcultural Nursing and Global Health. (3.0 cr.; prereq Nursing student or #; fall, spring, every year) Influence of culture on nursing care delivery/role of nurse in providing culturally appropriate care for increasingly diverse populations. Global health issues and factors affecting the health status of populations.

NURS 4402. Taking Ethical Action in Health Care. (1.0 cr.; A-F only; prereq Senior undergraduate nursing student, [4104 or #]; fall, every year) Ethical dimensions/role obligations of health care professionals related to selected social issues with health consequences.

NURS 4404V. Honors: Applied Research and Research Utilization. (3.0 cr.; A-F only; prereq Honors student in School of Nursing, Nurs 4205V, upper division statistics course; fall, every year) Systematic inquiry in interpreting/evaluating research. Implement study proposed in Nurs4205V. Write scholarly research report, which will serve as honors research thesis.

NURS 4430. Immunization Tour. (1.0 cr.; S-N or Audit; [PHAR 6210]; prereq [Senior Bachelor of Science nursing student or professional master's nursing student], completion of CPR; fall, every year) Nursing/pharmacy students operate influenza immunization clinics for faculty, staff, students. Inter-professional collaboration, public health principles, interventions. Logistics, screening, aseptic technique, emergency response strategies, syncope, needle sticks/mass immunization.

NURS 4505. Managing Chronic Health Conditions of Elders: a Study Abroad Practicum. (3.0 cr.; A-F or Audit; prereq 4100, 4101, 4102, 4103, 4104, 4202, 4205, 4210, 4300, 4302, 4414; fall, spring, offered periodically) Practicum in care of elders with complex, chronic health conditions in international setting using culturally focused, holistic framework. Students evaluate patient information from multiple sources to develop appropriate plans of care, analyze model of nursing and health care delivery.

NURS 4703. Specialty Focused Practicum I. (4.0 cr.; A-F only; prereq Nursing student in School of Nursing; fall, every year) Person-centered nursing care that is safe, effective, holistic, culturally sensitive.

NURS 4704. Continuum of Care Practicum. (2.0 cr.; A-F only; prereq Nursing Student in School of Nursing; fall, every year) Care coordination/relationship of acute, home, community services. Populations may include chronically ill, all ages (aging adults, pediatric), culturally diverse/healthy communities.

NURS 4705. Specialty Focused Practicum II. (6.0 cr.; A-F or Audit; prereq 4703, sr in good standing in BSN; spring, every year) Synthesis of previous learning while providing to high quality nursing care that is safe, ethical, evidence-based, holistic, culturally sensitive, and person-centered in selected clinical specialty. Application of professional nursing values to clinical practice. Preceptor led.

NURS 4706. Transition to Practice. (1.0 cr.; A-F or Audit; prereq Sr in BSN program; fall, spring, every year) Professional and legal issues necessary to the transition into nursing practice; strategies for lifelong learning and nursing career trajectories in preparation for entry into practice in a complex health care system.

NURS 4707. Nursing Leadership: Professional Practice in Complex Systems. (2.0 cr.; A-F only; prereq Sr enrolled in BSN program; spring, every year) Leadership skills for safe effective practice as a new graduate nurse; issues affecting nursing practice; leadership attributes, e.g., creating effective teams, confident interaction with others, resolving conflict, managing resources, leadership for assuring patient safety and quality care.

NURS 4777W. Senior Project in the Nursing Major. (3.0 cr. [max 9.0 cr.]; A-F only; prereq 4205W or 4205V; fall, spring, every year) Fundamental skills in systematic inquiry, interpretation, evaluation of research. Scholarly exploration of clinical problem or system issue
affecting nursing practice/patient outcomes. Development/presentation of project.

**NURS 4800. Nursing Topics.** (0.0-16.0 cr.; max 48.0 cr.; prereq #; fall, spring, summer, every year)

Exploration of a topic to meet individual student needs.

**NURS 4801. Research Topics.** (1.0-16.0 cr.; fall, spring, offered periodically)

Exploration of research topic to meet individual student needs.

**NURS 5010. Foundations of Interprofessional Communication and Collaboration.** (1.0 cr.; S-N only; prereq Nursing student; fall, every year)

Exploration of nature/need for interprofessional communication among health care professionals. Qualities of successful interprofessional teams/interactions. Introduction to professional identity, ethics, integrity, values. Strategies for communication/decision making.

**NURS 5011. Interprofessional Diabetes Experience.** (2.0 cr.; A-F only; prereq 2nd or 3rd year in nursing curriculum; spring, every year)

Explore diabetes mellitus through active, hands-on learning in an interprofessional environment. Week-long simulated experience of living with diabetes. Online learning activities focused on interprofessional teamwork for optimal care to patients with diabetes.

**NURS 5012. Phillips Neighborhood Clinic: Interprofessional Service.** (0.0 cr.; No Grade Associated; prereq Sophomore in School of Nursing, [2 year commitment or MN student]; fall, spring, summer, every year)

Apply for position as nursing student volunteer at Phillips Neighborhood Clinic. Provide nursing care under guidance of licensed faculty mentors. Meet Board of Nursing requirements for nursing students engaged in direct patient care.

**NURS 5014. Examining the Evidence: Forensic Health Care Practices and Opportunities.** (2.0 cr.; prereq Grad student or undergraduate senior or #; fall, offered periodically)

Forensic health care, including sexual assault forensic examiners/death investigators. Examine current research regarding these roles. Opportunity for relevant community-based field experiences.

**NURS 5016. Critical Reading of Scientific Literature in Adolescent Health.** (1.0 cr.; prereq [Grad-level research methods course, inferential statistics course] or #; fall, every year)

Develop skills for critically reading empirical literature within field of adolescent health. Written/oral critiques of core elements of research articles, including literature review, conceptual framework, research questions/hypotheses, methods, results, discussion, conclusions.

**NURS 5029. Introduction to Nursing Interventions.** (4.0 cr.; A-F only; prereq Admission to master of nursing (MN) program, &5030; fall, every year)

Evidence-based interventions for safe, culturally appropriate, and ethical nursing practice. Experiential learning activities in laboratory and clinical settings build skills in assessment, planning, implementation, and evaluation.

**NURS 5030. Foundational Concepts of Professional Nursing.** (3.0 cr.; A-F or Audit; prereq Admission to master's in nursing program; fall, every year)

Foundation of knowledge for culturally appropriate, ethical, evidence-based nursing practice across the life span. Research/theory that underlie the art/science of professional nursing. Concepts of person, environment, health, and nursing.

**NURS 5031. Human Response to Health and Illness: Adults and Elders.** (6.0 cr.; A-F or Audit; prereq Professional master of nursing [MN] student; spring, every year)

Individual responses to health/illness, in context of families/environments. Clinical component emphasizes application of nursing process in adult/elderly populations.

**NURS 5032. Human Response to Health and Illness: Children and Childbearing Families.** (6.0 cr.; A-F or Audit; prereq Professional master of nursing [MN] student; spring, every year)

Family responses to health/illness. Emphasizes application of nursing process in children/childbearing families. Seminar/community-based project focus on family as unit of care.

**NURS 5033. Population Response to Health and Mental Illness.** (5.0 cr.; A-F or Audit; prereq Nursing postbaccalaureate certificate program; summer, every year)

Population-based nursing practice. Emphasizes application of nursing process in promoting mental health and public health, and in preventing illness across life span. Clinical experiences include interactions with individuals, families, communities, and systems.

**NURS 5034. Nursing Care of Complex Clients and Diverse Populations.** (2.0 cr.; A-F or Audit; prereq 5033; fall, offered periodically)

Critical analysis of current/emergent nursing care issues. Essential role of nursing in providing care for complex/diverse populations.

**NURS 5035. Practicum Nursing Care for Complex Health Conditions.** (4.0 cr.; A-F or Audit; prereq Nursing postbaccalaureate certificate program or master of nursing program; fall, every year)

Clinical decision-making, comprehensive nursing care of clients with complex health problems. In collaboration with a clinical preceptor and a faculty adviser, students develop an individualized learning contract.

**NURS 5040H. Seeking Solutions to Global Health Issues.** (3.0 cr.; A-F only; prereq Prereq Junior or senior University Honors Program (UHP) student in nursing or other major, or graduate student, or instr consent; meets Lib Ed req of Global Perspectives; meets Honors req of Honors; fall, every year)

Global health issues from interdisciplinary perspective. Ethical/cultural sensitivity, complexities. Students propose realistic actions to resolve issues.

**NURS 5113. Web-based Teaching and Learning Strategies.** (2.0 cr.; S-N or Audit; spring, every year)

Skills necessary to design, produce, implement, and evaluate effective technology enhanced learning environments. Pedagogical/technological issues surrounding teaching with technology.

**NURS 5115. Interprofessional Health Care Informatics.** (3.0 cr.; A-F or Audit; fall, spring, every year)

Implications of informatics for practice, including nursing, public health, and health care in general. Electronic health record issues. Ethical, legislative, political, and global/future informatics issues.

**NURS 5116. Consumer Health Informatics.** (1.0 cr.; A-F only; prereq Grad student or #; fall, spring, every year)

Examines issues from consumer’s perspective in acquisition, understanding, use or provision of health information. Online strategies for improving health. Impact on consumer-provider relationships/ethical and legal issues.

**NURS 5117. Consumer Health Informatics Practicum.** (1.0 cr.; S-N only; prereq [Grad student, [5116 or &5116]] or #; fall, every year)

Apply student knowledge to analysis of health needs and consumer health principles, theories, and research to a consumer health informatics project.

**NURS 5120. Palliative Care for Children.** (1.0 cr.; prereq #; summer, every year)


**NURS 5170. Research Topics.** (1.0-16.0 cr.; [PUBH 6170]; fall, spring, offered periodically)

Exploration of research topic to meet individual student needs.

**NURS 5183. Scholarly Leadership.** (1.0 cr.; S-N or Audit; prereq Advanced doctoral nursing student, #; spring, every year)

Implications of dissertation research on advancing science, clinical practice, and leadership in nursing and health care. Principles of scholarly collaboration.

**NURS 5190. Essentials of Holistic Health Assessment.** (3.0 cr.; A-F only; prereq Admission to MN Program; fall, spring, every year)

Health assessment knowledge/skills for nursing practice across life span. History taking, interviewing techniques, technical skills to perform complete, systematic health assessment, focused assessments for acute care settings.

**NURS 5200. Holistic Health Assessment and Therapeutics for Advanced Practice Nurses.** (3.0 cr.; A-F only; prereq Admission to
Leadership theory/application. System issues affecting nursing practice and patient outcomes.

NURS 5501. Professional Issues in Nurse-Midwifery. (1.0-2.0 cr.; S-N or Audit; prereq Nurs grad major; #; spring, every year)
Analysis of professional issues that confront and impact the practice of certified nurse-midwives. History and development of the professional organization including certification, legislation, ethical dimensions, public policy, and clinical practice issues.

NURS 5505. Assessment and Support of Women in Labor. (2.0 cr.; S-N only; prereq Admission to DNP Program; spring, every year)
Self-directed study with goal of working with experienced labor nurses/learning knowledge/ skills required to perform labor. Clinical experience. Completion of selected online modules related to nursing care of women in labor.

NURS 5604. Advanced Health Assessment and Interventions with Adolescents. (2.0 cr.; prereq CPsPs 5303 or equiv or #; summer, every year)
Integrates knowledge from nursing, public health, health behavior, and adolescent development as framework for developing health assessment/intervention strategies for clinical practice with adolescents.

NURS 5808. American Indian Health and Health Care. (2.0 cr.; prereq Upper div or grad student or #; fall, spring, every year)
Examines health of native nations in Minnesota within historical/cultural contexts. Epidemiology of major health conditions, health services, traditional Indian medicine, health beliefs. Opportunities for contact with Native American community.

NURS 5812. Global Health Through Study Abroad. (2.0-3.0 cr.; S-N only; prereq #; spring, summer, every year)
Nursing as a global profession and the issues that impact health of populations worldwide.

NURS 5820. Foundations of Infection Control. (3.0 cr.; prereq Baccalaureate degree in health related field or #; fall, spring, summer, offered periodically)
Integrates microbiology, epidemiology, and patient care practices applied to a population-focused practice. Focuses on risk identification, prevention strategies.

NURS 5830. Advanced Clinical Nursing. (1.0-6.0 cr.; prereq Grad nursing major; #; fall, spring, summer, every year)
Independent study or faculty seminar on special clinical topic.

NURS 5925. Grant Writing and Critique. (1.0 cr.; prereq Grad student or #; spring, every year)
Self-paced course. Online modular format. How to write/critique grants. Students select a research or program grant to critique, applying knowledge obtained through learning modules.
Psychiatric/neuropsychological assessment/treatment. Issues related to medical/community management and to roles of OT/PTh with respect to clients with mental health needs. Interaction between physical/mental health and disability.

OT 5122. Descriptive Neurology. (2.0 cr.; A-F or Audit; prereq OT student or #; fall, every year)
Relates neuroanatomical/neurophysiological principles to neurological conditions commonly seen in occupational/physical therapy practice.

OT 5161. Theory of Physical Medicine and Rehabilitation Applied to Medical Sciences. (2.0 cr.; A-F or Audit; prereq OT student or #; fall, every year)
Diagnostic procedures. Medical, surgical, and rehabilitation management of patient problems in orthopedics, surgery, pediatrics, dermatology, medicine, cancer, and speech. Correlation to current practice. Presentation of patients.

OT 5182. Functional Neuroanatomy and Neurophysiology. (4.0 cr.; A-F or Audit; prereq Registered occupational therapy student or #; spring, every year)
Neuroanatomical structures as functional systems, basic neurophysiological concepts. Emphasizes applications for understanding/treating physical dysfunctions.

OT 5300. Concepts for Occupational Therapy Practice. (4.0 cr.; A-F or Audit; prereq enrolled OT student or #; fall, every year)
Critical thinking, ethics, professional resources/organizations, patient-therapist relationship. Level I fieldwork experience.

OT 5313. Therapeutic Occupation. (4.0 cr.; A-F or Audit; prereq enrolled OT student or #; fall, every year)
Occupational therapy philosophy, history, and frames of reference. Activity analysis applied to purposeful, therapeutic activities for individuals and groups.

OT 5341. Introduction: Evaluation and Intervention I. (4.0 cr.; A-F or Audit; prereq 5393 or #; spring, every year)
Assessment concepts/techniques. Application to patient populations with both mental health/physical disabilities. Treatment planning/documentation.

OT 5342. Compensatory Rehabilitation: Evaluation and Intervention II. (4.0 cr.; A-F or Audit; prereq 5300, 5313 or #; spring, every year)
Assessment of daily living performance areas; adaptation techniques to compensate for performance deficits. Level I fieldwork experience.

OT 5343. Specialty Topics: Evaluation and Intervention III. (4.0 cr.; A-F or Audit; prereq 5342 or #; fall, every year)
Applies critical thinking model to assessment/intervention of selected patient populations with mental/physical problems requiring specialized approaches. Focus on habilitation/rehabilitation of populations with multiple performance component deficits. Fieldwork.

OT 5344. Neurorehabilitation: Evaluation and Intervention IV. (5.0 cr.; A-F or Audit; prereq 5343 or #; spring, every year)
Assessment/intervention related to perception, cognition, reflexes, sensory integration, and motor control. Application to individuals with multiple performance component deficits.

OT 5360. Dynamics of Group Models. (2.0 cr.; A-F or Audit; prereq 5313 or #; fall, every year)
Application of group/team dynamics in diverse professional settings.

OT 5370. Theory of Occupation. (1.0 cr.; A-F or Audit; prereq enrolled OT student or #; fall, every year)
Occupational therapy frames of reference, role of activity, and historical development of profession.

OT 5375. Community Resources and Health-Care Issues. (2.0 cr.; A-F or Audit; prereq [5300, 5342] or #; fall, every year)
Analysis of community health-care systems, including cultural/family influences on individual health and decision making. Students identify current trends in health care and determine responses to them at social, political, or legislative level.

OT 5376. Adult Education and Planning. (1.0 cr.; A-F or Audit; prereq 5313 or #; spring, every year)
Skills needed to plan, implement, and evaluate adult educational programs/materials for patient/family education, peer/professional education, and education of others in order to carry out therapeutic interventions. Student teaching unit, community based activity.

OT 5380. Management of Occupational Therapy Services. (3.0 cr.; A-F or Audit; prereq [5360, 5375, 5376] or #; spring, every year)
Administration/management of occupational therapy services within managed care environment. Issues in Medicare, HMOs, TQM, consultation, human resources, promotion of profession. Emphasizes program development in current organizational structures.

OT 5391. Occupation Across the Life Span. (3.0 cr.; A-F or Audit; prereq [5375, 5376] or #; spring, every year)
The well elderly, school therapy, work-related injuries/industrial rehabilitation. Fieldwork.

OT 5392. Research in Occupational Therapy. (3.0 cr.; A-F or Audit; prereq 5313 or #; spring, every year)
Analysis of scientific literature, development of research proposals.

OT 5393. Functional Anatomy and Kinesiology. (4.0 cr.; A-F or Audit; prereq enrolled OT student or #; fall, every year)
Gross human anatomy emphasizing skeletal, muscular, circulatory, and peripheral nervous systems of the extremities and trunk. Includes cadaver lab procedures. Analyzing functional human movement from a biomechanical perspective.

OT 5394. Orthotics. (3.0 cr.; A-F or Audit; prereq 5341 or #; fall, every year)
Analysis, design, and construction of orthotic devices.

OT 5395. Independent Study in Occupational Therapy. (1.0-4.0 cr. [max 16.0 cr.;] prereq Enrolled OT student or #; fall, spring, summer, every year)
Independent Study in Occupational Therapy

Off-Campus Study (OCS)
College of Liberal Arts

OCS 520. Off-Campus Study. (0.0 cr.; S-N only; prereq %; fall, spring, every year)
OCS 550. National Student Exchange: Off-Campus Study. (0.0 cr.; S-N only; prereq %; fall, spring, summer, every year)
Off-campus study program.

OCS 1550. National Student Exchange: Off-Campus Study. (1.0-15.0 cr.; S-N only; prereq %; fall, spring, every year)
Non published
OCS 3500. Domestic Off-Campus. (1.0-15.0 cr.; S-N only; prereq %; fall, spring, every year)
Domestic off-campus study. (Do not publish.)

OCS 4941H. Honors Topics. (2.0-3.0 cr. [max 7.0 cr.]; A-F only; fall, every year)
Team taught.

Office of Undergraduate Education (OUE)
Undergraduate Education Administration

OUE 1086. The First Year Experience. (2.0 cr.; A-F only; prereq 1st-yr student athletes; fall, every year)
Awareness of roles, identity, needs, and interactions with diverse groups. Expectations, resources, and challenges associated with transition into college. Speakers, journals/portfolios, technology, reading/writing assignments, classroom exercises/experiences.

OUE 1909W. Freshman Seminar. (3.0 cr.; A-F only; spring, offered periodically)
Freshman seminar.

OUE 1910W. Freshman Seminar. (3.0 cr.; A-F only; spring, offered periodically)
Freshman seminar. Topics vary by semester.

OUE 2100. Academic Planning and Exploration. (1.0 cr.; prereq Ctr for Academic Planning and Exploration (CAPE) consent; fall, spring, summer, every year)
Undecided and competitive-major students engage in academic and career decision-making process. Students develop an exploratory action plan to help them discover/declare a best-fit major matching their interests, values, and academic skills. Customized course assignments include self-assessment, reflective essays, and an action plan project.

OUE 3050. Introduction to Peer Education. (1.0 cr.; fall, every year)
Peer cooperative learning. Factors that enhance effectiveness of group learning, including facilitating learning process, integrating learning skill development/
content knowledge acquisition, application of appropriate theories of learning.

Ojibwe (OJIB)
College of Liberal Arts

OJIB 1100. Ojibwe Immersion. (5.0 cr.; =OJIB 4100; summer, every year)
Three week course designed to help students with little or no knowledge of Ojibwe language. Introduction to fundamentals of Ojibwe language. Taught primarily in Ojibwe with some grammatical description. Learn to read/write in Ojibwe language.

OJIB 1101. Beginning Ojibwe I. (5.0 cr.; =OJIB 4101; fall, every year)
Speaking. Grammar. Writing systems.

OJIB 1102. Beginning Ojibwe II. (5.0 cr.; =OJIB 4102; prereq 1101; spring, every year)
Speaking. Grammar. Writing systems.

OJIB 3103. Intermediate Ojibwe I. (5.0 cr.; =OJIB 4103; prereq 1101, 1102; fall, every year)

OJIB 3104. Intermediate Ojibwe II. (5.0 cr.; =OJIB 4104; prereq 1102, 1102,3103; spring, every year)

OJIB 3127. Ojibwe Language for Teachers. (3.0 cr.; A-F only; prereq 1101; spring, every year)
How to learn Ojibwe outside classroom and teach it in formal/informal learning settings, including second language classrooms, immersion schools, language tables, and immersion camps.

OJIB 4100. Ojibwe Immersion. (3.0 cr.; =OJIB 4100; summer, every year)
Three week course designed to help students with little or no knowledge of Ojibwe language. Introduction to fundamentals of Ojibwe language. Taught primarily in Ojibwe with some grammatical description. Learn to read/write in Ojibwe language.

OJIB 4101. Beginning Ojibwe I. (3.0 cr.; =OJIB 4101; prereq 1004 in another language or passing score on LPE or grad student; fall, every year)
Speaking, grammar, writing systems.

OJIB 4102. Beginning Ojibwe II. (3.0 cr.; =OJIB 4102; prereq 1004 in another language or passing score on LPE or grad student; summer, every year)
Speaking, grammar, writing systems.

OJIB 4103. Intermediate Ojibwe I. (3.0 cr.; =OJIB 4103; prereq 1101, 3103; fall, every year)
Speaking, grammar, storytelling, oral history. Translation projects.

OJIB 4104. Intermediate Ojibwe II. (3.0 cr.; =OJIB 4104; prereq 1102, 3102; spring, every year)
Speaking, grammar, storytelling, oral history. Translation projects.

OJIB 4106. Advanced Ojibwe I. (3.0 cr.; A-F or Audit; fall, every year)
Focuses on immersion method.

OJIB 4109. Advanced Ojibwe II. (3.0 cr.; A-F or Audit; spring, every year)
Focuses on immersion method.

OJIB 5106. Advanced Ojibwe Language I. (3.0 cr.; =OJIB 5103; prereq 1101, 1102; fall, every year)
Focuses on immersion method.

OJIB 5109. Advanced Ojibwe Language II. (3.0 cr.; =OJIB 5109; prereq 1101, 1102; spring, every year)
Focuses on immersion method.

Ophthalmology (OPH)
Medical School

OPH 101. Introduction to Ophthalmology. (1.0 cr.; S-N only; =OJIB 101; fall, spring, every year)

OPH 1101. Academic Studies for Orthoptics Technicians. (7.0 cr.; S-N or Audit; prereq 1100 in another language or passing score on LPE or grad student; =OJIB 1101; fall, every year)

OPH 1201. Basic Science for Orthoptics Technicians. (8.0 cr.; S-N or Audit; prereq 1100 in another language or passing score on LPE or grad student; =OJIB 1201; spring, every year)

OPH 1301. Basic Science for Orthoptics Technicians. (7.0 cr.; S-N or Audit; prereq 1100 in another language or passing score on LPE or grad student; =OJIB 1301; fall, every year)

OPH 1302. Clinical Assisting for Orthoptics Technicians. (8.0 cr.; S-N or Audit; prereq 1100 in another language or passing score on LPE or grad student; =OJIB 1302; spring, every year)

OPH 1401. Clinical Assisting for Orthoptics Technicians. (7.0 cr.; S-N or Audit; =OJIB 1401; fall, every year)

OPH 1501. Ophthalmic Technician Externship. (15.0 cr.; S-N or Audit; =OJIB 1501; fall, every year)

OPH 1502. Ophthalmic Technician Externship. (15.0 cr.; S-N or Audit; =OJIB 1502; spring, every year)

OPH 1601. Ophthalmic Technician Externship. (15.0 cr.; S-N or Audit; =OJIB 1601; fall, every year)

OPH 5100. Orthoptics I. (4.0 cr.; =OJIB 5100; prereq 1100 in another language or passing score on LPE or grad student; =OJIB 5100; fall, every year)

OPH 5101. Orthoptics II. (5.0 cr.; =OJIB 5101; prereq 1100 in another language or passing score on LPE or grad student; =OJIB 5101; spring, every year)

OPH 5102. Orthoptics III. (5.0 cr.; =OJIB 5102; spring, every year)

OPH 5103. Orthoptics IV. (5.0 cr.; =OJIB 5103; fall, every year)

Clinical rotation involving experience in outpatient management and using intravenous sedation and general anesthesia.

OSUR 5276. Medicine Rotation for the Oral and Maxillofacial Surgeon. (0.0-6.0 cr.; S-N only; =OJIB 5276; fall, spring, summer, every year)

OSUR 5277. Physical Diagnosis for Oral Surgery Residents. (0.0-6.0 cr.; =OJIB 5277; fall, spring, summer, every year)

Six-week didactic course coupled with evaluation of patients.

Organizational Leadership, Policy and Development (OLPD)
College of Education and Human Development

OLPD 1301W. Personal Leadership in the University. (3.0 cr.; A-F only; =PA 1961W, OLPD 1301; fall, spring, summer, every year)
Students examine their own views of leadership, differences between personal/positional leadership, leadership ethics/values, and their own leadership strengths/skills.

OLPD 1302. Personal Leadership in the University. (3.0 cr.; A-F only; =PA 1961W, OLPD 1302; fall, spring, summer, every year)
Students examine their own views of leadership, differences between personal/positional leadership, leadership ethics/values, and their own leadership strengths/skills.

OLPD 1496. Supervised Career and Technical Education Teaching. (4.0 cr.; =OJIB 1496; S-N or Audit; =OJIB 1496; fall, spring, summer, every year)
Supervised teaching for beginning teachers, or teaching activities for preservice teachers.

OLPD 1801. Introduction to Career and Technical Education Teaching. (2.0 cr.; =OJIB 1801; A-F or Audit; =OJIB 1801; fall, spring, summer, every year)
Entry-level skills to function as a teacher. Philosophy of career/technical education, planning of instruction, instructional methods,
student evaluation, working with students who have special needs, ancillary duties of career/technical education faculty. Emphasizes microteaching and feedback.

OLPD 1905. Freshman Seminar. (1.0-3.0 cr.; [max 6.0 cr.]; prereq Fr; fall, spring, every year) Interdisciplinary seminar. Topics specified in Class Schedule.

OLPD 1909W. Freshman Seminar: International Perspectives and Writing Intensive. (1.0-3.0 cr.; [max 6.0 cr.]; prereq Fr; fall, spring, offered periodically) Interdisciplinary seminar. Topics specified in Class Schedule.

OLPD 1942. Freshman Seminar: Technology and Society. (1.0-3.0 cr. [max 6.0 cr.]; prereq Fr; fall, spring, every year) Ongoing evolution of social contexts and work through the interdisciplinary lens of future studies.

OLPD 2811. Societies of the Future: Changing Work Contexts. (3.0 cr.; A-F or Audit; fall, spring, every year) Ongoing evolution of social contexts and work through the interdisciplinary lens of future studies.

OLPD 2811H. Societies of the Future: Changing Work Contexts, Honors. (3.0 cr.; A-F or Audit; prereq Quality Matters certified; fall, spring, summer, every year) Theories of adult learning, teaching/learning styles, methods/perspectives of teaching, applications of teaching in various settings.

OLPD 3201. Adult Education Overview. (1.0 cr.; A-F or Audit; fall, spring, every year) Theories/practice of adult learning/development.

OLPD 3202. Introduction to Strategies for Teaching Adults. (3.0 cr.; A-F or Audit; prereq Quality Matters certified; fall, spring, summer, every year) Theories of adult learning, teaching/learning styles, methods/perspectives of teaching, applications of teaching in various settings.

OLPD 3302. Leadership, You, and Your Community. (3.0 cr.; A-F only; = [PA 3961]; prereq [1301W or 1302 or PA 1961W or CFAN 1101 or CFAN 3480], grade of at least C; fall, spring, every year) How do effective leaders create a positive systemic change within complex systems? What is community and how does it shape the work of leadership? Students examine leadership from a multi-dimensional/multicultural perspective and critically examine leadership theories in authentic, complex community settings.

OLPD 3304. Strategic Leadership for Future Societies. (3.0 cr.; fall, offered periodically) Emerging leadership implications of selected short-/long-range trends. Construction of context-relevant effective leadership scenarios for selected institutions in real/hypothetical societies.

OLPD 3305. Learning About Leadership Through Film and Literature. (3.0 cr.; fall, every year) Readings from leadership studies, literature, and film. Ethical dilemmas. Different styles of leadership and their consequences. Intersection of public/private in exercising leadership. Competing loyalties/pressures felt by leaders/followers. Fundamental questions about nature/desirability of leadership.

OLPD 3306. Leadership Minor: Field Experience. (3.0 cr.; A-F only; = [PA 3971]; prereq 3302 with grade of at least C; fall, spring, every year) Students apply/integrate leadership theory in a community experience, think critically about their positional leadership roles, extrapolate the experience to future leadership issues within their specific fields, and work through challenges of positional leadership.

OLPD 3310. Special Topics for Undergraduates. (1.0-3.0 cr. [max 9.0 cr.]; fall, spring, summer, every year) Inquiry into special topics related to organizational leadership, policy/development.

OLPD 3316. Field Experience: Intercultural Internship. (3.0 cr.; A-F only; summer, every year) Internship-based course focused on leadership principles and intercultural values that impact the work environment. For students in the undergraduate Leadership Minor, this is the opportunity to apply what they have learned in a real-life setting. Prior to departure for the on-site internship in the city location, students spend a week in class at the University studying the theoretical frameworks that will provide the foundation for the 6-week internship, reflection process, and living experience. The composition of the class cohort will include international and domestic students, which provides the opportunity to experience and reflect upon the internship and the designated city living experience through an intercultural lens. Upon completion of the internship, the class cohort will return to the University to complete a final week of class on campus.

OLPD 3318. Introduction to Project Management. (3.0 cr.; fall, spring, summer, every year) Project management for business and industry. Project lifecycles, deliverables, and processes as they are commonly used in the workplace.

OLPD 3320. Maximizing Study Abroad Through Culture and Language Strategies: Pre-Departure Preparation. (1.0 cr.; fall, spring, summer, offered periodically) Preparation for overseas sojourn: understanding culture, ways cultures differ in values, seeing oneself as a member of a culture or cultures.

OLPD 3321. Introduction to Historical Foundations of Modern Education. (3.0 cr.; fall, spring, summer, offered periodically) Analysis/interpretation of important elements in modern education derived from pre-classical sources: Greeks, Romans, Middle Ages, Renaissance, Reformation, Enlightenment, Industrial Revolution.

OLPD 3323. Introduction to History of Western Educational Thought. (3.0 cr.; fall, spring, summer, offered periodically) Great educational classics of Western civilization: Plato, Aristotle, Quintilian, Montaigne, Milton, Locke, Rousseau, others.

OLPD 3330. Global Identity: Connecting Your International Experience to Your Future. (1.0 cr.; prereq [3320 or EDPA 3102 or #]; studying abroad the semester student is enrolled in course; fall, spring, summer, every year) Reflect on activities/readings of study abroad experiences overseas. E-journaling, written activities, group interaction using various formats.

OLPD 3336. Religion, Ethics, and Educational Policy. (3.0 cr.; spring, every year) American religious pluralism in relationship to ethics and educational policy. History of religious belief/expression in K-12 and higher education. Students interact with community leaders. Legal issues, religion/science, sexuality, religious alternatives, policy topics.

OLPD 3380. Developing Intercultural Competence. (3.0 cr.; A-F or Audit; fall, every year) Past/current research on intercultural leadership. Students share their understanding/experiences within intercultural framework.

OLPD 3401. Teaching Marketing Promotion. (3.0 cr.; A-F or Audit; fall, spring, summer, every year) Materials, methods, and approaches to teaching marketing promotion. Advertising, promotion, public relations, direct selling, visual merchandising, and direct marketing.

OLPD 3424. Sales Training. (3.0 cr.; A-F or Audit; fall, spring, summer, every year) Strategies and techniques for developing effective sales people.

OLPD 3451. Technical Development: Advanced. (1.0-32.0 cr.; #; fall, spring, summer, every year) Work experience in business/industry.

OLPD 3461. Professional Sales Management. (3.0 cr.; A-F or Audit; fall, spring, summer, every year) Examination of the sales manager’s role in training and mentoring sales representatives in strategic selling, customer-oriented service, and problem-solving tactics. Includes recruitment, hiring, training, and retention of a sales force.

OLPD 3493. Directed Study in Business & Marketing Education. (1.0-4.0 cr.; prereq BME major, #; fall, spring, summer, every year) Open to qualified students. Opportunity to pursue study not available through regular coursework. In consultation with instructor, develop prospectus/complete progress reports/final report on project.

OLPD 3496. Profession and Practice of Business and Marketing Education. (2.0 cr.; A-F or Audit; prereq Undergrad student, BME major, [3 of 4 following courses completed: 3318, 3401, 3424, 4426]; fall, spring, summer, every year) Application of theory to practice related to BME core coursework with integrative paper.
OLPD 3601. Introduction to Human Resource Development. (3.0 cr.; A-F or Audit; fall, spring, every year) Human resource development theories, principles, concepts, and practices.

OLPD 3620. Introduction to Training and Development. (3.0 cr.; A-F or Audit; fall, spring, summer, every year) Processes to carry out theoretically sound training/development practices, within the context of systemic relationship with host organization or system.

OLPD 3640. Introduction to Organization Development. (3.0 cr.; A-F or Audit; fall, spring, summer, every year) Organization development theories, principles, concepts, and practices. How development is used to direct change in an organization.

OLPD 3693. Directed Study: Human Resource Development. (1.0-4.0 cr.; prereq HRD major; #; fall, spring, summer, every year) Open to qualified students. Opportunity to pursue study not available through regular coursework. In consultation with instructor, student develops prospectus/completes progress reports/final report on project.

OLPD 3696. Profession and Practice of Human Resource Development. (2.0 cr.; A-F or Audit; prereq Undergrad student, HRD major, 3 of following 4 courses completed: 3202, 3601, 3620, 3640; fall, spring, summer, every year) Course assists students with advancing career development skills, prepares them for HRD internship.


OLPD 3805. Introduction to Strategic Planning Through Human Resources. (3.0 cr.; A-F or Audit; prereq 3601 or HRD 3001; spring, offered periodically) Processes organizations use when engaged in strategic planning. How to participate in planning, implementing, and evaluating strategic initiatives to improve performance.

OLPD 3808. Foundations of Student and Trainee Assessment. (2.0 cr.; A-F or Audit; fall, spring, summer, every year) Developing tests of knowledge, affect, and processes for programs focused on instruction of skills associated with business/industry. Developing learning-progress reporting systems. Evaluating instructional effectiveness. Applying tests and other evaluation instruments to assess/report learning in business/industry and in career/technical education fields.

OLPD 3820. Principles of Supervisory Management. (3.0 cr.; fall, spring, every year) Introduction to the principles of supervision in education, business, industry, government, and service organizations.

OLPD 3828. Diversity in the Workplace. (3.0 cr.; A-F or Audit; fall, spring, every year) Diversity in the workplace. Issues of recruiting and selection, management, and performance.

OLPD 3829. Foundations of Course Development for Business and Industry. (2.0 cr.; A-F or Audit; fall, spring, every year) Designing instructional programs/courses focused on helping learners develop desired competence. Designing instruction for performance-based training and vocational/technical education. Developing course syllabus components that clarify broad course expectations. Developing academic/community-based elements that complement course goals.

OLPD 3861. Foundations of Instructional Methods for Business and Industry. (2.0 cr.; A-F or Audit; fall, spring, every year) Theory/practice in instructional methods/techniques for career/technical education (CTE) instructors and for human resources and development (HRD) professionals. How to deliver instruction using various teaching methodologies, select appropriate methodologies, and plan for their delivery.

OLPD 4301. Global Youth Leadership and Community Engagement. (6.0 cr.; A-F only; fall, spring, summer, offered periodically) Six-credit course over three semesters. Students take courses at the U of M (spring and fall) and at FLASCO University in Buenos Aires, Argentina, (four weeks in August). Theory and practice of youth-engagement/empowerment to address issues that affect their lives, their communities, and the broader global society.

OLPD 4303W. Leadership for Global Citizenship. (3.0 cr.; A-F only; prereq 3306 or EDPA 3402 or PA 3971; fall, spring, every year) Leadership theory, community building, social change, interdisciplinary approaches to complex global issues. Students finalize portfolios, submit scholarly products to demonstrate understanding of personal/positional leadership in changing global context. Capstone course.

OLPD 4318. Advanced Project Management. (3.0 cr.; A-F or Audit; prereq 3318 or EDPA 3218; fall, spring, summer, every year) Project management for business and industry. Advanced aspects and techniques in project management, project lifecycles, deliverables, and processes as they are commonly used in the workplace.

OLPD 4400. Education for Small Business Entrepreneurship. (3.0 cr.; A-F or Audit; fall, spring, summer, every year) Process of starting a small business. Helps students identify the skills necessary to operate the business.

OLPD 4401. E-Marketing. (3.0 cr.; A-F or Audit; fall, spring, every year) Basic understanding and personal experience with how e-marketing can be used as part of an overall marketing and promotion plan.

OLPD 4420. Practicum in Nonprofit Organizations. (2.0 cr. [max 4.0 cr.; ] A-F or Audit; prereq BME major recommended; fall, spring, every year) Opportunity to work in all aspects of nonprofit organization. Fundraising, managing events, marketing, conducting outreach programs.

OLPD 4426. Strategic Customer Relationship Management. (3.0 cr.; A-F or Audit; fall, spring, summer, every year) Principles of customer relationship management, brand identity, and integrated marketing communications. Comprehensive framework for how organizations interact with their various publics to create goodwill/loyalty.

OLPD 4466. Applied Experience in Business & Marketing Education. (1.0-4.0 cr.; S-N only; prereq BME major, ugrd. [&3496 or &3496]; fall, spring, summer, every year) Application of theory to practice related to BME core coursework with integrative paper. Work, internship, study abroad, research, field experience, service learning, etc. can all fulfill this degree requirement. Contact OLPD Program Advisors for more information.

OLPD 4602. Managing Work Teams. (3.0 cr.; A-F or Audit; fall, spring, summer, every year) Frameworks and strategies for developing effective work teams. Skill development in facilitating resolution of conflicts in organizations. Foundational information as well as practical applications for participants to become small team leaders.

OLPD 4608. Introduction to International Human Resource Development. (3.0 cr.; A-F or Audit; prereq 3601 or HRD 3001 or 3620 or HRD 3201 or 3640 or HRD 3301; spring, every year) International/cross-cultural aspects of HRD. Practices/impact of economic, social, and cultural influences on HRD programs/interventions.

OLPD 4627. Management and Supervisory Training and Development. (3.0 cr.; A-F or Audit; fall, spring, summer, every year) Problems, practices, programs, and methodologies relating to the training and development of managers and supervisors, including needed competencies, needs assessment, delivery modes, and evaluation.

OLPD 4666. Internship: Human Resource Development. (1.0-4.0 cr.; S-N only; prereq Undergrad student, HRD major, [&3696 or completed]; fall, spring, summer, every year) Apply/contract for human resource development internships. Contracts describe specific HRD responsibilities to be fulfilled during internship/theory-to-practice learning outcomes.

OLPD 4870. Introduction to Integrating Human Rights into Organizational Leadership. (3.0 cr.; A-F or Audit; spring, every year) Forum to explore local and international policies/practices for integrating human
OLPD 5001. Formal Organizations in Education. (3.0 cr.; fall, spring, summer, every year)
Classical/current theories of organizations. Applications to education and related fields.

OLPD 5002. Independent Colleges as Formal Organizations. (3.0 cr.; A-F or Audit; prereq Bachelors degree must be completed before starting this course.; fall, spring, summer, every year)
Provide certificate students with introduction to contemporary thinking on organizations/administration. Primary focus on organizational theory.

OLPD 5011. Leading Organizational Change: Theory and Practice. (3.0 cr.; fall, every year)
How theory is incorporated, affects the change process, and can improve schools/institutions of higher education. Characteristics that impact change processes/outcomes. Leadership/policy effects.

OLPD 5021. Historical Foundations of Modern Education. (3.0 cr.; = [SOC 4028]; HUM 3021);
Analysis and interpretation of important elements in modern education derived from pre-classical sources: Greeks, Romans, Middle Ages, Renaissance, Reformation, Enlightenment, and Industrial Revolution.

OLPD 5028. Education Imagery in Europe and America. (3.0 cr.;)
Images and ideas of education expressed in the visual arts of Western civilization (antiquity to 20th century) in relation to concurrent educational thought and practice; symbolism, myth, propaganda, didacticism, genre, caricature.

OLPD 5041. Sociology of Education. (3.0 cr.; = [SOC 5455]; spring, every year)
Structures and processes within educational institutions; linkages between educational organizations and their social contexts, particularly related to educational change.

OLPD 5044. Introduction to the Economics of Education. (3.0 cr.; fall, spring, offered periodically)
Costs and economic benefits of education, with a focus on K-12; educational markets, prices, and production relationships; investment and cost-benefit analysis.

OLPD 5048. Cross-Cultural Perspectives on Leadership. (3.0 cr.; fall, summer, every year)
Introduction to cultural variables of leadership that influence functioning of cross-cultural groups. Lectures, case studies, discussion, problem-solving, simulations. Intensive workshop.

OLPD 5056. Case Studies for Policy Research. (3.0 cr.; A-F or Audit; fall, spring, summer, every year)
Qualitative case study research methods and their applications to educational policy and practice. Emphasis on designing studies that employ open-ended interviewing as primary data collection technique.

OLPD 5057. Research in International Education. (3.0 cr.; summer, every year)

OLPD 5061. Ethnographic Research Methods. (3.0 cr.; fall, spring, every year)
Practice in aspects of field methodology below the level of full field study: detailed reading; analysis of studies in anthropology and education for methodological content.

OLPD 5080. Special Topics: Organizational Leadership, Policy, & Development. (1.0-3.0 cr. [max 24.0 cr.]; fall, spring, summer, every year)
Topical issues in organizational leadership, policy, development.

OLPD 5087. Seminar: Organizational Leadership, Policy, and Development. (1.0-3.0 cr. [max 24.0 cr.]; fall, spring, summer, every year)
Shared responsibility of students/instructor in presentation of topics.

OLPD 5095. Problems: Organizational Leadership, Policy, and Development. (1.0-3.0 cr. [max 24.0 cr.]; fall, spring, summer, every year)
Course or independent study on specific topic within department program emphasis.

OLPD 5096. Internship: Organizational Leadership, Policy, and Development. (1.0-9.0 cr. [max 24.0 cr.]; fall, spring, every year)
Internship in elementary, secondary, general, postsecondary administration, or other approved field related setting.

OLPD 5102. Knowledge Constructions and Applications in International Development Contexts. (3.0 cr.; spring, every year)
Interrelationships of knowledge capital (noetic symbolic resources) and culture through intrinsic, cross/multicultural perspectives. Distinguishing knowledge from information/data. National/international developments occurring along basic/applied knowledge paths.

OLPD 5103. Comparative Education. (3.0 cr.; fall, every year)
Examination of systems and philosophies of education globally with emphasis upon African, Asian, European, and North American nations. Foundations of comparative study with selected case studies.

OLPD 5104. Strategies for International Development of Education Systems. (3.0 cr.; A-F or Audit; prereq Grad student; ) Strategies for improving quality/efficiency of schooling in developing countries. Introduction to current research on what policy/programmatic interventions have proven most successful in increasing access, raising quality, and improving efficiency of education in developing countries.

OLPD 5107. Gender, Education, and International Development. (3.0 cr.; A-F or Audit; fall, every year)
Role of gender/gender relations in international development/education. Interdisciplinary body of literature from development studies, political science, economics, anthropology, cultural studies, gender/women's studies.

OLPD 5121. Educational Reform in International Context. (3.0 cr.; spring, every year)
Critical policy analysis of educational innovation and reform in selected countries. Use theoretical perspectives and a variety of policy analysis approaches to examine actual educational reforms and their implementation.

OLPD 5124. Critical Issues in International Education and Educational Exchange. (3.0 cr.; spring, every year)
Analysis of comprehensive policy-oriented frameworks for international education; practices of U.S. and other universities; conceptual development of international education and its practical application to programs, to employment choices, and to pedagogy.

OLPD 5128. Anthropology of Education. (3.0 cr.; = [ANTH 5128]; spring, offered periodically)
Insights from educational anthropology for educators to address issues of culture, ethnicity, and power in schools.

OLPD 5132. Intercultural Education and Training: Theory and Application. (3.0 cr.; spring, every year)
Examination of intercultural education; formal and nonformal education programs intended to teach about cultural diversity, promote intercultural communication and interaction skills, and teach students from diverse background more effectively.

OLPD 5141. Global Youth Policy and Leadership: Comparative Youth Policy and Leadership. (3.0 cr.; A-F only; fall, every year)
Comparative approach to public responses at global level to youth development and leadership issues. Social systems such as education, health, employment, and recreation. Role of individuals, communities, governments, and international organizations in providing programs/services.

OLPD 5142. Youth Futures in International and Global Contexts. (3.0 cr.; A-F only; prereq CIDE student or #; spring, every year)
Strategic trends in global youth development. Implications. Reconciling trends with normative scenarios with respect to presence, absence, and projected likelihood of suitable policies, workable collaborations, and funding.

OLPD 5201. Strategies for Teaching Adults. (3.0 cr.; A-F or Audit; prereq Grad student only; fall, spring, summer, offered periodically)
Psychological theories of adult learning; learning styles and personality types; teaching styles; group and team learning; moderating and study circles; teaching technologies and distance learning; gender, race, and cultural communication. Applications of strategies.
OLPD 5202. Perspectives of Adult Learning and Development. (3.0 cr.; fall, summer, offered periodically) Emphasis on major adult development theorists, theories, and current applications. Transformative learning, self-directed learning, experiential learning, and cooperative learning provide theoretical framework for exploring physiological, psychological, sociological, and cultural aspects of adult development through the life span.


OLPD 5204. Designing the Adult Education Program. (3.0 cr.; A-F or Audit; spring, offered periodically) Designing and implementing educational programs for adults. Application of concepts, theories, and models in different adult learning situations.

OLPD 5211. Introduction to the Undereducated Adult. (1.0 cr.; A-F or Audit; summer, every year) Definitions of literacy in workplace, community, and family. Issues: poverty/welfare, ethnicity, cultural diversity, social class, language/learning, immigrants.

OLPD 5212. Introduction to Adult Literacy in the Workplace. (1.0 cr.; A-F or Audit; prereq 5211 or ADED 5211; summer, every year) Review workplace literacy programs, funding, program planning, and needs assessment. Reaching/recruiting workers. Role of employers and the unions. Writing for low literacy employees.

OLPD 5213. Introduction to Adult Literacy in the Community. (1.0 cr.; A-F or Audit; prereq 5211 or ADED 5211; summer, every year) Community programs in United States. Literacy building. Family literacy skills. Correctional education in reintegrating offenders back into community. Integrating people with disabilities through community literacy programs. Literacy/development in developing countries. Reaching/recruiting indigenous, migrant, immigrant groups. Social action approaches to literacy education.

OLPD 5224. Formal Assessment of Adult Literacy. (1.0 cr.; A-F or Audit; prereq 5211 or ADED 5211; fall, offered periodically) Assessment of adult English/literacy skills for work, family, community, and continuing education. Formal testing policy, techniques, standardized tests. Assumptions about testing, cultural bias, and interpretation of formal tests. Test preparation programs.

OLPD 5225. Informal Assessment of Adult Literacy. (1.0 cr.; A-F or Audit; prereq 5211 or ADED 5211; fall, offered periodically) Informal assessment of adult English/literacy skills for work, family, community, and further education. Informal testing techniques, setting educational goals, formal versus informal assessment.

OLPD 5226. Advanced Assessment of Adult Literacy. (1.0 cr.; A-F or Audit; prereq 5211 or ADED 5211; fall, offered periodically) Applications/case studies. Educational planning for work, family, community.

OLPD 5233. Methods of Teaching Beginning Adult Literacy. (1.0 cr.; A-F or Audit; prereq 5211 or ADED 5211; fall, offered periodically) Learning English/literacy as an adult. Initial approaches to teaching reading, writing, and communications skills. Theories of learning/curriculum design. Technology as teaching tool. Teaching students with disabilities or with cultural/gender differences.

OLPD 5234. Methods of Teaching Intermediate Adult Literacy. (1.0 cr.; A-F or Audit; prereq [5211 or ADED 5211], [5233 or ADED 5233]; fall, offered periodically) Learning English/literacy as an adult. Approaches to teaching reading, writing, and communications skills. Communication/comprehension in oral/written English. English reading/oral communication skills for workplace. Evaluating commercial materials/software.

OLPD 5235. Methods of Teaching Advanced Adult Literacy. (1.0 cr.; A-F or Audit; prereq [5211 or ADED 5211], [5233 or ADED 5233]; fall, offered periodically) Learning English/literacy as an adult. Approaches to teaching reading, writing, study, communication skills. Preparing students for college/continuing education. English in workplace/on Internet. Problem solving, analytical thinking. Technology as teaching tool. Evaluating commercial materials/software.

OLPD 5296. Field Experience in Adult Education. (1.0-6.0 cr.; S-N or Audit; fall, spring, summer, every year) Supervised fieldwork and practice. Presentations and evaluations of adult education practices.

OLPD 5302. Educational Policy: Context, Inquiry, and Issues. (3.0 cr.; fall, spring, summer, every year) Review of social science concepts/research in considering educational policies/issues, process of inquiry that affect policy development, implementation, evaluation. Focus on pre-K-12. Role of educational leaders, administrators.

OLPD 5310. Data-Driven Decision Making I. (1.0 cr.; prereq Broadband Internet access, a new computer; spring, every year) Data-driven decision making for schools/administrators. Focuses on data collection/analysis needs of educational organizations and on use of appropriate software/databases to collect, manage, analyze, and report school information.

OLPD 5311. Data-driven Decision Making II. (1.0 cr.; prereq [5310 or EdPA 5310], broadband Internet access, newer computer; summer, every year) Continuation of 5310. Data-driven decision making for schools/administrators. Hands-on training in students' own organizations in using technology to analyze data to make educational decisions.

OLPD 5321. The Principal as Leader of High-Performing Schools. (3.0 cr.; fall, spring, summer, every year) Role of principal: qualifications, duties, problems.

OLPD 5322. Leaders in the Superintendency and Central Office. (3.0 cr.; fall, summer, every year) Role/responsibility of superintendent in school district. Real life experiences, leadership potential as CEO. Purposes, power, politics, practices of position. Interplay of internal school forces, community forces. Leadership in public, high-profile appointment.

OLPD 5323. Women in Leadership. (3.0 cr.; prereq Technology access; fall, every year) Women in leadership, in context of larger systems and their own lives. Supporting equity/equality across areas of difference.

OLPD 5324. Strategic Financial Planning and Policy for Educational Leaders. (3.0 cr.; prereq Grad student pursuing licensure as elementary-secondary [principal or superintendent]; spring, summer, every year) State-local school finance systems, budgeting, governmental fund accounting. Interpretation of financial information.

OLPD 5325. Personal Leadership and the Independent College. (3.0 cr.; A-F or Audit; prereq Must have Bachelors degree awarded prior to taking this course.; fall, spring, summer, every year) Recognize/develop leadership skills and competencies necessary for team work, consensus building, group leadership within independent colleges. Blend practice/theoretical perspectives to develop leadership competencies of students.

OLPD 5341. The American Middle School. (3.0 cr.; fall, summer, every year) Focus on the uniqueness of the early adolescent and appropriate learning situations. For educators working with middle-level students.

OLPD 5344. School Law. (3.0 cr.; spring, summer, every year) Legal foundations of elementary/secondary education. Statutory themes, relevant case law, emergent policy issues. Implications for educational organizations and for administrative practice.

OLPD 5346. Politics of Education. (3.0 cr.; A-F or Audit; prereq postbac, MEd, or grad student; fall, spring, every year) Political dimensions of policy formulation/implementation in education. Use of power/influence in shaping educational policies and in resolving conflicts over educational issues. Analysis of consequences/cross-impacts.

OLPD 5348. Leaders of Human Resources Administration. (3.0 cr.; prereq Designed for students working on licensure for [dir of community educ or superintendent or K-12 principal or dir of special educ]; spring, summer, every year)
OLPD 5356. Disability Policy and Services. (3.0 cr.; spring, summer, every year) Policy, research, and current practices related to education, health, and social services that support children, youth, and adults with special needs, and that support their families. Federal, state, and local perspectives.

OLPD 5361. Project in Teacher Leadership. (3.0 cr.; Student Option No Audit; =CI 5178; prereq MEd student in Teacher Leadership Program; fall, spring, summer, every year) Create, implement, evaluate, and present a leadership project designed to initiate positive change in educational environments. Review of related literature, proposal development, project development, implementation and evaluation, critical reflection, sharing learning outcomes.

OLPD 5364. Context and Practice of Educational Leadership. (3.0 cr.; A-F or Audit; fall, spring, every year) Current research/practice on educational leadership. Focuses on creating school cultures conducive to continuous improvement/change. Strategies for personal/organizational leadership in PK-12 settings.

OLPD 5368. Leadership for Special Education Services. (3.0 cr.; prereq Administrator or supervisor or professional responsible for managing general or special or alternative education program; fall, spring, every year) Legislative, procedural, executive, and judicial actions that affect services, families, and children with special needs at federal, state, and local levels.

OLPD 5374. Leadership for Professional Development. (4.0 cr.; prereq Postbaccaleateaurate, at least 3 yrs teaching experience; fall, every year) Designing, implementing, evaluating staff development in preK-12 settings. Research-based standards for effective staff development. Need for embedded time for collaborative learning, evaluating staff/student outcomes.

OLPD 5381. The Search for Children and Youth Policy in the U.S.. (3.0 cr.; spring, every year) Review of contemporary policy issues affecting children and youth in the U.S. and South Africa; identify national standards, norms and principles of youth development; conflicting expectations facing policy-makers; and search for the critical content of youth policy.

OLPD 5385. Licensure Seminar: Program Policies and Inclusionary Leadership. (1.0 cr.; S-N or Audit; fall, spring, summer, every year) Preparation for licensure program. Program overview, preassessment, reflective practice, APA writing, exit panel review, administrative employment interview.

OLPD 5386. Leadership Portfolio Seminar. (1.0 cr.; S-N or Audit; prereq 5385 or 85385 or EDPA 5385; fall, spring, summer, every year) Development of electronic administrative licensure portfolio to earn endorsement for license as school superintendent. K-12 principal, director of special education, or director of community education.

OLPD 5387. Leadership for Teaching and Learning. (3.0 cr.; spring, summer, every year) Multiple aspects of administrating teaching/learning. Administration of teaching/learning as system in inclusive schools. Questions administrator must ask as leader of learning for students/adults.

OLPD 5388. Leadership for Master(ful) Scheduling. (2.0 cr.; fall, summer, every year) Work of high-performing professional learning communities. Implications for moving from building master schedule to leadership for master(ful) scheduling of time, space, motion, people. Hands-on work with infinite campus software/scheduling-building logic.

OLPD 5389. Community Education Leadership. (3.0 cr.; spring, every year) Competencies of leadership, community relations, communication, community assessment, program development, program evaluation. Philosophy/administration of community/alternative education programs.

OLPD 5391. Special Education Law for Leaders. (1.0 cr.; prereq Designed for students working on licensure in PK-12 administration; fall, summer, every year) Competencies of leadership, policy, and political influence. Legal/regulatory applications focusing on special education law.

OLPD 5392. Special Education Finance: Program Models, Policy, and Law. (2.0 cr.; prereq [5324 or 85324 or EDPA 5324 or EDPA 5324]; knowledge of special education; summer, every year) How special education revenue is a resource to accomplish student-related objectives. Revenue sources, compliance, budget monitoring. Key policy, case law, program models from perspective of director of special education.

OLPD 5393. Leading School Finance Elections. (1.0 cr.; S-N or Audit; spring, every year) Comprehensive planning model for conducting school finance elections. Emphasizes systems, strategies, and campaign tactics.

OLPD 5394. Leadership in Community Education Finance and Law. (1.0 cr.; S-N or Audit; prereq [5324 or EDPA 5324] recommended; summer, every year) Interplay between finance and laws directly applicable to community education. MN Statute 124D, revenues/expenditures, and UFARS approached from frame of resource development.

OLPD 5396. Field Experience in PK-12 Administration: Authentic Practice in Leadership. (3.0 cr. [max 12.0 cr.]; S-N or Audit; prereq #; fall, spring, every year) Field experience or internship arranged for students seeking licensure as PK-12 principal/superintendent. Content/credit depend on licensure requirements specified in individual field experience agreement.


OLPD 5403. Tourism Studies Capstone Seminar. (3.0 cr.; S-N or Audit; Tourism studies major; fall, offered periodically) Students present, critique, and discuss implications of supporting programs for tourism.

OLPD 5404. The Business of Tourism. (3.0 cr.; A-F or Audit; fall, offered periodically) Introduction to major theories, concepts, skills, and techniques influencing tourism business/industry.

OLPD 5405. Critical Issues in Business and Industry. (3.0 cr.; spring, every year) Identification and analysis of major current issues in business and industry education.

OLPD 5411. Teaching Marketing Promotion. (3.0 cr.; A-F or Audit; spring, summer, every year) Materials, methods, and approaches to teaching marketing promotion. Covers the basic elements of the marketing mix: advertising, promotion, public relations, direct selling, visual merchandising, and direct marketing.

OLPD 5452. Methods of Teaching Business and Marketing Concepts. (3.0 cr.; A-F or Audit; fall, every year) Recent research/developments in teaching business concepts related to economics, business organization/management, business law, entrepreneurship, marketing, international business, information systems, accounting, risk management, and personal finance.

OLPD 5454. Technical Development: Specialized. (1.0-12.0 cr. ; A-F or Audit; fall, spring, summer, every year) Students select/study technical processes/principles based on subjects they plan to teach, integrate specialized technical instruction in advanced/emerging areas.

OLPD 5457. Methods of Teaching Business Employment and Marketing Employment. (3.0 cr.; A-F or Audit; spring, every year) Recent research/developments in teaching for business employment. Administrative support positions, accounting/information processing, marketing, sales, computer operations, other occupations using desktop computing.

OLPD 5475. Curriculum Development for Business and Marketing Education. (3.0 cr.; A-F or Audit; fall, summer, every year) Introduction to conceptual models for design/delivery of business/marketing education programs in secondary/postsecondary schools, in adult education settings, and in business/industry. Preparing programs of instruction
OLPD 5476. Field Based Projects in Business and Industry. (1.0-4.0 cr.; S-N or Audit; fall, spring, summer, every year) Curricular, instructional, developmental, or evaluative problems and projects applicable to local school or business and industry situations.

OLPD 5493. Directed Study in Business and Industry. (1.0-4.0 cr.; fall, spring, summer, every year) In-depth individual inquiry in the content areas related to business and industry.

OLPD 5496. Occupational Experience in Business and Industry. (1.0-10.0 cr.; S-N or Audit; prereq #: fall, spring, summer, every year) Observation/employment in business/industry to develop technical/occupational competencies. Includes 100 clock hours of supervised work experience per credit.

OLPD 5501. Principles and Methods of Evaluation. (3.0 cr.; EPSY 5243; fall, spring, summer, every year) Introduction to program evaluation. Planning an evaluation study, collecting and analyzing information, reporting results; evaluation strategies; overview of the field of program evaluation.

OLPD 5502. Theory and Models of Evaluation. (3.0 cr.; prereq [5501, EPsy 5243] or PA 5311 or PubH 6034 or another introductory evaluation course approved by instructor.; fall, summer, every year) Evaluation theories/models currently available to practitioners. Communication with clients about value/utility of program. Systems theory.

OLPD 5521. Cost and Economic Analysis in Educational Evaluation. (3.0 cr.; fall, every year) Use and application of cost-effectiveness, cost-benefit, cost-utility, and cost-feasibility in evaluation of educational programs and programs.

OLPD 5524. Evaluation Colloquium. (1.0 cr. [max 24.0 cr.]; S-N or Audit; =EPSY 5246; prereq [5501 or EDPA, 5501 or EPSY 5243]; fall, spring, every year) Informal seminar of faculty/students. Issues/problems of program evaluation.

OLPD 5528. Focus Group Interviewing Research Methods. (3.0 cr.; fall, every year) Skills needed to conduct focus group interviews. Students conduct focus group study and report results at final class session.

OLPD 5601. Foundations of Human Resource Development. (1.0 cr.; fall, spring, summer, every year) Introduction to human resource development as a field of study and practice.

OLPD 5602. Economic Foundation of Human Resource Development. (1.0 cr.; prereq 5601 or HRD 5101; fall, spring, summer, every year) Introduction to economics as core discipline supporting theory/practice of human resource development.

OLPD 5603. Psychological Foundation of Human Resource Development. (1.0 cr.; prereq 5601 or HRD 5101; fall, spring, summer, every year) Introduction to psychology as core discipline supporting theory/practice of human resource development.

OLPD 5604. Systems Foundation of Human Resource Development. (1.0 cr.; prereq 5101; fall, spring, summer, every year) Introduction to system theory as a core discipline supporting the theory and practice of human resource development.

OLPD 5605. Strategic Planning through Human Resources. (3.0 cr.; A-F or Audit; prereq 5607 or 5615 or HRD 5201 or HRD 5301; spring, offered periodically) Strategic nature of organizations. How HRD can align its goals with those of organization. Strategic planning, systems thinking. Ways HRD managers can become strategic players in organization.

OLPD 5607. Organization Development. (3.0 cr.; A-F or Audit; prereq Grad student only; fall, spring, summer, offered periodically) Introduction to major concepts, skills, and techniques for organization development/change.

OLPD 5610. Survey of Research Methods and Emerging Research in Human Resource Development. (3.0 cr.; A-F or Audit; prereq [Registered, in attendance] at conference of Academy of HRD; spring, offered periodically) Role of research in HRD. Standards/criteria for evaluating research, critique of conference research papers, identification of emerging research themes. Offered in conjunction with the annual conference of Academy of HRD.

OLPD 5611. Facilitation and Meeting Skills. (1.0 cr.; fall, spring, summer, every year) Introduction to the disciplines of planning and running effective meetings. Tools and methods for meeting management and evaluation are presented within the context of organization development.

OLPD 5612. International Human Resource Development. (3.0 cr.; prereq Grad students only; undergrad seniors with instr consent; fall, spring, summer, every year) Problems, practices, programs, theories, and methodologies in human resource development as practiced internationally.

OLPD 5615. Training and Development of Human Resources. (3.0 cr.; A-F or Audit; prereq Grad student only; spring, summer, offered periodically) Training/development of human resources in organizations. Process phases of analysis, design, development, implementation, and evaluation.

OLPD 5616. Training on the Internet. (3.0 cr.; prereq Grad student only; spring, summer, every year) Major concepts, skills, and techniques for giving and receiving training on the Internet.

OLPD 5619. Planning and Decision-Making Skills. (1.0 cr.; fall, spring, summer, every year) Introduction to the disciplines of planning and decision making typically used in process improvement interventions. Tools and methods for facilitating group decisions and problem solving.

OLPD 5625. Technical Skills Training. (3.0 cr.; offered periodically) Analyzing technical skills training practices in business and industry. Systems and process analysis and trouble-shooting of work behavior; design methods and developing training materials.

OLPD 5670. Special Topics in Human Resource Development. (1.0-3.0 cr; max 24.0 cr.; fall, spring, summer, every year) Issues, methods, and knowledge in HRD areas. Topics vary.

OLPD 5696. Internship: Human Resource Development. (1.0-10.0 cr.; S-N or Audit; prereq [3901 or HRD 3601, 3696 or HRD 3196, 3620 or 3640 or HRD 3201 or HRD 3301, 3202 or ADED 3101, undergrad] or [[5607 or 5615 or HRD 5201 or HRD 5301], [5801 or WHRE 5001, grad student]], #; fall, spring, offered periodically) Students apply/contract for human resource development positions.

OLPD 5697. International Field Study in Human Resource Development. (3.0 cr. [max 6.0 cr.]; A-F only; prereq 5001; spring, summer, every year) Engage in international travel/study for one week with an HRD faculty leader. Visit a variety of sites in business and industry to become aware of how HRD is practiced outside the United States.

OLPD 5701. U.S. Higher Education. (3.0 cr.; fall, summer, every year) U.S. higher/postsecondary education in historical/contemporary perspective. Emphasizes structure, history, and purposes of system as a whole.

OLPD 5704. College Students Today. (3.0 cr.; EPSY 5451); spring, summer, every year) Issues involving population of students in colleges/universities. College student development theory, students’ expectations/interests. How college affects student outcomes. Role of curricular/extracurricular activities. Student-faculty interaction.


OLPD 5721. Race and Ethnicity in Higher Education. (3.0 cr.; fall, spring, summer, every year) Review of research. Theoretical frameworks, methodological perspectives, and research
OLPD 5724. Leadership and Administration of Student Affairs. (2.0-3.0 cr.; = [EPSY 5421]; fall, spring, offered periodically) Scope, administration, coordination, and evaluation of programs in college and university student affairs.

OLPD 5732. The Law and Postsecondary Institutions. (3.0 cr.; fall, spring, offered periodically) Analysis of court opinions and federal regulations affecting postsecondary educational institutions.

OLPD 5734. Institutional Research in Postsecondary Education. (2.0-3.0 cr.; A-F or Audit; prereq [5701, [EPSY 5231 or EPSY 8261]; grad student] or #; fall, offered periodically) Scope, role, administration, research strategies, and evaluation of institutional research in postsecondary institutions. Methodologies, disciplinary foundations of research. Use of institutional, state, and national databases in addressing institutional missions/functions.

OLPD 5736. Public Engagement and Higher Education. (3.0 cr.; A-F only; spring, every year) Study/practice of public engagement in higher education. Civic roles of post-secondary education institutions.

OLPD 5795. Plan B Research Design. (3.0 cr. [max 6.0 cr.]; A-F or Audit; prereq Grad student; ) Foundation to design Plan B research project relevant to student's professional interests. Literature review strategies to establish conceptual framework for project. Relates research question to design alternatives and to associated qualitative/quantitative analysis techniques. Issues such as human subjects and APA guidelines for preparing research papers.

OLPD 5801. Survey: Human Resource Development and Adult Education. (3.0 cr.; prereq Grad student only; fall, spring, summer, every year) Overview of fields of human resource development and adult education. Societal context, theories, processes, definitions, philosophies, goals, sponsoring agencies, professional roles, participants, and resources. Unique characteristics and ways fields overlap and enhance one another.


OLPD 5808. Student and Trainee Assessment. (2.0 cr.; A-F or Audit; = [HRD 5601]; fall, spring, summer, every year) Developing learning progress reporting systems/tests for skills instruction in business/industry. Evaluating instructional effectiveness. Applying test/evaluation instruments to assess/report learning. Students develop each type of test and evaluation plan for a course.

OLPD 5811. Education for Work. (3.0 cr.; spring, offered periodically) Examination of contextual bases underlying education for work; implications for practice.

OLPD 5813. Enhancing Work-based Learning Through Collaboration. (2.0 cr.; summer, every year) Interagency planning issues/practices relating to special populations for educational, business, and human service organization personnel, family members, and advocates.

OLPD 5816. Distance Learning in Adult Education and Training. (3.0 cr.; A-F or Audit; fall, spring, every year) Distance learning concepts, theory, history, present practice, delivery systems, course design, major issues, future directions.

OLPD 5819. Evaluating and Using Research in Organizations and Education. (3.0 cr.; A-F or Audit; prereq Grad student; fall, spring, summer, every year) Role of educational research in professional practice. Problems of practice for research. Alternative modes of research. Synthesis/application of results of research.


OLPD 5823. Work-Based Learning Policies. (2.0 cr.; fall, summer, offered periodically) Aims/purposes of federal, state, and local policies, related to work-based learning.

OLPD 5824. Diversity and Organizational Transformation in Organizational Leadership, Policy, and Development. (3.0 cr.; spring, offered periodically) Developing models for understanding impact of diversity on individual, organizational, community outcomes. Discuss organizational change in relation to diversity.

OLPD 5829. Course Development for Business and Industry. (2.0 cr.; A-F or Audit; fall, spring, summer, every year) Designing instructional programs/courses that help learners develop desired competence. Designing instruction for performance based training and vocational/technical education. Developing course syllabus components that clarify course expectations. Developing academic/community-based elements that complement course goals. Reflect on and compare performance-based instruction with other curriculum models for the field.

OLPD 5842. Global Program Delivery Techniques and Technology of Extension. (2.0 cr.; A-F or Audit; fall, offered periodically) Special educational activities and teaching and communications methods and techniques for youth and adults, ranging from outreach to extension services, with an emphasis on youth and adult education programs in different global settings.

OLPD 5845. The Entrepreneurial Independent College. (3.0 cr.; A-F or Audit; prereq Must have completed Bachelors degree before taking this course.; fall, spring, summer, every year) Financial management/entrepreneurial strategies for independent college. Enrollment management, revenue generating strategies, branding/marketing, fundraising, developing/sustaining entrepreneurial institutions. Design strategies for independent colleges.

OLPD 5851. Methods for Change in Developing Countries. (3.0 cr.; A-F or Audit; fall, offered periodically) Sociocultural and parameters as they pertain to promoting the adoption of improved practices in rural, community, and agricultural development, including formal and informal education institutions. Project planning, implementation, and evaluation related to actual change and development situations in developing countries.

OLPD 5861. Instructional Methods for Business and Industry. (2.0 cr.; spring, every year) Theory/practice in instructional methods for career/technical education (CTE) instructors and human resources/development (HRD) professionals. How to select various teaching methods and plan for their delivery. Preparing an instructional methods plan to clarify course content, teaching methods selected, rationale for their selection, and how a student organization might facilitate student learning.

OLPD 5871. Teaching Entrepreneurship: Small Business Management. (3.0 cr.; fall, offered periodically) Methods, organization, curriculum development and modification, and implementation of educational programs for entrepreneurs.

OLPD 5890. Special Topics in Organizational Leadership, Policy, and Development. (1.0-4.0 cr.; fall, spring, summer, every year) Topics vary.

OLPD 5893. Directed Study in OLPD. (1.0-4.0 cr.; fall, spring, summer, every year) Self-directed study, with faculty advice, in areas not covered by regular courses.

OLPD 5896. Teaching Internship: Introduction. (1.0 cr.; S-N only; prereq Admission to initial licensure program; fall, summer, every year) Initial experiences in teaching profession. Observation of school organization/administration, seminars, relationship building with cooperating teachers, reflection on personal involvement as a beginning student teacher.

OLPD 5897. Teaching Internship: School and Classroom Settings. (2.0 cr.; prereq 5696 or WHRE 5696; fall, every year)
Part-time supervised teaching experience in school. Seminars on managing student learning in context of work/human resource education programs in contemporary schools. Becoming a reflective educator.

OLPD 5898. Teaching Internship. (3.0-8.0 cr.; prereq Admission to initial licensure program; spring, every year) Teaching experience in a school system that provides programs for grades 5-12.

OLPD 5899. Teaching Internship: Extended. (1.0 cr.; prereq 5898 or WHRE 5698; spring, summer, every year) Teaching experience in school system that provides programs for grades 5-12.

OLPD 5902. Leading Change in Independent Colleges. (3.0 cr.; A-F or Audit; prereq Must have Bachelors degree awarded prior to taking this course; fall, spring, summer, every year) Theories of organizational change process/application for leading independent colleges with unique cultures/distinctive missions. Factors impacting change process/implications for leading independent colleges.

Otolaryngology (OTOL) Medical School

OTOL 5101. Introduction to the Basic Sciences in Otolaryngology I: Ear. (2.0 cr.; A-F or Audit; prereq Otolaryngology major or #; fall, spring, every year) Multidisciplinary introduction to the basic sciences of the ear. Acoustics and psychoacoustics, temporal bone anatomy, external and middle ear mechanisms, cochlear physiology, auditory neurophysiology, ear embryology, ear biochemistry, immunology, fine structures, vestibular mechanisms and measurement. S-N grading option for nonmajors only.

OTOL 5102. Introduction to the Basic Sciences in Otolaryngology II: Head and Neck. (2.0 cr.; A-F or Audit; prereq Otol major or #; fall, spring, every year) Multidisciplinary introduction to the basic sciences of the head and neck. Laryngeal anatomy and physiology, nasal anatomy and physiology, immune biology, embryology of head and neck. S-N grading option for nonmajors only.

OTOL 5993. Directed Studies. (1.0-12.0 cr. [max 24.0 cr.]; prereq #; fall, spring, summer, every year) Directed readings and preparation of reports on selected topics.

Periodontics (PERO) School of Dentistry

PERO 5123. Practice Management Externship. (1.0 cr.; prereq Resident in advanced education program in periodontology; spring, every year) Familiarizes periodontal students with the private practice environment and prepares them to select the type of practice they want to purchase or build and successfully manage their office.

Pharmaceuticals (PHM) College of Pharmacy


Pharmacology (PHCL) Medical School

PHCL 2001. Basic Principles of Pharmacology: A Drug's Fantastic Voyage. (2.0 cr.; A-F only; prereq First-year chemistry; fall, every year) Basic principles of pharmacology affecting drug from administration through action/elimination.

PHCL 3100. Pharmacology for Pre-Med and Life Science Students. (2.0 cr.; A-F or Audit; prereq College-level biology, biochemistry or physiology recommended; spring, every year) Principles/mechanisms of drug action. Major drug categories for different organ systems.

PHCL 4001. Mechanisms of Drug Action. (2.0 cr.; A-F or Audit; prereq Upper div or #; [prev or concurrent] courses in [biology, biochemistry] recommended; fall, spring, every year) How drugs function as applied to treatment of a single medical condition. Pharmacokinetics, pharmacodynamics, pharmacogenetics, pharmacogenomics.

PHCL 4003. Anti-infective drugs: Drugs that kill invaders. (2.0 cr.; A-F or Audit; prereq College-level biology; spring, every year) Principles/mechanisms of anti-infective drugs, and treatments of infectious diseases.

PHCL 4010. Current Research Topics in Pharmacology. (2.0 cr.; A-F only; prereq Upper div or #; fall, every year) Cutting-edge research projects in pharmacology. Research seminars, literature studies, discussion sessions, oral presentations.

PHCL 4100. Laboratory in Molecular Pharmacology. (2.0 cr.; A-F only; prereq [2001 or 4001], 3100, [BioC 3021 or BioC 4331], [BioC 4025, BioC 4125 recommended]; spring, every year) Hands-on experimentation using molecular techniques for data collection/analysis.

PHCL 4343. Pharmacology of the Synapse. (2.0 cr.; A-F only; prereq [2001, 3100] or #; fall, every year) Study synapse as pharmacological gateway to nervous system. Explore physiology of/cellular signalling at synapse, how signalling influences conditions such as Parkinson's disease, depression, anxiety, pain, addiction. How various drugs modify signalling at synapse.

PHCL 4993. Directed Studies. (1.0-3.0 cr. [max 6.0 cr.]; S-N only; prereq #; %; fall, spring, summer, every year) Individual study ("dry lab" experience) on selected topics in pharmacology/biomedical science with faculty from the Pharmacology Department or other biomedicine disciplines. Readings and use of scientific literature.

PHCL 4994. Directed Research. (1.0-3.0 cr. [max 12.0 cr.]; S-N only; prereq #; %; fall, spring, summer, every year) Laboratory research ("wet lab" experience) in the areas of pharmacological/biomedical research.

PHCL 5102. Pharmacology for Pharmacy Students II. (2.0 cr.; A-F only; prereq 5101 or #; spring, every year) Action/fate of drugs.

PHCL 5109. Problems in Pharmacology. (1.0-18.0 cr.; prereq Upper div or grad student or #; fall, spring, summer, every year) Research projects and special problems by arrangement.

PHCL 5110. Introduction to Pharmacology. (3.0 cr.; A-F or Audit; prereq Grad student or #; fall, every year) Basic principles of Pharmacology. Focuses on molecular mechanisms of drug action.

PHCL 5111. Pharmacogenomics. (3.0 cr.; A-F or Audit; prereq Grad student or #; spring, every year) Human genetic variation, its implications. Functional genomics, pharmacogenomics, toxicogenomics, proteomics. Interactive, discussion-based course.

PHCL 5112. A Graduate Toolkit I: An Introduction to the Scientific Research Lab. (1.0 cr.; A-F only; prereq #; fall, every year) Basic operating principles/techniques of scientific research lab. Personnel structure, professionalism, authorship/publication. Recombinant protein production/purification, DNA/RNA purification/methods, molecular biology methods, microscopy, model systems/bioinformatics.

PHCL 5113. A Graduate Toolkit II: Scientific Speaking and Writing for Graduate Students. (2.0 cr.; A-F only; prereq Completion of one yr of a grad program; fall, every year) Guidance on PowerPoint design, public speaking, question/answer sessions at scientific talks. Practice sessions are videotaped/analyzed to highlight strategies for improvement. Guidance in writing thesis research topic.

PHCL 5462. Neuroscience Principles of Drug Abuse. (2.0 cr.; =[NSC 5462]; prereq #; spring, offered periodically) Current research on drugs of abuse, their mechanisms of action, characteristics shared by various agents, and neural systems affected by them. Offered biennially, spring semester of even-numbered years.

Otolaryngology Clinic.

PHAR 1. CoP - Phillips Neighborhood Clinic. (0.0 cr.; No Grade Associated; prereq Current Student Pharmacist in the College of Pharmacy; fall, spring, summer, every year) Teaching laboratories to community/clinic-based interprofessional patient care model at Phillips Neighborhood Clinic.
PHAR 1001. Orientation to Pharmacy. (2.0 cr.; fall, spring, summer, every year) Overview of profession of pharmacy.

PHAR 1002. Medical Terminology. (2.0 cr.; fall, spring, summer, every year) Students analyze/build terminology by using/combining forms, suffixes, prefixes.

PHAR 1003. Non-Prescription Medications and Self-Care: Treating Minor Conditions. (2.0 cr.; fall, spring, summer, every year) Non-prescription medications and self-care available to treat many different medical conditions. Becoming an informed consumer of over-the-counter medications and testing devices.

PHAR 1004. Common Prescription Drugs and Diseases. (2.0 cr.; fall, spring, summer, every year) Frequently prescribed medications, how they work and are chosen, what conditions they are intended to treat, and why some medications cannot be used by certain people.

PHAR 1006. Orientation to Health Literacy and Communication. (2.0 cr.; A-F only; fall, spring, summer, every year) Issues associated with health literacy. Dimensions associated with misunderstandings that occur in health-related communication.

PHAR 3206. Issues in Health Literacy and Communication. (3.0 cr.; A-F only; =PHAR 5206); fall, spring, summer, every year) Issues associated with health literacy. Dimensions associated with misunderstandings that occur in health-related communication.

PHAR 3207. Leadership in Health Care. (3.0 cr.; A-F only; =PHAR 5207); fall, spring, summer, every year) Leadership skills/theories to create positive change in health care settings.


PHAR 3601. Basic Human Physiology for the Health Professions. (3.0 cr.; A-F only; prereq Medical terminology and anatomy; fall, spring, summer, every year) Normal functions/physiology of major human organ systems/diseases/pathophysiology in those systems.

PHAR 3700. Fundamentals of Pharmacotherapy. (3.0 cr.; A-F only; =PHAR 5700); prereq Medical terminology; fall, spring, every year) Drug therapy/pharmacology. Recognition of brand/generic drug names. Therapeutic classes, common uses. How to review medication lists and other forms of health communication/documentation.

PHAR 3800. Pharmacotherapy for the Health Professions. (3.0 cr.; A-F or Audit; =PHAR 5800); prereq Anatomy/physiology, nursing or respiratory care; fall, spring, every year) Drug therapy. Implications in patient care.

PHAR 4200W. Drugs and the U.S. Health Care System. (3.0 cr.; A-F only; =PHAR 5200, PHAR 4200W; fall, spring, every year) How to be informed/responsible participant in debates related to medication use within US health care system.


PHAR 4293. Directed Research I for Undergraduates. (1.0-5.0 cr.; prereq undergrad, #; fall, spring, summer, every year) Work with College of Pharmacy faculty.

PHAR 4294. Directed Study I for Undergraduates. (1.0-5.0 cr.; [max 10.0 cr.]; prereq Undergrad, #; fall, spring, summer, every year) Individualized study. Students work with faculty on special projects.

PHAR 5200. Drugs and the U.S. Health Care System. (3.0 cr.; A-F only; =PHAR 5200, PHAR 4200W, PHAR 4200W; spring, every year) How to be informed/responsible participant in debates related to medication use.

PHAR 5201. Applied Health Sciences Terminology. (2.0 cr.; prereq Basic knowledge of human anatomy/physiology; fall, spring, summer, every year) Identify/describe various medical conditions/processes. Medical abbreviations, surgical procedures, medical terminology. Analyzing words at roots.

PHAR 5205. Obesity: Issues, Interventions, Innovations. (2.0 cr.; A-F only; prereq Student in a science or health-related program. Biochemistry, cell biology and physiology background and/or course work.; fall, spring, summer, every year) Information necessary for prevention, treatment, management of obesity, from individual adipose cell to entire public health community.

PHAR 5206. Applied Health Literacy and Communication. (3.0 cr.; A-F only; =PHAR 3206); fall, spring, summer, every year) Issues associated with health literacy. Dimensions associated with misunderstandings that occur in health-related communication.

PHAR 5207. Applied Leadership in Health Care. (3.0 cr.; A-F only; =PHAR 3207); prereq advanced undergraduates or professional health care students or grad students; fall, spring, summer, every year) Leadership skills/theories to create positive change in health care settings.

PHAR 5212. Survey of Pediatric Metabolic, Genetic, and Oncologic Disease. (2.0 cr.; A-F only; prereq Second year or higher in College of Pharmacy or #; fall, summer, every year) Appraisal of major genetic/metabolic disorders and oncologic diseases of childhood. Disease state epidemiology, pharmacotherapy, monitoring, practical applications.

PHAR 5230. Principles of Clinical Pharmacology Research. (2.0 cr.; A-F only; prereq 3rd Year Pharmacy Student or #; fall, every year) Drug therapy investigation. Topics include experimental design of drug studies in human research subject volunteers. Topics related to individualization of therapy including effects of genetic polymorphisms, demographic variables, physiologic variables, age on drug disposition treatment outcomes.


PHAR 5700. Applied Fundamentals of Pharmacotherapy. (3.0 cr.; A-F only; =PHAR 3700); prereq Medical terminology and admission to grad program or #; fall, spring, every year) Drug therapy/pharmacology. Recognition of brand/generic drug names. Therapeutic classes, common uses. Review medication lists/other forms of health communication/documentation.

PHAR 5800. Pharmacotherapy for the Health Professions. (3.0 cr.; A-F only; =PHAR 3800); prereq Nursing grad program; fall, every year) Drug therapy, its implications in patient care.

Philosophy (PHIL)

College of Liberal Arts

PHIL 1001. Introduction to Logic. (4.0 cr.; =PHIL 1021, PHIL 1001H); fall, spring, summer, every year) Application of formal techniques for evaluating arguments.

PHIL 1002W. Introduction to Philosophy. (4.0 cr.; =PHIL 1102, PHIL 1002W, PHIL 1006W, PHIL 1026W); fall, spring, every year) Problems, methods, historical/contemporary schools of philosophy.

PHIL 1003W. Introduction to Ethics. (4.0 cr.; =PHIL 1003V, PHIL 1103); fall, spring, every year) Are values/principles relative to our culture? Is pleasure valuable? Are there any absolute rules? These questions and others are addressed through critical study of moral theories.

PHIL 1004W. Introduction to Political Philosophy. (4.0 cr.; =PHIL 1004V); fall, spring, every year) Central concepts, principal theories of political philosophy.
PHIL 1005. Scientific Reasoning. (4.0 cr.; =PHIL 1005H; prereq [1st or 2nd yr student or #; fall, every year) How does science work? What is scientific method? How to evaluate scientific information in popular media or specialized publications, especially when it relates to technology used in everyday life? General reasoning skills.

PHIL 1005H. Scientific Reasoning. (4.0 cr.; =PHIL 1005; prereq [1st or 2nd yr honors student or #; fall, every year) How does science work? What is scientific method? How to evaluate scientific information in popular media or specialized publications, especially when it relates to technology used in everyday life? General reasoning skills.

PHIL 1006W. Philosophy and Cultural Diversity. (4.0 cr.; =PHIL 1002W, PHIL 1102, PHIL 1002V, PHIL 1026W; fall, spring, every year) Central problems/methods of philosophy through culturally diverse texts. Focus is critical/comparative, reflecting range of U.S. philosophical traditions.

PHIL 1007. Introduction to Political Philosophy Practicum. (1.0 cr.; prereq & 1004W; fall, spring, every year) Students do at least two hours a week of community service and connect their service activities in writing to issues discussed in 1004.

PHIL 1026W. Philosophy and Cultural Diversity. (3.0 cr.; =PHIL 1002W, PHIL 1102, PHIL 1002V, PHIL 1006W; summer, every year) Central problems/methods of philosophy through culturally diverse texts. Focus is critical/comparative, reflecting a range of U.S. philosophical traditions.

PHIL 1905. Topics: Freshman Seminar. (3.0 cr. [max 6.0 cr.]; A-F or Audit; prereq freshman; fall, every year) Topics specified in Class Schedule.

PHIL 1910V. Honors Freshman Seminar. (3.0 cr.; prereq Fr or fewer than 30 cr; fall, every year) Topics specified in Class Schedule.

PHIL 1910W. Topics: Freshman Seminar. (3.0 cr.; A-F or Audit; prereq freshman; fall, spring, offered periodically) Topics specified in Class Schedule.

PHIL 3001V. Honors: General History of Western Philosophy: Ancient Period. (4.0 cr.; =PHIL 3101; fall, offered periodically) Major developments in ancient Greek philosophic thought: pre-Socrates, Socrates, Plato, Aristotle, Hellenistic thinkers.

PHIL 3001W. General History of Western Philosophy: Ancient Period. (4.0 cr.; =PHIL 3001V; fall, offered periodically) Major developments in ancient Greek philosophic thought: pre-Socrates, Socrates, Plato, Aristotle, Hellenistic thinkers.

PHIL 3002W. General History of Western Philosophy: Modern Period. (4.0 cr.; =PHIL 3105, PHIL 3005V; spring, every year) Major developments in philosophic thought of the modern period: renaissance beginnings, Descartes through Hume. Some attention to Kant.

PHIL 3000. Value Theory Practicum. (1.0 cr. [max 3.0 cr.]; prereq &3301 or &3302W or &3304 or &3307 or &3308); #; fall, spring, every year) Combines issues in ethics/political philosophy courses to needs of people in Twin Cities through community service. At least 26 hours of community service for semester is required.


PHIL 3231. Philosophy and Language. (4.0 cr.; fall, spring, every year) Philosophical issues concerning the nature and use of human language.

PHIL 3234. Knowledge and Society. (4.0 cr.; fall, offered periodically) Critical discussion of concepts such as knowledge, objectivity, justification, rationality, evidence, authority, expertise, and trust in relation to the norms and privileges of gender, race, class, and other social categories.

PHIL 3301. Environmental Ethics. (4.0 cr.; spring, every years) Philosophical basis for membership in moral community. Theories applied to specific problems (e.g., vegetarianism, wilderness preservation). Students defend their own reasoned views about moral relations between humans, animals, and nature.

PHIL 3302W. Moral Problems of Contemporary Society. (4.0 cr.; =PHIL 3402, PHIL 3322W; fall, spring, summer, every year) How do we determine what is right and wrong? How should we live our lives? What do we owe others? Moral/ethical thought applied to problems and public disputes (e.g., capital punishment, abortion, affirmative action, animal rights, same-sex marriage, environmental protection).

PHIL 3302W. Introduction to Ethical Theory. (4.0 cr.; fall, spring, every year) Nature and justification of moral judgments and moral principles; analysis of representative moral views.

PHIL 3322W. Moral Problems of Contemporary Society. (3.0 cr.; =PHIL 3402, PHIL 3322W; summer, every year) How do we determine what is right and wrong? How should we live our lives? What do we owe others? Moral/ethical thought applied to problems and public disputes (e.g., capital punishment, abortion, affirmative action, animal rights, same-sex marriage, environmental protection).

PHIL 3402. Moral Problems of Contemporary Society. (4.0 cr.; =PHIL 3322W, PHIL 3302W; fall, offered periodically) How do we determine what is right and wrong? How should we live our lives? What do we owe others? Moral/ethical thought applied to problems and public disputes (e.g., capital punishment, abortion, affirmative action, animal rights, same-sex marriage, environmental protection).

PHIL 3502W. Introduction to Aesthetics. (3.0 cr. [max 4.0 cr.]; fall, every year) Development of aesthetic theories with applications to specific aesthetic problems.

PHIL 3601W. Scientific Thought. (4.0 cr.; prereq One course in philosophy or natural science; fall, spring, summer, every year) Introduction to philosophical issues concerning the nature of scientific knowledge. Reading of historical and contemporary sources that describe major scientific achievements and controversies.

PHIL 3602. Science, Technology, and Society. (3.0 cr.; A-F or Audit; fall, offered periodically) Philosophical issues that arise out of interaction between science, technology, society (e.g., religion and science, genetics and society, science and the environment).

PHIL 3607. Philosophy of Psychology. (4.0 cr.; prereq One course in philosophy or psychology; fall, spring, every year) Major theories of mind including the "invention" of the mind by Descartes, classical empiricism, the impact of Darwinism, Freud's theories, Gestalt psychology, behaviorism, Chomsky's rationalism, contemporary functionalism, the computer model.

PHIL 3800. Directed Studies. (1.0-3.0 cr.; max 6.0 cr.; fall, spring, every year) Guided individual reading or study. Prereq instr consent, dept consent, college consent.

PHIL 4010. Ancient Philosophers. (3.0 cr. [max 6.0 cr.]; prereq 3001 or #; spring, offered periodically) Major work of selected ancient philosophers (e.g., Plato's Parmenides, Plato's Sophist,
Aristotle's Metaphysics). Works discussed may vary from offering to offering.

PHIL 4055. Kant. (3.0 cr.; prereq 3005 or 4004 or #; fall, spring, offered periodically) Major work (e.g., Critique of Pure Reason).

PHIL 4070. Selected 19th- or Early to Middle 20th-Century Philosophy. (3.0 cr. [max 6.0 cr.]; prereq One sem history of philosophy; fall, spring, offered periodically) Major writings of selected 19th- or early to middle 20th-century philosopher (e.g., Schopenhauer's World as Will and Idea, Thoreau's Walden, Du Bois's The Souls of Black Folk, Wittgenstein's Philosophical Investigations, de Beauvoir's The Second Sex).

PHIL 4100. Value Theory Practicum. (1.0 cr. [max 3.0 cr.]; prereq &4320 or &4321 or &4330 or &4324 or &4414); #; fall, spring, every year) Issues studied in ethics/political philosophy courses applied to needs of people in Twin Cities through community service. At least 26 hours of community service for semester is required.

PHIL 4101. Metaphysics. (3.0 cr.; prereq One course in history of philosophy or #; fall, spring, odd years) Philosophical theories concerning nature of reality.

PHIL 4105W. Epistemology. (3.0 cr.; A-F or Audit; prereq 1001 or #; fall, spring, offered periodically) Theories of nature/sources of knowledge/epistemology.

PHIL 4231. Philosophy of Language. (3.0 cr.; prereq 1001 or 5201 or #; fall, spring, offered periodically) Theories of reference, linguistic truth, relation of language/thought, translation/synonymy.

PHIL 4310W. History of Moral Theories. (3.0 cr.; prereq 1003 or #; ) Issues in western moral philosophy from classical age to present.

PHIL 4320W. Intensive Study of an Historical Moral Theory. (3.0 cr. [max 6.0 cr.]; prereq 1003 or #; ) Intensive consideration of an author or theory in the history of moral or political philosophy.

PHIL 4321W. Theories of Justice. (3.0 cr.; prereq 1003 or 1004 or #; fall, summer, even years) Philosophical accounts of concept/principles of justice.

PHIL 4325. Education and Social Change. (4.0 cr.; A-F or Audit; =PHIL 5323; fall, even years) Connections between education, social change. Theories of democratic/popular education, their application through in-depth practicum in community education setting.

PHIL 4326. Lives Worth Living: Questions of Self, Vocation, and Community. (4.0 cr. [max 8.0 cr.]; =PHIL 5326; prereq #; summer, every year) Immersion experience. Students live together as a residential community of learners. Works of philosophy, history, and literature form backdrop for exploring such questions as How is identity constructed? What is vocation? What experiences of community are desirable in life? Each student creates a life-hypothesis for a life worth living.

PHIL 4330. Contemporary Moral Theories. (3.0 cr.; prereq 1003 or #; fall, spring, offered periodically) Discusses views that evaluative judgments cannot be based on factual considerations alone, relation of this view to objectivity of ethics.

PHIL 4350. Catching Lives Worth Living: Participation in the Growth of a Living-Learning Community. (2.0 cr. [max 4.0 cr.]; prereq Application; #; summer, every year) Involvement in a democratic living-learning community built by students/instructors. Students participate in community activities and daily instructor meetings. Four seven-day offerings each summer.

PHIL 4414. Political Philosophy. (3.0 cr.; prereq 1004 or #; fall, spring, offered periodically) Survey of historical/contemporary works in political philosophy.

PHIL 4501. Principles of Aesthetics. (3.0 cr.; prereq 3502 or philosophy course or #; fall, spring, offered periodically) Problems arising in attempts to identify, characterize, or evaluate art.

PHIL 4510. Philosophy of the Individual Arts. (3.0 cr.; =PHIL 5510; prereq 3502; fall, spring, offered periodically) Aesthetic problems that arise in studying or practicing an art.

PHIL 4605. Space and Time. (3.0 cr.; =PHIL 5605; prereq Courses in [philosophy or physics] or #; fall, spring, offered periodically) Philosophical problems concerning nature/structure of space, time, and space-time.


PHIL 4615. Minds, Bodies, and Machines. (3.0 cr.; prereq one course in philosophy or #; fall, spring, offered periodically) Mind-body problem. Philosophical relevance of cybernetics, artificial intelligence, computer simulation.

PHIL 4622. Philosophy and Feminist Theory. (3.0 cr.; =PHIL 5622, GWSS 4122, GWSS 5122; prereq 8 crs in [philosophy or women's studies] or #; spring, odd years) Encounters between philosophy/feminism. Gender's influence in traditional philosophical problems/methods. Social role of theorist/theorizing as they relate to politics of feminism.

PHIL 4760. Selected Topics in Philosophy. (3.0 cr. [max 9.0 cr.]; prereq 3 [3xxx-5xxx] cr in philosophy or #; fall, spring, offered periodically) Philosophical problems of contemporary interest. Topics specified in Class Schedule.

PHIL 4993. Directed Studies. (1.0-3.0 cr.; max 6.0 cr.; fall, spring, summer, every year) Guided individual reading or study. Prereq instr consent, dept consent, college consent.

PHIL 4995. Senior Project (Directed Studies). (1.0 cr.; A-F only; prereq #; %; fall, spring, summer, every year) Guided individual study leading to research paper that satisfies senior project requirement.

PHIL 4995H. Honors Senior Project. (1.0 cr.; A-F only; prereq #; %; fall, spring, summer, every year) Guided individual study leading to research paper that satisfies senior project requirement.

PHIL 5010. Ancient Philosophers. (3.0 cr.; max 6.0 cr.; prereq 3001 or #; spring, offered periodically) Major work of selected ancient philosophers (e.g., Plato's Parmenides, Plato's Sophist, Aristotle's Metaphysics). Works discussed vary.

PHIL 5050. Empiricists. (3.0 cr.; max 6.0 cr.; prereq 3005 or #; fall, spring, offered periodically) Major work of selected early modern empiricists (e.g., Locke's Essay Concerning Human Understanding, Berkeley's Principles of Human Knowledge, Hume's Treatise of Human Nature). Works discussed may vary from offering to offering.

PHIL 5201. Symbolic Logic I. (4.0 cr.; prereq 1001 or #; fall, spring, every year) Study of syntax and semantics of sentential and first-order logic. Symbolization of natural-language sentences and arguments. Development of deductive systems for first-order logic. Metatheoretic proofs and methods, including proof by mathematical induction and proof of consistency and completeness.

PHIL 5202. Symbolic Logic II. (4.0 cr.; prereq 5201 or #; spring, every year) Elements of set theory, including the concepts of enumerability and nonenumerability. Turing machines and recursive functions; the results of Church, Godel, and Tarski and the philosophical significance of those results.

PHIL 5211. Modal Logic. (4.0 cr.; prereq 5201 or #; spring, even years) Axiomatic and semantic treatment of propositional and predicate modal logics; problems of interpreting modal languages.

PHIL 5221. Philosophy of Logic. (3.0 cr.; prereq 5202 or #; ) Attempts to answer, "What is logic?" Scope of logic. Disputes about alternative logics. Theories concerning logical truth (e.g., conventionalism: view that logical truths are contingent).

PHIL 5222. Philosophy of Mathematics. (3.0 cr.; prereq College level logic or mathematics course or #; fall, spring, offered periodically) Major philosophical questions arising in connection with mathematics. What is
PHIL 5323. Education and Social Change. (4.0 cr.; A-F or Audit; prerequisite: PHIL 4325; fall, offered periodically) Connections between education, social change. Theories of democratic/popular education, their application through in-depth practicum in community education setting.


PHIL 5350. Catching Lives Worth Living: Participation in the Growth of a Living-Learning Community. (1.0-3.0 cr. [maximum 6.0 cr.]; prerequisite: Application, #; summer, every year) Involvement in a democratic living-learning community built by students/instructors. Students participate in community activities and daily instructor meetings. Four seven-day offerings each summer.

PHIL 5415. Philosophy of Law. (3.0 cr.; prerequisite 1003 or 1004 or 3302 or social science major or #; spring, offered periodically) Analytical accounts of law and legal obligation.

PHIL 5510. Philosophy of the Individual Arts. (3.0 cr.; prerequisite PHIL 4510; prerequisite 3502; fall, spring, offered periodically) Aesthetic problems that arise in studying or practicing an art.

PHIL 5601. History of the Philosophy of Science. (3.0 cr.; prerequisite #; fall, spring, offered periodically) History of logical empiricism, from its European origins in first half of 20th century to its emergence as nearly universal account of science in post-war Anglo-American philosophy.

PHIL 5602. Scientific Representation and Explanation. (3.0 cr.; prerequisite #) Contemporary issues concerning representation and explanation of scientific facts.

PHIL 5603. Scientific Inquiry. (3.0 cr.; spring, offered periodically) Philosophical theories of methods for evaluating scientific hypotheses. Role of experimentation in science. How hypotheses are accepted within scientific community.

PHIL 5605. Space and Time. (3.0 cr.; prerequisite Courses in [philosophy or physics] or #) Philosophical problems concerning nature/structure of space, time, and space-time.

PHIL 5606. Philosophy of Quantum Mechanics. (3.0 cr.; ) Problems of interpretation in ordinary (nonrelativistic) quantum mechanics. Two-slit experiment, Schroedinger cat paradox (measurement problem), Einstein-Podolsky-Rosen paradox. Leading approaches to interpretation (Copenhagen, hidden variables, universal wave function) and their connections with philosophical issues.

PHIL 5622. Philosophy and Feminist Theory. (3.0 cr.; prerequisite PHIL 4622, GWSS 4122, GWSS 5122; prerequisite 8 crs in [philosophy or women's studies] or #; ) Encounters through philosophy/feminism. Gender's influence in traditional philosophical problems/methods. Social role of theorizing as they relate to politics of feminism.

PHIL 5760. Selected Topics in Philosophy. (3.0 cr. [maximum 9.0 cr.]; prerequisite 3xxx-5xxx course in phil or #; fall, spring, offered periodically) Philosophical problems of contemporary interest. Topics specified in Class Schedule.

PHIL 5993. Directed Studies. (1.0-3.0 cr. [maximum 6.0 cr.]; prerequisite #, %, @; fall, spring, summer, every year) Guided individual reading or study.

**Physical Education (PE)**

College of Education and Human Development

PE 1004. Diving: Springboard. (1.0 cr.; prerequisite Student Option No Audit; prerequisite 1007 or equiv or #; fall, spring, offered periodically) Fundamentals of diving. Proper mechanics/techniques to ensure safety. Technical/numerical aspects. Lecture, participatory testing.

PE 1007. Beginning Swimming. (1.0 cr.; prerequisite Student Option No Audit; fall, spring, every year) Introduction to basic aquatic safety, fundamentals of swimming and hydrodynamics. Principles of hydrodynamics and stroke mechanics; five basic strokes; basic rescue techniques with use of pool equipment; hydrotherapy for disabilities and other conditions, opportunities for competitive activities, lifetime enjoyment of aquatics.


PE 1014. Conditioning. (1.0 cr.; prerequisite Student Option No Audit; fall, spring, every year) Fundamentals of personal fitness. Principles of fitness; health and motor skill components of fitness; principles of training/conditioning programs; nutrition; weight control; common fitness injuries; motivation and consistency in fitness programs; stress management.

PE 1015. Weight Training. (1.0 cr.; prerequisite Student Option No Audit; fall, spring, every year) Introduction to weight training. Basic aspects of weight training including exercise selection and technique, charting workouts, program design, nutritional considerations, and safety.

PE 1016. Posture and Individual Exercise. (1.0 cr.; prerequisite Student Option No Audit; fall, spring, every year) Good posture techniques, individual exercises, fitness concepts, and mental techniques. Specific overall sound body and mind techniques to include flexibility exercises, cardiovascular fitness, resistance training, nutrition management, weight control, stress management, and self-thought.

PE 1029. Handball. (1.0 cr.; prerequisite Student Option No Audit; fall, spring, every year) Hand and eye coordination, footwork in practice and game conditions, and skills and strategies of service and rally for the court sport handball (four-wall version). Novice to intermediate levels of play accommodated.

PE 1031. Sabre Fencing. (1.0 cr.; prerequisite Student Option No Audit; fall, every year) Basic sabre techniques, movement, an overview of fencing as a recreational sport and an Olympic sport, and the history of fencing.

PE 1032. Badminton. (1.0 cr.; prerequisite Student Option No Audit; fall, spring, offered periodically) Fundamentals including etiquette, terminology, game rules for singles and doubles, footwork, shot selection, and strategy.

PE 1033. Foil Fencing. (1.0 cr.; prerequisite Student Option No Audit; fall, spring, every year) Fencing fundamentals, including basic foil techniques, movement, a general overview of fencing as a recreational sport and an Olympic sport, and the history of fencing.

PE 1034. Judo. (1.0 cr.; prerequisite Student Option No Audit; fall, spring, every year) Basic skills for throwing, falling, grappling (matwork), choking, arm and neck techniques; contest rules from Jiu-Jitsu; fundamental rules and scoring of contests. Videotapes used for technique instruction and contest appreciation.

PE 1035. Karate. (1.0 cr.; prerequisite Student Option No Audit; fall, spring, every year) Japanese Traditional Shotokan Karate (JITSK) is non-contact—no protective pads or gear are worn. Structural foundation, discipline and control, posture, basic body dynamics, blocking, kicking, punching techniques, as well as basic sparring (kumate) and forms (kata).

PE 1036. Racquetball. (1.0 cr.; prerequisite Student Option No Audit; fall, spring, every year) Fundamentals of racquetball, including equipment; safety and etiquette; terminology; game rules of singles, doubles, and cutthroat; grips; basic strategies; serves and shots.

PE 1037. Squash Racquets. (1.0 cr.; prerequisite Student Option No Audit; fall, spring, every year) Entry-level technique, basic equipment, international dimension courts, and fitness.

PE 1038. Beginning Tennis. (1.0 cr.; prerequisite Student Option No Audit; fall, spring, every year) Fundamental strokes, including forehands, backhands, volleys, lobs, overheads,
and serves; introduction to doubles play; terminology, rules, and etiquette.

**PE 1043. Beginning Horse Riding.** (1.0 cr.; Student Option No Audit; fall, spring, offered periodically)

Techniques, styles, and communication of English riding. Students will learn riding techniques at a walk, trot, canter, and jumping.

**PE 1044. Self-Defense.** (1.0 cr.; Student Option No Audit; fall, spring, every year)

Physical, psychological, and de-escalation skills for acting in crisis situations. Distance, body language, and tone of voice are addressed. Physical skills include striking, kicking, shifting, blocking, releasing techniques, floor defenses, and applications to armed attackers and multiple attackers.

**PE 1045. Rock Climbing.** (1.0 cr.; Student Option No Audit; fall, spring, every year)

Fundamentals of Tae Kwon Do. Principles of martial arts, body mechanics of Tae Kwon Do, practical self-defense.

**PE 1046. Tae Kwon Do.** (1.0 cr.; Student Option No Audit; fall, spring, every year)

Basic turns, basic stops, balance techniques, and various other skills from both the forward and backward positions. Equipment, safety issues, ice skating terminology.

**PE 1047. Bowling.** (1.0 cr.; Student Option No Audit; fall, spring, every year)

Fundamentals, including stance, approach and delivery, scoring, bowling terminology, and etiquette.

**PE 1053. Ice Skating.** (1.0 cr.; Student Option No Audit; fall, spring, every year)

Basic turns, basic stops, balance techniques, and various other skills from both the forward and backward positions. Equipment, safety issues, ice skating terminology.

**PE 1055. Golf.** (1.0 cr.; Student Option No Audit; fall, spring, summer, every year)

Proper grip, stance, back address, swing, club selection, psychological management, rules, and etiquette. Basic instruction in analyzing, assisting with, and coaching golf.

**PE 1056. Nordic (Cross-Country) Skiing.** (1.0 cr.; Student Option No Audit; spring, offered periodically)

Introduction to the fundamental techniques of classical and freestyle cross country skiing. Students will be taught through lecture and direct experience on cross country skiing trails.

**PE 1057. Beginning Skiing.** (1.0 cr.; Student Option No Audit; spring, every year)

Alpine skiing. How to stop, turn, and use lifts. Safety, etiquette, and purchase of equipment. Class held at Highland Hills ski area in Bloomington.

**PE 1058. Snowboarding.** (1.0 cr.; Student Option No Audit; prereq Good general health, injury free; spring, every year)

Alpine snowboarding. Uses American Teaching System. Classes are split into nine skill levels, beginning through advanced. Held at Hyland Ski and Snowboard School in Bloomington.

**PE 1059. Track and Field.** (1.0 cr.; Student Option No Audit; fall, spring, offered periodically)

Introduction to track and field: conditioning and training, events and skills, strategies, track and field knowledge, equipment, facilities, and technology.

**PE 1065. Beginning Tumbling and Gymnastics.** (1.0 cr.; Student Option No Audit; fall, spring, offered periodically)

Rolls, handstands, cartwheels, extensions, handsprings, tucks (flips). Spotting techniques. Skills on bars, vault, and beam.

**PE 1067. Basketball.** (1.0 cr.; Student Option No Audit; fall, spring, every year)

Fundamental skills and rules of basketball, with emphasis on basic court movement and different offensive and defensive strategies.

**PE 1071. Beginning Cricket.** (1.0 cr.; Student Option No Audit; fall, spring, offered periodically)

Fundamentals of Cricket. Laws of Cricket, bowling/batting techniques, competitive/recreational Cricket opportunities.

**PE 1072. Soccer.** (1.0 cr.; Student Option No Audit; fall, spring, every year)

Fundamentals of soccer including sporting behavior both on and off the field, game rules, soccer terminology, participation and competition drills, fundamental soccer skills, practical instruction in strategy.

**PE 1074. Beginning Volleyball.** (1.0 cr.; Student Option No Audit; fall, spring, every year)

Basic skills, team play, rules, officiating, and strategy.

**PE 1075. Ice Hockey.** (1.0 cr.; Student Option No Audit; prereq 1053 or equiv or #; spring, offered periodically)

Offensive/defensive strategies/techniques, goal tending, scrimmage play. Students need their own equipment.

**PE 1076. Flag Football.** (1.0 cr.; Student Option No Audit; fall, spring, offered periodically)

Introduction to flag football, techniques, field positions, rules/regulations. Students will participate in vigorous exercise activities including running, throwing, kicking, and catching.

**PE 1077. Lacrosse.** (1.0 cr.; Student Option No Audit; fall, spring, offered periodically)

Introduction to lacrosse, techniques, field positions, rules, regulations. Students participate in vigorous exercise activities including running, throwing, catching, and stick handling.

**PE 1078. Ultimate Disc.** (1.0 cr.; Student Option No Audit; fall, spring, every year)

Introduction to ultimate disc, techniques, field positions, rules, regulations. Students participate in vigorous exercise activities including running, throwing, and catching.

**PE 1079. Rugby (Non-contact).** (1.0 cr.; Student Option No Audit; fall, spring, offered periodically)

Appropriate techniques and field positions. Safe play using appropriate rules and laws. Vigorous exercise activities, including running, passing, catching, evasion, and other physical activity associated with rugby.

**PE 1082. Broomball.** (1.0 cr.; Student Option No Audit; fall, spring, offered periodically)

Techniques. Safe play using appropriate rules and regulations. Vigorous exercise activities, including running, stick handling, shooting, passing, and other physical activity associated with broomball.

**PE 1107. Intermediate Swimming.** (1.0 cr.; Student Option No Audit; prereq 1007 or equiv, proficient ability to swim 100 meters or #; fall, spring, offered periodically)

Intermediate swimming skills. Fundamentals of swimming and hydrodynamics.

**PE 1129. Intermediate Handball.** (1.0 cr.; Student Option No Audit; prereq 1029 or #; fall, spring, offered periodically)


**PE 1133. Intermediate Foil Fencing.** (1.0 cr.; Student Option No Audit; prereq 1033 or equiv or #; spring, offered periodically)

Intermediate/advanced technical/tactical actions in foil, rudimentary epee skills, intermediate/advanced footwork, Rules, officiating, bout tactics.

**PE 1135. Intermediate Karate.** (1.0 cr.; Student Option No Audit; prereq 1035 or equiv or #; spring, every year)

Techniques of Japanese traditional Shotokan Karate taught through Ippon Kumite (one step sparring), San Kumite (three step sparring), and Heian Shodan Kata/Nidan Kata (forms). Testing for orange belt is optional.

**PE 1137. Intermediate Squash.** (1.0 cr.; Student Option No Audit; prereq 1037 or #; fall, spring, offered periodically)


**PE 1146. Intermediate Tae Kwon Do.** (1.0 cr.; Student Option No Audit; prereq 1046, previous Tae Kwon Do experience (World Tae Kwon Do Federation sanctioned), basic white Tae Kwon Do uniform; fall, offered periodically)

Continuation of 1046. Focuses on Olympic-style intermediate skills/techniques. Self-defense techniques for men/women.

**PE 1154. Figure Skating.** (1.0 cr.; Student Option No Audit; prereq 1053 or equiv or #; spring, offered periodically)


**PE 1174. Intermediate Volleyball.** (1.0 cr.; Student Option No Audit; prereq [1074 or equiv], #; spring, offered periodically)

Volleyball systems of play. Incorporating offensive/defensive formations. Team play, transition, coaching, officiating.
PE 1205. Scuba and Skin Diving. (1.0 cr.; Student Option No Audit; prereq Ability to swim 400 yds comfortably or #; fall, spring, every year)
Diving equipment, physics, physiology, decompensation, emergencies, recreational dive planning, oceans, currents and aquatic life, snorkeling/SCUBA equipment usage, buoyancy control, entries, emergencies.

PE 1207. Advanced Swimming. (1.0 cr.; Student Option No Audit; prereq [PE 1007, PE 1107, PE 1306, PE 1411] or #; fall, spring, offered periodically)
Principles of lifetime physical fitness, derived from aquatic exercise. Workout made up of various drills and exercises demonstrating value of swimming fundamentals and training. Training variety, proper technique, and appropriate safety procedures.

PE 1262. Marathon Training. (3.0 cr.; Student Option No Audit; prereq No pre-existing medical condition that would prevent finishing a marathon, #; spring, every year)
Physical challenge adapted through physiological/psychological adaptation. Goal setting is fostered adaptation in many facets of life. Marathon history.

PE 1720. Special Activities in Physical Education. (1.0-3.0 cr. [max 9.0 cr.]; Student Option No Audit; fall, spring, summer, offered periodically)
Activities or related opportunities not normally available through regular course offerings.

Physical Therapy (PT)
Medical School

PT 1002. Orientation to Physical Therapy. (1.0 cr.; S-N or Audit; fall, spring, every year)
Introduction to the profession of physical therapy through lectures, discussions, patient presentations, clinic visit, videotapes, and exposure to treatment equipment.

Physics (PHYS)
Institute of Technology

PHYS 1001W. Energy and the Environment. (4.0 cr.; prereq 1 yr high school algebra; fall, spring, every year)
Fundamental principles governing physical world in context of energy/environment. Lab.

PHYS 1011. Physical World. (3.0 cr.; A-F or Audit; prereq 1 yr high school algebra; fall, spring, summer, every year)
Fundamental laws and principles governing the physical world, discussed in the context in which encountered in modern science and technology.

PHYS 1101W. Introductory College Physics I. (4.0 cr.; prereq High school algebra, plane geometry, trigonometry; primarily for students interested in technical areas; fall, spring, summer, every year)
Fundamental principles of physics in the context of everyday world. Use of kinematics/dynamics principles and quantitative/qualitative problem solving techniques to understand natural phenomena. Lecture, recitation, lab.

PHYS 1102W. Introductory College Physics II. (4.0 cr.; prereq 1101W or 1107; spring, every year)
Fundamental principles of physics in context of everyday world. Use of conservation principles and quantitative/qualitative problem solving techniques to understand natural phenomena. Lecture, recitation, lab.

PHYS 1107. Introductory Physics Online I. (4.0 cr.; prereq High school algebra, plane geometry, trigonometry; fall, spring, every year)
Principles of physics in context of everyday world. Use of kinematics/dynamics principles together with quantitative/qualitative problem solving techniques to understand natural phenomena.

PHYS 1108. Introductory Physics Online II. (4.0 cr.; prereq 1101W or 1107; primarily for students interested in technical areas; fall, spring, every year)
Fundamental principles of physics in context of everyday world. Use of conservation principles and quantitative/qualitative problem solving techniques to understand natural phenomena. Lecture content, recitation, lab.

PHYS 1201W. Introductory Physics for Biology and Pre-medicine I. (5.0 cr.; =PHYS 1501V, PHYS 1301W, PHYS 1401V, PHYS 1281, PHYS 1381); prereq [High school or college calculus], trigonometry, algebra; fall, spring, summer, every year)
Fundamental principles of physics. Description of motion, forces, conservation principles, structure of matter. Applications to mechanical systems, including fluids, waves, heat. Lab.

PHYS 1202W. Introductory Physics for Biology and Pre-medicine II. (5.0 cr.; =PHYS 1282, PHYS 1382, PHYS 1302W, PHYS 1502V, PHYS 1402V); prereq 1201W; fall, spring, summer, every year)
Fundamental principles of physics. Motion, forces, conservation principles, structure of matter. Applications to electromagnetic phenomena, including optics, atomic structure. Lab.

PHYS 1301W. Introductory Physics for Science and Engineering I. (4.0 cr.; =PHYS 1501V, PHYS 1201W, PHYS 1401V, PHYS 1281, PHYS 1381); prereq & Math 1271 or & Math 1371 or & Math 1571; fall, spring, summer, every year)
Use of fundamental principles to solve quantitative problems. Motion, forces, conservation principles, structure of matter. Applications to mechanical systems.

PHYS 1302W. Introductory Physics for Science and Engineering II. (4.0 cr.; =PHYS 1282, PHYS 1382, PHYS 1502V, PHYS 1202W, PHYS 1402V); prereq 1301W. & Math 1272 or Math 1372 or Math 1572; fall, spring, every year)
Use of fundamental principles to solve quantitative problems. Motion, forces, conservation principles, fields, structure of matter. Applications to electromagnetic phenomena.

PHYS 1401V. Honors Physics I. (4.0 cr.; A-F only; =PHYS 1501V, PHYS 1301W, PHYS 1201W, PHYS 1281, PHYS 1381); prereq honors student and permission of University Honors Program; fall, every year)
Comprehensive, calculus-level general physics. Emphasizes use of fundamental principles to solve quantitative problems. Description of motion, forces, conservation principles. Structure of matter, with applications to mechanical systems.

PHYS 1402V. Honors Physics II. (4.0 cr.; A-F only; =PHYS 1302W, PHYS 1502V, PHYS 1202W); prereq 1401V; honors student and permission of University Honors Program; spring, every year)
Fundamental principles to solve quantitative problems. Description of motion, forces, conservation principles, fields. Structure of matter, with applications to electro-magnetic phenomena.

PHYS 1501V. Honors Introduction to Mechanics. (4.0 cr.; A-F only; =PHYS 101W, PHYS 1201W, PHYS 1401V, PHYS 1281, PHYS 1381); prereq One year of high school physics, one year of college-level calculus (or a grade of 5 on the BC-level AP calculus exam), Honors, permission of UHP; fall, every year)
Principles of mechanics for those with full year of calculus/equivalent of one year of high-school physics. Introduction to kinematics, forces, momentum/energy, conservation laws, angular momentum, rigid body motion, gravity, simple harmonic motion, waves.

PHYS 1502V. Honors Introduction to Electricity and Magnetism. (4.0 cr.; A-F only; =PHYS 1282, PHYS 1382, PHYS 1302W, PHYS 1502W, PHYS 1402V); prereq 1501V; honors; spring, every year)
Principles of electricity/magnetism for those with full year of calculus/equivalent of one year of high-school physics. Introduction to electrostatics, magnetostatics, electrodynamics, electric/magnetic properties of materials, circuits, Maxwell's equations, electromagnetic waves.

PHYS 1901. Freshman Seminar: Environment. (1.0-3.0 cr. [max 6.0 cr.]; A-F or Audit; prereq freshman; fall, spring, offered periodically)
Topics vary. See Class Schedule.

PHYS 1904. Freshman Seminar. (1.0-3.0 cr. [max 6.0 cr.]; prereq Freshman; fall, spring, offered periodically)
Topics vary. See Class Schedule.

PHYS 1905. Freshman Seminar. (1.0-3.0 cr. [max 6.0 cr.]; prereq Fr; fall, spring, every year)
Topics vary. See Class Schedule.

PHYS 1910W. Freshman Seminar: Writing Intensive. (1.0-3.0 cr.; prereq freshman; fall, every year)
Topics vary. See Class Schedule.

PHYS 2201. Introductory Thermodynamics and Statistical Physics. (3.0 cr.; prereq [1302W or 1402V], [MATH 1272 or MATH 1372 or MATH 1572H]; fall, every year)
Thermodynamics, its underlying statistical nature.
PHYS 2303. Physics III: Physics of Matter. (4.0 cr.; [PHYS 2503, PHYS 2403H]; prereq 1302, [MATH 1272 or MATH 1372 or MATH 1572H]; [MatSci or EE] student; spring, every year)
Thermodynamics, mechanical/electromagnetic waves, optics, quantum theory. Applications of quantum nature of solids.

PHYS 2311. Modern Physics. (4.0 cr.; prereq [1302 or 1402], Chem 1022, Math 2243; fall, spring, summer, every year)
Broad overview of physical concepts developed in twentieth century. Special relativity, wave-particle duality, Schrodinger equation, Bohr atom, hydrogen atom in wave mechanics, many-electron atoms, x-rays, nuclear structure, radioactivity, nuclear reactions, statistical physics.

PHYS 2403H, Honors Physics III. (4.0 cr.; A-F only; [PHYS 2303, PHYS 2503]; prereq 1402V, honors student and permission of University Honors Program; fall, every year)
Third semester of comprehensive calculus-level general physics. Emphasizes use of fundamental principles to solve quantitative problems. Applications to 20th-century physics such as classical/quantum mechanical waves, optics, special relativity, and atomic structure of materials.

PHYS 2503. Physics III: Intro to Waves, Optics, and Special Relativity. (4.0 cr.; [PHYS 2303, PHYS 2403H]; prereq 1302W, [MATH 1272 or MATH 1372 or MATH 1572H]; fall, every year)
Third semester of introductory physics. Mechanical/electromagnetic waves, optics, special relativity.

PHYS 2601. Quantum Physics. (4.0 cr.; prereq [2403H or 2503], & [Math 2243 or Math 2373 or Math 2574H]; spring, every year)
Introduction to quantum mechanics. Applications to molecular, condensed-matter, nuclear, elementary-particle, and statistical physics. Associated lab is 2605.

PHYS 2605. Quantum Physics Laboratory. (3.0 cr.; prereq & 2601; spring, every year)
Laboratory experiments in atomic, solid state, and nuclear physics offered in conjunction with 2601.

PHYS 3022. Introduction to Cosmology. (3.0 cr.; prereq 2601; fall, even years)

PHYS 3071W. Laboratory-Based Physics for Teachers. (4.0 cr.; prereq College algebra; no credit for CSE students; fall, spring, every year)
Laboratory-based introductory physics. Topics selected to apply to elementary school curriculum: earth's motion, properties of matter, heat/temperature, kinematics, electric current.

PHYS 3993. Directed Studies. (1.0-5.0 cr.; max 10.0 cr.; prereq #, dept consent; fall, spring, summer, every year)
Directed study in Physics in areas arranged by the student and a faculty member.

PHYS 3994. Directed Research. (1.0-5.0 cr.; [PHYS 2503, PHYS 2403H]; prereq 1302, [MATH 1272 or MATH 1372 or MATH 1572H]; [MatSci or EE] student; spring, every year)
Independent, directed study in physics in areas arranged by the student and a faculty member.

PHYS 4001. Analytical Mechanics. (4.0 cr.; prereq [2303 or 2601 or Chem 3501 or Chem 3502], two sems soph math; fall, every year)
Analytic Newtonian mechanics. Mathematics beyond prerequisites developed as required.

PHYS 4002. Electricity and Magnetism. (4.0 cr.; prereq [2303 or 2601 or Chem 3501 or Chem 3502], two sems soph math; spring, every year)
Classical theory of electromagnetic fields using vector algebra and vector calculus.

PHYS 4041. Computational Methods in the Physical Sciences. (4.0 cr.; prereq Upper div or grad student or #; fall, spring, offered periodically)
Introduction to using computer programs to solve problems in physical sciences. Selected numerical methods, mapping problems onto computational algorithms. Arranged lab.

PHYS 4051. Methods of Experimental Physics I. (5.0 cr.; prereq 2605 or equiv lab experience or #; fall, every year)
Contemporary experimental techniques. Introduction to modern analog and digital electronics from an experimental viewpoint. Use of computers for data acquisition and experimental control. Statistics of data analysis.

PHYS 4052W. Methods of Experimental Physics II. (5.0 cr.; prereq 4051; spring, every year)
Second semester of laboratory sequence. Contemporary experimental techniques illustrated by experiments with data analysis. Students design and execute an experimental project. Lectures on specialized topics of professional concern.

PHYS 4071. Concepts in Physics. (3.0 cr.; prereq 2201, 2303; fall, every year)
Overview of physics with emphasis on 20th-century developments. Primarily for secondary teachers and science majors wishing to understand the conceptual connections within physics.

PHYS 4101. Quantum Mechanics. (4.0 cr.; prereq [2303 or 2601 or Chem 3502], two sems soph math; fall, every year)

PHYS 4121W. History of 20th-Century Physics. (3.0 cr.; [PHYS 2411W]; prereq general physics or #; fall, spring, even year)
Experimental and theoretical discoveries in 20th-century physics (birth of modern physics, special theory of relativity, old and new quantum theories, nuclear physics to WWII) within the context of concurrent educational, institutional, and political developments in Europe and the United States.

PHYS 4201. Statistical and Thermal Physics. (3.0 cr.; prereq 2601; fall, every year)
Principles of thermodynamics and statistical mechanics. Selected applications such as kinetic theory, transport theory, and phase transitions.

PHYS 4211. Introduction to Solid-State Physics. (3.0 cr.; prereq 4101, 4201; spring, every year)
A modern presentation of the properties of solids. Topics include vibrational and electronic properties of solids; diffraction of waves in solids and electron band structure. Other possible topics include optical properties, magnetic phenomena, and superconductivity.

PHYS 4303. Electrodynamics and Waves. (3.0 cr.; prereq 4001, 4002; fall, spring, every year)
Analytical mechanics. Electricity/magnetism, including mechanical/electromagnetic wave phenomena. Physical/geometrical optics.

PHYS 4501. Experimental Project. (1.0-5.0 cr.; prereq 4052, #; fall, spring, summer, every year)
Research project in physics area of contemporary interest. Project must be approved by faculty coordinator before registration.

PHYS 4511. Introduction to Nuclear and Particle Physics. (3.0 cr.; prereq 4101; spring, every year)
Fundamental particles and Standard Model. Symmetries/quarks, models of nuclei, interactions between particles/nuclei, tests of conservation laws, fission/fusion.

PHYS 4611. Introduction to Space Physics. (3.0 cr.; prereq [4001, 4002] or equiv or #; fall, odd years)

PHYS 4621. Introduction to Plasma Physics. (3.0 cr.; prereq [4001, 4002] or equiv or #; fall, odd years)
Basic properties of collisionless, magnetized plasmas, single particle motion, plasmas as fluids, magnetohydrodynamics, waves in plasmas, equilibrium, instabilities, kinetic theory/shocks.

PHYS 4911. Introduction to Biopolymer Physics. (3.0 cr.; [PHYS 5081]; prereq [2303, 2403H, 2503] or Chem 3501 or #; spring, every year)
Introduction to biological and soft condensed matter physics. Emphasizes physical ideas necessary to understand behavior of macromolecules and other biological materials. Elements of thermodynamics and statistical mechanics are presented as needed.

PHYS 4950H. Senior Thesis. (1.0-3.0 cr.; max 6.0 cr.; S-N or Audit; prereq #; fall, spring, every year)
Independent project with adviser.

PHYS 4960H. Honors Seminar. (1.0 cr. [max 2.0 cr.]; Student Option No Audit; prereq Upper div honors, #; fall, spring, every year)
In-depth examination of a conceptual theme in physics, its experimental foundations and historical perspectives. Kinematics and dynamics from Aristotle through Einstein; nature of charge and light; energy and thermodynamics; electricity, magnetism, and quantized fields; structure of matter.

**PHYS 5072. Best Practices in College Physics Teaching.** (1.0-3.0 cr.; max 5.0 cr.); fall, spring, every year
Pedagogies for introductory physics classes. Topics from educational research/practice as applied to classroom.

**PHYS 5081. Introduction to Biopolymer Physics.** (3.0 cr.; [PHYS 4911]; prereq working knowledge of [thermodynamics, statistical mechanics];) Introduction to biological and soft condensed matter physics. Emphasizes physical ideas necessary to understand behavior of macromolecules and other biological materials.

**PHYS 5201. Thermal and Statistical Physics.** (3.0 cr.; A-F or Audit; prereq [4101, 4201] or equiv) previous exposure to thermodynamics, introductory statistical physics; fall, every year

**PHYS 5402. Radiological Physics.** (4.0 cr.; prereq One semester of introductory calculus-based physics, such as PHYS1301W. Students not sure if they meet prerequisites should consult instructor.; spring, odd years)
Signal analysis, medical imaging, medical x-rays, tomography, radiation therapy, nuclear medicine, MRI, similar topics.

**PHYS 5994. Directed Research.** (1.0-5.0 cr. [max 5.0 cr.;] Independent, directed study in physics in areas arranged by the student and a faculty member.}
courses listed in this catalog are current as of december 12, 2014. for up-to-date information, visit www.catalogs.umn.edu.
transport, intracellular electrolyte composition, membrane potential. Aspects of intercellular communication.

PHSL 5701. Physiology Laboratory. (1.0-2.0 cr.; A-F or Audit; prereq #; fall, every year) Experiments in physiology. Emphasizes quantitative aspects, including analysis of organ systems.

Plant Biology (PBIO)
College of Biological Sciences

PBIO 1212. Plant Biotechnology and Society. (3.0 cr.; [max 8.0 cr.]; spring, every year) Importance of plants to humans. How human interaction with plants has profoundly affected human societies, how human technology has changed our interaction with plants and affected the environment. Development of transgenic plants. Biofuels.

PBIO 4321. Minnesota Flora. (3.0 cr.; prereq One semester college biology; fall, even years) Practical skills for identifying plant species/surveying Minnesota vegetation to students of biology, environmental sciences, resource management, horticulture. Integrates botany, ecology, evolution, earth history, climate, global change in context of local plant communities. Labs/Saturday field trips explore Minnesota plants/plant communities.

PBIO 4404. Developmental Plant Anatomy. (3.0 cr.; prereq Biol 2022 or Biol 3007; spring, offered periodically) Introduction to the microscopic structure and development of plants at the cell, tissue, and organ level. Emphasis on relationships between anatomy and the ontogeny, phylogeny, and ecology of seed plants with some reference to lower vascular plants.


PBIO 4601. Topics in Plant Biochemistry. (3.0 cr.; A-F only; prereq [Biol 1002 or Biol 1009 or Biol 2003], CHEM 2301; spring, every year) Biochemical analysis of processes unique to photosynthetic organisms. Photosynthesis and carbon dioxide fixation. Synthesis of carbohydrates, lipids, and derivatives. Aromatic compounds such as lignin, other natural products. Functions of natural products.

PBIO 4793W. Directed Studies: Writing Intensive. (1.0-7.0 cr.; S-N or Audit; prereq #; fall, spring, summer, every year) Individual study on selected topics or problems. Emphasizes readings, use of scientific literature. Written report.

PBIO 4794W. Directed Research: Writing Intensive. (1.0-6.0 cr.; max 42.0 cr.; S-N or Audit; prereq #; fall, spring, summer, every year) Lab or field investigation of selected areas of research, including written report.

PBIO 4993. Directed Studies. (1.0-7.0 cr.; S-N or Audit; prereq #; fall, spring, summer, every year) Individual study on selected topics or problems. Emphasizes selected readings, use of scientific literature.

PBIO 4994. Directed Research. (1.0-6.0 cr.; max 42.0 cr.; S-N or Audit; prereq #; fall, spring, summer, every year) Lab or field investigation of selected areas of research.


PBIO 5301. Plant Genomics. (3.0 cr.; ==[PLPA 5301]; prereq [Intro course in genetics, intro course in biochemistry] or #; fall, every year) Introduction to genomics. Emphasizes plants and relevant model organisms. DNA marker/sequencing technology, comparative genomics, whole genome sequencing, DNA chips/microarrays, EST libraries and SAGE analysis, gene-knockout systems, genome databases, sequence comparison/clustering algorithms, visualization tools.

PBIO 5412. Plant Physiology. (3.0 cr.; prereq Biol 2022 or Biol 3002 or Biol 3007, Biol/BioC 3021 or BioC 4331; fall, every year) Physiological and biochemical bases of plant systems with emphasis on higher plants.

PBIO 5514. Plant Molecular Genetics and Development. (3.0 cr.; prereq BIOC 3021 or Biol 3021 or Biol 4003 or BioC 4332 or equiv; fall, every year) Survey topics in plant molecular biology. How advances in molecular/genomic biology are used to understand plant physiology and developmental biology. Uses of transgenic plants in research/biotechnology.

PBIO 5516. Plant Cell Biology. (3.0 cr.; ==[PBIO 4516W]); prereq [Biol 2022 or Biol 3007 or Biol 3022], [BioC 3021 or BioC 3021 or Biol 4003]) Structure, function, and dynamic properties of plant cellular components such as organelles, cytoskeleton, and cell wall. How cellular structures are assembled, how it contributes to cell growth/division. Cell fate/development. Responses to hormones and external signals.

PBIO 5601. Topics in Plant Biochemistry. (3.0 cr.; A-F or Audit; prereq [Biol 1002 or Biol 1009 or Biol 2003], CHEM 2301; spring, every year) Biochemical analysis of processes unique to photosynthetic organisms. Photosynthesis and carbon dioxide fixation. Synthesis of carbohydrates, lipids, and derivatives. Aromatic compounds such as lignin, other natural products. Functions of natural products.

Plant Pathology (PLPA)
College of Food, Agricultural and Natural Resource Sciences


PLPA 1942. Topics: Freshman Seminar. (3.0 cr.; A-F or Audit; prereq Fr; fall, spring, every year) Topics specified in class catalog.

PLPA 2001. Introductory Plant Pathology. (3.0 cr.; prereq BIOL 1009 or equiv; spring, every year) Biology of the major groups of plant pathogens, symptoms and signs of plant disease, plant disease diagnosis, and principles of disease management. Lecture and laboratory.

PLPA 2003. Plague, Famine, and Beer: The Impact of Microscopic Organisms on Human Civilization. (3.0 cr.; fall, every year) Impacts that microbes have made on course of human civilization. Negative influences of major human/plant infectious disease. Positive benefits attained by harnessing power of microbes. Scale of history includes prehistoric to present day. Projected future impacts.

PLPA 3003. Diseases of Forest and Shade Trees. (3.0 cr.; spring, every year) Diseases of trees in urban and forested areas. Biology, ecology and control of tree diseases. Labs provide experience identifying disease agents and learning appropriate integrated control procedures.

PLPA 3090. Research in Plant Pathology. (1.0-4.0 cr.; fall, spring, summer, every year) Assignment of special problems to undergraduates desiring opportunity for independent research in plant pathology.

PLPA 4096. Professional Experience Program: Internship. (1.0-3.0 cr.; [max 6.0 cr.]; S-N or Audit; prereq COAFES undergrad, complete internship contract available in COAFES Career Services before registering; UC only; fall, spring, every year) Supervised practicum with professional experience in plant pathology and related industries including the Plant Disease and "Dial-U" clinics. Evaluative reports and
consultations with faculty advisers and employers.

PLPA 5003. Diseases of Forest and Shade Trees. (3.0 cr.; spring, every year) Diseases of trees in urban and forested areas. Biology, ecology, and control of tree diseases. Identifying disease agents, integrated control procedures. Laboratory.

PLPA 5090. Issues in Plant Pathology. (1.0-4.0 cr.; fall, spring, summer, every year) See Class Schedule or department for current offerings.

PLPA 5103. Plant-Microbe Interactions. (3.0 cr.; prerequisite Intro course in plant pathology or molecular biology or equiv; fall, every year) Genetics, physiology, molecular biology of plant-microbe interactions. Communication between plant/microbes, signal transduction, control of gene expression, symbiosis/parasitism, plant host response mechanisms, plant disease physiology.

PLPA 5202. Field Plant Pathology. (2.0 cr.; summer, every year) Characteristics of a variety of plant diseases. Field trips to observe symptoms and effects of diseases, and to learn about prevention and control of diseases in field, forest, golf course, greenhouse, nursery, orchard, and urban environments.

PLPA 5203. Introduction to Fungal Biology. (3.0 cr.; prerequisite BIOL 1009 or equiv; fall, every year) Fungi are a critical component of the diversity and function of terrestrial ecosystems, affecting decomposition, plant nutrient uptake, and agricultural practices. Key components of fungal biology, including ecology, genetics, life cycles and diversity. Labs provide hands on experience with a diverse range of organisms.

PLPA 5300. Current Topics in Molecular Plant Pathology. (1.0-2.0 cr.; S-N only; prerequisite #; fall, every year) Interactive class. Students read, discuss, and critique publications in molecular plant pathology. Focus on article, examining from different dimensions (underlying principles, experimental strategies, data analysis, impact on the broader discipline).

PLPA 5301. Plant Genomics. (3.0 cr.; prerequisite PBio 5301; prerequisite Intro course in genetics or #; fall, every year) Plants and model organisms. DNA sequencing, comparative genomics, genome structure and function, DNA chips/microarrays, RNA expression, gene-knockout systems, genome databases, sequence comparison/clustering algorithms, and visualization tools.

PLPA 5444. Ecology, Epidemiology, and Evolutionary Biology of Plant-Microbe Interactions. (3.0 cr.; A-F or Audit; prerequisite Intro plant pathology or advanced biology coursework recommended; fall, every year) Concepts and recent research in the ecology, epidemiology, and evolutionary/coevolutionary biology of plant-microbe interactions spanning the range from parasitic to mutualistic in agricultural and natural habitats.

PLPA 5480. Principles of Plant Pathology. (3.0 cr.; prerequisite BIOL 1009 or equiv; fall, every year) Diseases that affect plants, microbiology and microbial and plant interactions. Mycology and select diseases caused by fungi within Ascomycota, Basidiomycota, and the fungal-like Oomycota. Diseases caused by bacteria, nematodes, viruses, parasitic plants and abiotic damage. Lecture and Lab.

PLPA 5660. Plant Disease Resistance and Applications. (3.0 cr.; A-F only; prerequisite BIOL 4003; spring, every year) Fundamentals of disease resistance in plants and the genetics of host-parasite interactions as they relate to the sustainable control of plant diseases. Examples explored at the Mendelian, populational, and molecular level of organization.

PLPA 5999. Special Topics in Plant Pathology. (1.0-8.0 cr.; fall, spring, summer, every year) Workshops on topics in plant pathology. See Class Schedule or department for current offerings.

Polish (PLSH)

PLSH 1101. Beginning Polish. (5.0 cr.; =PLSH 4101; fall, offered periodically) Develop basic proficiency in listening, speaking, reading, and writing and become acquainted with Polish culture. First of four courses designed to satisfy CLA language graduation requirement.

PLSH 1102. Beginning Polish. (5.0 cr.; =PLSH 4102; prerequisite 1101 or equiv; spring, offered periodically) Develop basic proficiency in listening, speaking, reading and writing and to acquaint students with Polish culture. Second of four courses designed to satisfy CLA language graduation requirement.

PLSH 3001. Intermediate Polish. (5.0 cr.; =PLSH 4103; prerequisite 1102 or equiv; fall, offered periodically) Conversation, composition, advanced grammar, translation, and readings in appropriate literature. Third of four courses designed to satisfy CLA language graduation requirement.

PLSH 3002. Intermediate Polish. (5.0 cr.; =PLSH 4104; prerequisite 3001 or equiv; fall, odd years) Conversation, composition, advanced grammar, translation, and readings in appropriate literature. Fourth of a sequence of courses designed to satisfy CLA language graduation requirement.

PLSH 4011. Beginning Polish. (3.0 cr.; =PLSH 1101; prerequisite Fourth sem course in another language or grad student; fall, offered periodically) Listening, speaking, reading, writing, Polish culture.

PLSH 4012. Beginning Polish. (3.0 cr.; =PLSH 1102; prerequisite 4011, fourth sem course in another language or grad student; spring, offered periodically) Listening, speaking, reading, writing, Polish culture.

PLSH 4103. Intermediate Polish. (3.0 cr.; =PLSH 3001; prerequisite 4102, fourth sem course in another language or grad student; fall, offered periodically) Conversation, composition, advanced grammar, translation, readings in appropriate literature.

PLSH 4104. Intermediate Polish. (3.0 cr.; =PLSH 3002; prerequisite 4103, fourth sem course in another language or grad student; spring, offered periodically) Conversation, composition, advanced grammar, translation, and readings in appropriate literature.

PLSH 5993. Directed Studies. (1.0-3.0 cr.; fall, offered periodically) Guided individual reading or study in Polish language, literature, and culture.

Political Science (POL)


POL 1019. Indigenous Peoples: A Global Perspective. (3.0 cr.; A-F or Audit; =AMIN 1002; fall, spring, summer, every year) Colonial experiences of selected indigenous peoples in Americas, Eurasia, Pacific Rim.

POL 1025. Global Politics. (4.0 cr.; =POL 1025H; fall, spring, summer, every year) Study of international relations and issues in contemporary world affairs. Forms of state interaction from violent conflict to cooperation and integration; activities of international institutions; transnational relations involving non-state actors such as international businesses, human rights networks, and environmental movements.

POL 1025H. Honors: Global Politics. (4.0 cr.; A-F or Audit; =POL 1025; prerequisite Honors student; fall, spring, every year) Introduction to international relations/issues in contemporary world affairs. War, peace, nuclear proliferation. Politics of humanitarian intervention. Global monetary/trading systems. Activities of international institutions/non-governmental organizations.
POL 1026. We and They: U.S. Foreign Policy. (4.0 cr.; fall, spring, every year) 
Contemporary foreign policy issues; how the United States makes foreign policy in a global era; historical background. How two regions (such as the Middle East and China) affect and are affected by U.S. policy.

POL 1054. Puzzles in World Politics. (4.0 cr.; fall, spring, summer, every year) 
Political life. Repression, democracy, rights, corruption, gender, political change. Guest lectures by political science professors.

POL 1054H. Honors: Puzzles in World Politics. (4.0 cr.; A-F only; prereq Honors student; fall, spring, every year) 
Political life. Repression, democracy, rights, corruption, gender, political change. Guest lectures by political science professors who are experts on different parts of world.

POL 1201. Political Ideas and Ideologies. (4.0 cr.; fall, spring, summer, every year) 
Analysis of major concepts and ideas (e.g., freedom, equality, democracy) as they are constructed by major theories and ideologies (liberalism, conservatism, socialism, etc.).

POL 1234. Citizen U: Building Tomorrow's Citizens Today. (3.0 cr.; A-F only; spring, every year) 
Questions of public engagement and higher education. Focuses on U as public space for public action/discussion. How is the University of U.S. its ongoing initiatives in public engagement. Core concepts of public achievement. Model of public engagement practiced at U.

POL 1903. Freshman Seminar. (3.0 cr.; prereq Fr or no more than 30 cr; fall, spring, every year) 
Topics specified in Class Schedule.

POL 1904. Topics: Freshman Seminar. (3.0 cr. [max 6.0 cr.]; prereq Fr or FRFY; fall, spring, every year) 
International perspectives.

POL 1905. Freshman Seminar. (3.0 cr.; prereq Fr; fall, spring, every year) 
Topics specified in Class Schedule.

POL 1908W. Topics: Freshman Seminar. (3.0 cr.; A-F or Audit; prereq freshman; fall, spring, every year) 
Topics specified in Class Schedule.

POL 1909W. Topics: Freshman Seminar. (3.0 cr.; A-F or Audit; prereq freshman; fall, spring, every year) 
Topics specified in Class Schedule.

POL 1910W. Topics: Freshman Seminar. (3.0 cr.; prereq Freshman; fall, spring, offered periodically) 
Topics specified in Class Schedule.

POL 1942. Topics: Freshman Seminar. (3.0 cr.; prereq Freshman; fall, spring, offered periodically) 
Topics specified in Class Schedule.

POL 3070. Faculty-Supervised Individual Field Work. (1.0-13.0 cr.; A-F or Audit; prereq #; fall, spring, summer, every year) 
Faculty-supervised research related to work in political or governmental organizations.

POL 3080. Faculty-Supervised Individual Internships. (3.0-13.0 cr. [max 15.0 cr.]; A-F or Audit; prereq #; fall, spring, summer, every year) 
Internship with government or community organizations arranged by the department and awarded competitively each spring semester.

POL 3085. Quantitative Analysis in Political Science. (4.0 cr.; A-F or Audit; fall, spring, every year) 
Empirical research techniques. Testing a political hypothesis using data. Topics such as setting up research question in political science, research design, and techniques of data analysis.

POL 3085H. Honors Course: Quantitative Analysis in Political Science. (4.0 cr.; A-F only; prereq Honors student; fall, spring, every year) 
Empirical research techniques/how one tests a political hypothesis using data. Topics such as setting up a research question in political science, proper research design, and basic techniques of data analysis.

POL 3108H. Honors Tutorial: Thesis Preparation and Political Science Inquiry. (3.0 cr.; A-F only; prereq Pol sci major; honors; fall, spring, every year) 
Advance research skills and prepare to write senior thesis. Political science research. Develop thesis topic, test ideas in a structured/collegiate setting.

POL 3110H. Honors Thesis Credits. (1.0-4.0 cr.; A-F only; prereq 3109, pol sci, honors, #; fall, spring, summer, every year) 
Individual research/writing of departmental honors thesis.

POL 3210. Practicum. (2.0 cr. [max 12.0 cr.]; fall, spring, every year) 
Offers different kinds of out-of-class opportunities to complement the readings, assignments, and objectives of a parent course in political science. Opportunities vary according to demands of the parent course.

POL 3225. American Political Thought. (3.0 cr.; prereq Suggested prerequisite POL 1201; fall, spring, summer, every year) 
Puritans, American Revolution, Constitution, pro- and anti-slavery arguments, civil war/reconstruction, industrialism, westward expansion, Native Americans, immigration, populism, socialism, social Darwinism, women's suffrage, red scares, Great Depression, free speech, pluralism, multiculturalism.

POL 3235W. Democracy and Citizenship. (3.0 cr.; prereq Suggested prerequisite 1201; fall, spring, every year) 

POL 3251W. Power, Virtue and Vice: Ancient and Early Modern Political Theory. (3.0 cr.; =POL 5251; fall, offered periodically) 
Ancient/early modern political thinking confronts basic questions of political order.

POL 3252W. Revolution, Democracy, and Empire: Modern Political Thought. (3.0 cr.; prereq Suggested prerequisite 1201; spring, odd years) 
Thinkers, discourses, events that craft understanding of revolution, democracy, empire. Emergence of democracy/democratic institutions alongside problems of religious zealotry, political hierarchy/exclusion, market economies, cultural marginalization.

POL 3265. Ideas and Protest in French Postwar Thought. (3.0 cr.; fall, spring, every year) 
Examine events, political/ethical challenges, intellectuals who shaped France in its century of politics/protest. Historical documents, cultural media, philosophical texts. Thinkers range from film-maker Gillo Pontecorvo to philosopher-playwright Jean-Paul Sartre to philosopher Michel Foucault.

POL 3306. Presidential Leadership and American Democracy. (3.0 cr.; =POL 5306; spring, even years) 
President's political/constitutional powers. American expectations. American politics.

POL 3308. Congressional Politics and Institutions. (3.0 cr.; =POL 4308, POL 5308; fall, spring, summer, every year) 
Origin/development of U.S. congressional institutions, parties, committees, leaders, lobbying/elections, and relations between Congress/executive branch. Relationship of campaigning/governing, nature of representation, biases of institutional arrangements.

POL 3309. Justice in America. (3.0 cr.; prereq 1001 or 1002 or #; fall, spring, every year) 
American judiciary. Selection of judges. How/why these individuals/institutions behave as they do. What influences judicial decisions. What impact decisions have. Why people comply with them.

POL 3310. Topics in American Politics. (3.0 cr.; max 6.0 cr.; fall, spring, every year) 
Topics in American politics, as specified in Class Schedule.

POL 3310H. Topics in American Politics. (3.0 cr.; fall, spring, offered periodically) 
Topics in American politics.

POL 3317. Food Politics: Actors, Arenas, and Agendas. (3.0 cr.; A-F or Audit; fall, spring, every year) 
How food is grown, transported, processed, consumed. Examine how various political actors interact in complex policy arena that is food. Explore various resources, arguments, evidence used by participants in food politics. Investigate institutional, cultural, moral rules of engagement that provide structure in which political contenders attempt to advance economic interests/ideological agendas.
POL 332. Political Tolerance in the United States. (3.0-4.0 cr.; spring, offered periodically) Political importance of civil liberties in American society. Tolerance as a political phenomenon. Issues such as free speech, privacy, religion, race, gender.


POL 3410. Topics in Comparative Politics. (3.0 cr.; [max 9.0 cr.]; fall, spring, summer, every year) Topics of current analytical or policy importance to comparative politics. Topics vary, as specified in Class Schedule.

POL 3451W. Politics and Society in the New Europe. (3.0 cr.; fall, spring, even years) Changing politics/society of Europe. Generational change/values, political parties, welfare state, future of European integration, political stability, democratization.

POL 3464. Politics of Inequality. (3.0 cr.; A-F or Audit; fall, spring, every year) Causes/consequences of economic inequality in the USA and Europe. America and European countries in contrast to one another. What differences there are and whether they matter.

POL 3465. Theories of Political Economy. (3.0 cr.; A-F or Audit; fall, spring, every year) Theories of economics/politics that underlie debates between politicians and commentators in modern life. Classic debates among economists and political scientists. Role of government in the market. Applying theories to contemporary debate on causes of and response to current financial crisis.


POL 3477. Political Economy of Development. (3.0-4.0 cr.; fall, spring, summer, every year) Political processes/problems associated with economic development. Political economy of underdevelopment/development. Problems of state building, development of political institutions.

POL 3489W. Citizens, Consumers, and Corporations. (3.0 cr.; spring, odd years) How ordinary people can act collectively to hold corporations accountable for effects their activities have on communities/nations. Mobilizing as citizens through mass protests, lobbying politicians, and pursuing claims through court system. Mobilizing as consumers through purchasing decisions.


POL 3733. From Suffragettes to Senators: Gender, Politics & Policy in the U.S.. (3.0 cr.; A-F or Audit; spring, every year) Overview to field of gender/politics. Examine role women play in U.S. policy process. How public policies are "gendered." How policies compare to feminist thinking about related issue area. Theories of role(s) gender plays in various aspects of politics.

POL 3739. Politics of Race, Class, and Ethnicity. (3.0 cr.; fall, spring, summer, every year) How race/ethnicity/class interact in political process. Political conflict through comparative analysis of United States, South Africa, Brazil.

POL 3752. Chicana/o Politics. (3.0 cr.; [CHIC 3852]; fall, spring, every year) Theory/practice of Chicana/o politics through analysis of Mexican American experience, social agency. Response to larger political systems/behaviors using social science methods of inquiry. Unequal power relations, social justice, political economy.

POL 3766. Political Psychology of Mass Behavior. (3.0 cr.; fall, spring, every year) How political behavior of citizens and political elites is shaped by psychological factors, including personality, attitudes, values, emotions, and cognitive sophistication. Political activism/apathy, leadership charisma, mass media, group identifications, political culture.

POL 3767. Political Psychology of Elite Behavior. (3.0 cr.; A-F or Audit; fall, spring, odd years) Intersections of politics, personality, and social psychology. Focuses on political leaders and elites. Usefulness of psychological theories for conducting political analysis. Role of individual, of group processes, of political/social cognition, and of context in political decision-making.

POL 3769. Public Opinion and Voting Behavior. (3.0 cr.; =POL 5767; fall, spring, every year) Major factors influencing electoral decisions/political attitude formation/change. Data analysis lab required.

POL 3785. Persuasion and Political Propaganda. (3.0 cr.; A-F or Audit; =POL 3785H; fall, spring, every year) Introduction to persuasion and political propaganda. Persuasion theories relevant to designing effective political propaganda. Applying theories to analyze WWII/WWIII propaganda posters, films, and political campaign commercials. Use of fiction as propaganda tool.

POL 3785H. Persuasion and Political Propaganda. (3.0 cr.; A-F only; =POL 3785; fall, spring, even years) Persuasion theories relevant to designing effective political propaganda. Applying theories to analyze WWII/WWIII propaganda posters, films, and political campaign commercials. Use of fiction as propaganda tool.

POL 3810. Topics in International Relations and Foreign Policy. (3.0 cr. [max 6.0 cr.]; fall, spring, every year) Analysis of selected issues in contemporary international relations. Topics vary, as specified in Class Schedule.

POL 3833. The United States and the Global Economy. (3.0 cr.; fall, spring, offered periodically) Domestic and international politics of the United States, foreign economic policy (trade, aid, investment, monetary, and migration policies). Effects of policies and international economic relations on the U.S. economy and U.S. politics.

POL 3835. International Relations. (3.0 cr.; fall, spring, summer, every year) Introduction to theoretical study of international relations. How theoretical perspective shapes one's understandings of structure/practices of global politics.


POL 3873V. Global Citizenship and International Ethics. (3.0 cr.; A-F only; fall, spring, even years) Case studies of ethics in intervention, war, weapons, foreign aid, environmental practices, and human rights are used to examine global ethical responsibilities of individual citizens and public officials. Effectiveness of transnational social movements in influencing policy at domestic/international levels.

POL 3873W. Global Citizenship and International Ethics. (3.0 cr.; fall, spring, odd years)
Courses listed in this catalog are current as of December 12, 2014. For up-to-date information, visit www.catalogs.umn.edu
POL 4501W. The Supreme Court and Constitutional Interpretation. (3.0 cr.; = [POL 5487]; fall, every year)

Historical/analytical approaches to Court's landmark decisions. Theory/techniques of judicial review. Relates court's authority to wider political/social context of American government.

POL 4502W. The Supreme Court, Civil Liberties, and Civil Rights. (3.0 cr.; spring, every year)

Supreme Court's interpretation of Bill of Rights, 14th amendment. Freedom of speech, press, religion; crime/punishment; segregation/desegregation, affirmative action; abortion/privacy.

POL 4507. Law, Sovereignty, and Treaty Rights. (3.0 cr.; fall, odd years)

History of American Indian law and the post-contact effects of colonial and U.S. law on American Indians through the 20th century.

POL 4525W. Federal Indian Policy. (3.0 cr.; A-F or Audit; = [MIN 4525W, POL 4473W]; fall, even years)

Formulation, implementation, evolution, comparison of Indian policy from pre-colonial times to self-government of new millennium. Theoretical approaches to federal Indian policy. Major federal Indian policies. Views/attitudes of policy-makers, reactions of indigenous nations to policies. Effect of bodies of literature on policies.

POL 4561. Comparative Legal Systems. (3.0 cr.; = [POL 5561]; prereq Jr or sr or non-pol sci grad major; fall, offered periodically)

Survey of the principal legal systems of the Western world. Examine the role of the legal system in relation to various political and economic systems and the contrast between the common law and civil law traditions.

POL 4737W. American Political Parties. (4.0 cr.; = [POL 5737]; prereq 1001 or equiv or #; fall, spring, odd years)

The American two-party system; party influence in legislatures and executives; decline of parties and their future.

POL 4766. America, the Unusual?: American Political Culture in Comparative Context. (3.0 cr.; = [POL 5766]; prereq suggested 1001 or equiv; fall, spring, even years)

Empirical analysis of basic political values. Individualism, freedom, equality. Democratic principles, materialism, capitalism, citizenship, patriotism, heroism.

POL 4771. Racial Attitudes and Intergroup Conflict. (3.0 cr.; )

Basic approaches, findings, and controversies in research on racial attitudes and intergroup relations, from perspective of political psychology. Approaches developed by researchers in political science, social psychology, and sociology. Contemporary issues/debates, historical development of research/theory.

POL 4773W. Interest Groups, Social Movements and Politics of Race, Class, and Gender. (3.0 cr.; fall, spring, every year)

Interest groups/social movements as agents of democratic representation/political change in American politics/policy-making. Organizations/movements that represent racial/ethnic minorities, women, religious conservatives, lesbian, gay, bisexual, transgender people, low-income people.

POL 4810. Topics in International Politics and Foreign Policy. (3.0 cr. [max 6.0 cr.]; fall, spring, summer, every year)

Analysis of selected issues in contemporary international relations. Topics vary, as specified in Class Schedule.

POL 4867W. United States Foreign Policy Toward the Middle East. (4.0 cr.; prereq Jr or sr; fall, every year)

U.S. foreign policy toward Israeli-Palestinian issue in Turkey, Iran, Iraq, etc. Mideast politics, debates, actions. Rationales for U.S. engagement with region. Readings of Middle East authors.

POL 4878W. Israeli-Palestinian Situation. (4.0 cr.; = [JWST 4878W]; fall, spring, every year)

Situation as clash of two communities. History, politics, respective narratives of each community. Divisions within each community that are consequential for reconciliation. Examples of reconciliation literature from both communities.

POL 4883W. Global Governance. (3.0 cr.; = [POL 5883]; prereq 3835 or non-pol sci grad or #; fall, spring, summer, offered periodically)

Seminar discussions and class simulations examine the rise and role of inter-governmental organizations such as the United Nations and non-governmental organizations. Topics include peacekeeping, trade, development, human rights, security and arms control, self-determination, refugees, health, and the environment.

POL 4885W. International Conflict and Security. (4.0 cr.; = [POL 5855]; fall, spring, odd years)

An examination of alternative theories of the sources of militarized international conflict. Apply these theories to one or more past conflicts and discuss their relevance to the present.

POL 4887. Thinking Strategically in International Politics. (3.0 cr.; A-F or Audit; = [POL 5887]; fall, spring, odd years)

Survey of applications of game theory to international politics; conflict and cooperation, global environmental commons, deterrence and reputation.

POL 4900V. Honors: Senior Paper. (1.0 cr.; A-F or Audit; prereq Honors, pol sr, #; fall, spring, summer, every year)

Can be attached to any 3xxx or 4xxx course. A 10-15 page paper is submitted for final submission.

POL 4900W. Senior Paper. (1.0 cr.; A-F or Audit; prereq Pol sr, #; fall, spring, summer, every year)

Can be attached to any 3xxx or 4xxx course (with the agreement of that course's instructor). A 10-15 page paper is submitted for evaluation/advice by instructor, then revised for final submission.

POL 4970. Individual Reading and Research. (1.0-4.0 cr.; fall, spring, summer, every year)

Guided individual reading or study. Prereq Instructor consent, dept consent, college consent.

POL 5210. Topics in Political Theory. (3.0 cr. [max 9.0 cr.]; fall, spring, offered periodically)

Topics specified in the Class Schedule.

POL 5280. Topics in Political Theory. (3.0-4.0 cr. [max 3.0 cr.]; = [POL 4280]; prereq grad student; fall, spring, offered periodically)

Topics in historical, analytical, or normative political theory. Topics vary, see Class Schedule.

POL 5306. Presidential Leadership and American Democracy. (3.0 cr.; = [POL 3306]; prereq grad student or #; )

Examines whether president's political and constitutional powers are sufficient to satisfy citizens' high expectations and whether president should be expected to dominate American politics.

POL 5315. State Governments: Laboratories of Democracy. (4.0 cr.; = [POL 4315W]; prereq grad student or #; )

Political behavior, governmental institutions, and public policies in American states. Comparison among states, between state and national government. Emphasizes Minnesota.

POL 5322. Rethinking the Welfare State. (3.0-4.0 cr. [max 3.0 cr.]; = [POL 4322]; prereq grad student; fall, spring, offered periodically)

Competing arguments about welfare states in advanced industrial countries. Whether welfare states result from sectional interests, class relations, or citizenship rights. Compares American social policy with policies in other western countries.

POL 5327. Politics of American Cities and Suburbs. (3.0 cr.; prereq = 4327; [(1001 or 1002), (non-pol sci grad major or equiv) or #; )


POL 5331. Thinking Strategically in Domestic Politics. (3.0-4.0 cr. [max 3.0 cr.]; prereq = 4331; grad student; )

Applications of rational-choice and game theories to important features of domestic politics in the United States and elsewhere.

POL 5403. Comparative Constitutionalism. (3.0 cr.; fall, spring, even years)


POL 5410. Topics in Comparative Politics. (3.0 cr.; prereq grad student; fall, spring, every year)
Topics of current analytical or policy importance. Topics vary, see Class Schedule.

**POL 5461W. European Government and Politics.** (4.0 cr.; =POL 4461W; prereq grad student or #; spring, every year)

**POL 5477. Struggles and Issues in the Middle East.** (4.0 cr.; prereq =: 4477; 1054 or 3051 or non-pol sci grad student or #; )
Turkey, Iran, Israel, and selected Arab states. Domestic politics of religious/secular, ethnic, economic, environmental, and other policy/identity issues. Regional politics of water access, Israeli/Palestinian/Arab world relationships, oil and Persian/Arabian Gulf, human rights.

**POL 5485. Human Rights and Democracy in the World.** (3.0 cr.; =POL 4485; prereq grad student or #)
History of ideas about human rights and democracy. Economic, political, psychological, and ideological explanations for repression.

**POL 5502. Supreme Court, Civil Liberties, and Civil Rights.** (3.0 cr.; prereq =: 4502; 1001 or 1002 or equiv or non-pol sci grad student or #; spring, every year)

**POL 5525. Federal Indian Policy.** (3.0 cr.; A-F or Audit; prereq =: 4525, Amin 4525; grad student; )
Formulation, implementation, evolution, comparison of Indian policy from pre-colonial times to self-governance of new millennium. Theoretical approaches to federal Indian policy. Major federal Indian policies. Views/attitudes of policy-makers, reactions of indigenous nations to policies. Effect of bodies of literature on policies.

**POL 5561. Comparative Legal Systems.** (3.0 cr.; =POL 4561; prereq grad student or #; )
Survey of principal legal systems of Western world. Role of legal system in relation to various political/economic systems. Contrast between common law and civil law traditions.

**POL 5737. American Political Parties.** (3.0 cr.; =POL 4737V; prereq grad student or #; )

**POL 5767. Public Opinion and Voting Behavior.** (3.0 cr.; =POL 3769; prereq grad student or #; fall, spring, every year)
Major factors influencing electoral decisions. Political attitude formation/change. Data analysis lab required.

**POL 5810. Topics in International Politics and Foreign Policy.** (3.0 cr. [max 6.0 cr.]; prereq Grad student or advanced undergrad; fall, spring, every year)
Selected issues in contemporary international relations. Topics vary, see Class Schedule.

**POL 5833. The United States in the Global EconomyUS For Econ Policy.** (3.0-4.0 cr. [max 3.0 cr.]; prereq =: 4833; grad student; 3835 recommended; )
Domestic/international politics of United States. Foreign economic policy (trade, aid, investment, monetary, migration policies). Effects of policies and international economic relations on U.S. economy/politics.

**POL 5885. International Conflict and Security.** (3.0 cr.; =POL 4885W; prereq grad student; )
Alternative theories of sources of militarized international conflict. theories applied to past conflicts. Theories' relevance to present.

**POL 5970. Individual Reading and Research.** (1.0-4.0 cr.; max 8.0 cr.; fall, spring, summer, every year)
Guided individual reading or study. Prereq instr consent, dept consent, college consent.

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**PORT 1101. Beginning Portuguese.** (5.0 cr.; fall, summer, every year)
Listening, speaking, reading, writing. Cultures of Portugal, Brazil, or Portuguese-speaking Africa. Workbook assignments, paired/small group activities.

**PORT 1102. Beginning Portuguese.** (5.0 cr.; prereq 1101 or #; spring, summer, every year)
Reading, writing, speaking, listening. Cultures of Portugal, Brazil, or Portuguese-speaking Africa. Workbook assignments, paired/small group activities.

**PORT 1103. Intermediate Portuguese.** (5.0 cr.; prereq 1102 or #; fall, every year)
Emphasizes speaking, comprehension. Reading/writing skills based on Portuguese-language materials. Cultures of Portugal, Brazil, or Lusophone Africa.

**PORT 1104. Intermediate Portuguese.** (5.0 cr.; prereq 1103 or #; spring, every year)

**PORT 1904. Freshman Seminar.** (3.0 cr. [max 6.0 cr.]; prereq Fr; fall, offered periodically)
Topics specified in Class Schedule.

**PORT 1905. Topic Freshman Seminar.** (3.0 cr. [max 6.0 cr.]; prereq Fr; spring, offered periodically)
Topics specified in Class Schedule.

**PORT 1909W. Freshman Seminar.** (3.0 cr.; prereq Fr; fall, every year)
Topics specified in Class Schedule.

**PORT 3001. Portuguese for Spanish Speakers.** (4.0 cr.; prereq [SPAN 1004 or SPAN 1014 or SPAN 1044, SPAN LPE pass] or #; fall, spring, summer, every year)
Listening, reading, speaking, writing. Uses communicative approach.

**PORT 3002. Business Portuguese for Spanish Speakers.** (4.0 cr.; prereq SPAN LPE pass, [SPAN 1004 or SPAN 1014 or SPAN 1044 or #]; spring, every year)
Basic communication skills in Portuguese. Cultural knowledge needed to function in business environment in Brazil. Designed for English speakers with proficiency in Spanish, but with no prior knowledge of Brazilian Portuguese or for students with limited knowledge of Portuguese.

**PORT 3003. Portuguese Conversation and Composition.** (4.0 cr.; prereq 1104 or 3001 or Port LPE; fall, spring, every year)
Development of oral/written skills. Cultural information from Portuguese-speaking world.

**PORT 3501W. Global Portuguese: 1300-1900.** (3.0 cr.; prereq 3003; fall, every year)

**PORT 3502W. Global Portuguese: 1900-present.** (3.0 cr.; prereq 3003; spring, every year)
Significant expressions of Brazilian culture, from colonial period to present. Emphasizes 20th/21st centuries. Literature, history, visual/sound culture, architecture.

**PORT 3503W. Literatures and Cultures of Lusophone Africa.** (3.0 cr.; =PORT 3503V; prereq 3003; fall, offered periodically)
Introduction to Lusophone Africa (Angola, Cape-Verde, Guinea-Bissau, Mozambique, Sao Tome/Principe). Literature, cultural/critical criticism, history, anthropology, media (film, art, music).

**PORT 3603W. Portuguese-Speaking Cultures in Translation.** (3.0 cr.; fall, spring, every year)
Portuguese-speaking world. Sociohistorical, geopolitical, and cultural foundations of Lusophone Africa, Brazil, and/or Portugal.

**PORT 3800. Film Studies in Portuguese.** (3.0 cr. [max 9.0 cr.]; A-F or Audit; =PORT 3800H; prereq 3003 or # or %; fall, offered periodically)
Films from Portuguese-speaking world in their historical, (geo)political, and socioeconomic contexts. Films from Brazil, Portugal, or Lusophone Africa analyzed under interdisciplinary framework, noting aspects related to cinematography/rhetoric.

**PORT 3910. Topics in Lusophone Literatures.** (3.0 cr. [max 9.0 cr.]; =PORT 3910H; prereq 3003; fall, spring, offered periodically)
Issues studied through literature, visual, sound, media culture from one or more Portuguese-speaking countries. Topics may include gender/sexuality, postcolonialism/globalization, transatlantic studies.

**PORT 3920. Topics in Lusophone Cultures.** (3.0 cr. [max 9.0 cr.]; prereq [1101, 1102, 1103,
1104] or [3001, 3003] or equiv; spring, every year]

Critical studies of various aspects of Portuguese-speaking cultures (Portugal, Brazil, or Lusophone Africa). Topics may include popular music, visual/media culture, religion, diaspora, Amazon.

PORT 4001. Portuguese for Spanish Speakers. (4.0 cr.; prereq [SPAN 1004 or SPAN 1014 or SPAN 1044, SPAN LPE pass] or #; fall, spring, summer, every year) Listening, reading, speaking, writing. Uses communicative approach.

PORT 4101. Beginning Portuguese. (2.0 cr.; prereq Grad student; fall, every year) Meets concurrently with 1101. See 1101 for course description.

PORT 4102. Beginning Portuguese. (2.0 cr.; prereq Grad student; spring, every year) Meets concurrently with 1102. See 1102 for course description.

PORT 4103. Intermediate Portuguese. (2.0 cr.; prereq Grad student; fall, every year) Meets concurrently with 1103. See 1103 for course description.

PORT 4104. Intermediate Portuguese. (2.0 cr.; prereq Grad student; spring, every year) Meets concurrently with 1104. See 1104 for course description.

PORT 5520. Portuguese Literary and Cultural Studies. (3.0 cr. [max 9.0 cr.]; prereq Grad student or #; fall, offered periodically) Origins/development of modern Portuguese nation (late 15th to 20th century) using literature, cultural and literary criticism, history, sociology, and various media (film, art, music, Internet). Main cultural problematics pertaining to Portugal as well as fundamental literary texts.

PORT 5530. Brazilian Literary and Cultural Studies. (3.0 cr. [max 9.0 cr.]; prereq Grad student or #; fall, spring, offered periodically) Study of origins and development of modern Brazilian nation (late 16th to 20th century) using literature, cultural and literary criticism, history, sociology) and various media (film, art, music, Internet). Main cultural problematics pertaining to Brazil as well as fundamental literary texts.

PORT 5540. Literatures and Cultures of Lusophone Africa. (3.0 cr. [max 9.0 cr.]; prereq Grad student or #; fall, spring, offered periodically) Origins/development of Lusophone Africa (Angola, Mozambique, Cape-Verde, Guinea-Bissau, Sao TomA, Principe). Literature, cultural/literary criticism, history, sociology, media (film, art, music).

PORT 5910. Topics in Lusophone Cultures and Literatures. (3.0 cr. [max 9.0 cr.]; prereq Grad student or #; fall, spring, offered periodically) Cultural manifestations in Portuguese-speaking world (Portugal, Brazil, Lusophone Africa). Literature, history, film, intellectual thought, critical theory, popular culture. Topics may include writers (e.g. Machado de Assis) groups of writers (e.g. Lusophone women writers), or problematics such as (post-)colonialism or Luso-Brazilian modernities.

PORT 5930. Topics in Brazilian Literature. (3.0 cr. [max 9.0 cr.]; fall, every year) Major issues of Brazilian literature; focuses on important authors, movements, currents, genres. Problems, socioeconomic questions, literary techniques related to Brazilian themes. Topics specified in Class Schedule.

PORT 5970. Directed Readings. (3.0 cr. [max 9.0 cr.]; fall, spring, summer, every year) Lusophone studies (Portuguese-speaking Africa, Brazil, Portugal). Areas not covered in other courses. Students submit reading plans for particular topics, figures, periods, or issues. Prereq MA or PhD candidate, instr consent.

PORT 5990. Directed Research. (1.0-4.0 cr. [max 9.0 cr.]; fall, spring, summer, every year) Graduate-level research in literatures and cultures of the Portuguese-speaking world. Topics vary. Prereq Grad student or instr consent.

PSTL 722. Introductory Algebra (Computer). (0.0 cr.; prereq [4 cr equiv], General Math Placement Test; fall, spring, summer, every year) Students learn via multimedia software. Instructor helps students individually during class. Real numbers, expressions, equations, inequalities, rectangular graphs, systems, word problems, exponents, polynomials, factoring.

PSTL 732. Intermediate Algebra (Computer). (0.0 cr. ;#IPSTL 731; prereq 4 cr equiv or grade of at least C in [0713 or 0717 or 0721 or 0722] or General Math Placement Test; fall, spring, summer, every year) Students learn via multimedia software. Instructor helps students individually during class. Rational expressions, absolute value, roots, radicals, quadratic, exponential, and logarithmic functions, complex numbers.

PSTL 1004. Statistics: Understanding and Applying Data. (4.0 cr.; prereq Intermediate algebra or equiv or placement exam; fall, spring, summer, every year) Introduction to statistics. Problem-solving/decision-making informed by data collection, analysis, interpretation. Estimation, correlation, hypothesis testing, chi-square analysis.

PSTL 1006. College Algebra through Modeling. (3.0 cr.; #MATH 1051, MATH 1031; prereq Three yrs high school math or grade of at least C+ in 0731 or 0732 or placement test score or #; fall, spring, summer, every year) Math modeling, including linear, polynomial, rational, exponential, logarithmic functions, counting/probability. Excel or calculators used to develop equations/graphs from theoretical/real interdisciplinary data. Projects enable students to use models to examine trends, make predictions.

PSTL 1051. Editing for Writers. (2.0 cr.; fall, spring, summer, every year) Editing one's own writing. Linguistic features of standard written English. Styles/language utilized in academic writing. Small-group activities, individual/peer conferencing.

PSTL 1081. Integrated Learning in the Social Sciences. (2.0 cr. [max 4.0 cr.]; A-F only; prereq Concurrent registration in social science course, adviser approval; fall, spring, every year) Intensive support for developing conceptual/ contextual understanding of material presented in companion social science course. Methods for critical thinking, field-specific vocabulary, core concepts, writing for social sciences.

PSTL 1082. Integrated Learning in the Sciences. (2.0 cr. [max 6.0 cr.]; A-F only; prereq Concurrent registration in science course, adviser approval; fall, spring, every year) Intensive support for mastering concepts/ skills in companion science course. Scientific research methods, field-specific vocabulary, core concepts, writing/presentation styles associated with disciplinary content.

PSTL 1112. Nature in the City. (4.0 cr.; fall, spring, every year) Science/politics of ecosystems within Twin Cities. Evolution, ecological competition, food production. Living organisms that have adapted to urban environment. Potential interventions to environmental problems.

PSTL 1131. Principles of Biological Science. (4.0 cr.; fall, spring, every year) Biodiversity/classification, genetics, evolution, ecology, and life cycles. Empirical/theoretical foundations. How scientific information and inquiry skills are relevant to daily lives.

PSTL 1135. Essentials of Human Anatomy and Physiology. (4.0 cr.; fall, spring, every year) Fitness, disease, body systems such as muscula/cardiovascular systems. Cooperative learning groups, computer-enhanced learning, anatomical models, inquiry-based lab activities.

PSTL 1163. Physics by Inquiry. (4.0 cr.; fall, spring, every year) Lecture/lab introductory class. Forces, energy, and small particle theory. Performing experiments similar to real scientific investigations. Nature of science knowledge and learning about science.

PSTL 1171. Earth Systems and Environments. (4.0 cr.; fall, spring, every year) Interaction between natural cycles and society. Formation of continents/mountains. Geologic time, living with natural hazards (e.g., earthquakes, volcanoes). Climate changes, natural resources. Lecture, lab.

PSTL 1204. Ways of Knowing in the Social Sciences. (4.0 cr.; A-F or Audit; fall, spring, every year) Multidisciplinary social science exploration of an international issue. Local/global dimensions of worldwide immigration from perspective of
economics, political science, history, sociology, anthropology, and geography.

PSTL 1211. Sociological Perspectives: A Multicultural America. (4.0 cr.; fall, spring, every year)
Introduction to sociological thinking through engaged, active learning, including service in community. Interaction of race, class, gender, age with greater societal institutions. Apply foundational understanding of sociology to real world situations.

PSTL 1231. America's Past and Present: Multicultural Perspectives. (4.0 cr.; fall, spring, every year)
Explore diverse historical perspectives. Scholarly/first-hand accounts, regarding what it has meant to be "American." Develop critical frameworks for engaging in ongoing conversation about America's multicultural past/how it is tied to contemporary politics, privilege, power.

PSTL 1246. Multicultural Contexts: Engaging Citizenship and Democracy. (3.0 cr.; =PSTL 1235W; fall, spring, every year)
Role of individuals/groups in shaping U.S. citizenship and public ethics. Social science texts, historical narratives, and legal cases. Nature of legal/personal responsibility. Race, class, gender, civil rights.

PSTL 1251. Forces of Modern Historical Change: Global Perspectives. (4.0 cr.; fall, spring, every year)
Explore diverse historical perspectives. Scholarly/first-hand accounts which speak to most significant forces of global change in twentieth century.

PSTL 1281. Principles of Psychology. (4.0 cr.; =PSY 1001H, PSY 1001); prerequisite have not received college credit for intro psych; fall, spring, summer, every year)
Terminology, theories, and results of research in sensation, perception, cognition, motivation, emotion, learning, personality, abnormal behavior, therapeutic practices, health, and social behavior.

PSTL 1312. Creating Identities Through Art and Performance. (4.0 cr.; fall, spring, every year)
Creative thinking and artistic problem solving in relation to identity, community, and diverse cultures. Students work with various art forms such as visual arts, performance, and music. Discussion, reading, writing.

PSTL 1365W. Stories of Self and Community: Multicultural Perspectives. (4.0 cr.; =PSTL 1366); fall, spring, summer, every year)
Practice skills of literary analysis through interactive/collaborative classroom designed to support diverse learning styles. Gain insight into identity development in diverse social contexts by engaging with literary works.

PSTL 1367W. Stories of Social Change: Global Perspectives. (4.0 cr.; =PSTL 1368); fall, spring, every year)
Practice skills of literary analysis through interactive/collaborative classroom designed to support diverse learning styles. Gain insight into forces that shape social interactions/social change in variety of global contexts. Extensive formal/informal written assignments.

PSTL 1368. Stories of Social Change: Global Perspectives. (3.0 cr.; =PSTL 1367W); fall, spring, every year)
Prepare students for interactive/collaborative classroom designed to support diverse learning styles. Gain insight into forces that shape social interactions/social change in variety of global contexts. Extensive formal/informal written assignments.

PSTL 1371. Reading Short Stories. (3.0 cr.; fall, spring, summer, every year)
Current short story format from diverse communities within North America, Africa, the Caribbean, and Europe. Emphasizes written literature inspired by oral "storytelling," storytelling as "theatre," and storytelling as communal endeavor.

PSTL 1461. Multicultural Perspectives in Public Speaking. (3.0 cr.; =COMM 1101H, COMM 1101); fall, spring, summer, every year)
How to confidently convey thoughts/ideas in a public forum. Students present speeches on socially significant topics in multicultural contexts. Focuses on ethics, citizenship, voice, and language.

PSTL 1525V. First-Year Inquiry: Multidisciplinary Ways of Knowing. (4.0 cr.; A-F only; prerequisite CEHD student, honors, 1st- term fr; fall, every year)
Writing intensive multidisciplinary approach to addressing the common question, "How can one person make a difference?" Students read a common book/work collaboratively to produce a final project. Active learning strategies to develop students' skills in critical reading, thinking, and writing.

PSTL 1525W. First-Year Inquiry: Multidisciplinary Ways of Knowing. (4.0 cr.; A-F only; fall, every year)
Writing intensive multidisciplinary approach to addressing the common question, "How can one person make a difference?" Students read a common book/work collaboratively to produce a final project. Active learning strategies to develop students' skills in critical reading, thinking, and writing.

PSTL 1571. Computer Literacy and Problem Solving. (4.0 cr.; =RM 1203); fall, spring, summer, every year)
Competencies in computer technologies used in social sciences and in business to solve problems. Using advanced word processing techniques to create complex written documents such as reports. Using electronic spreadsheet to analyze data and present it graphically. Using database management programs to store, organize, and query data. Using presentation software to communicate ideas/findings in multimedia format to larger groups.

PSTL 1906W. Freshman Seminar: The Environment. (3.0 cr.; prerequisite Fr; fall, spring, offered periodically)
Reading, discussion, critical analysis, and writing about the environment. Intensive, small-group setting.

PSTL 1907W. Freshman Seminar: Diversity and Social Justice in the United States. (3.0 cr.; prerequisite Fr, fall, spring, offered periodically)
Reading, discussion, critical analysis, and writing about diversity and social justice in the United States. Intensive, small group setting.

PSTL 1908W. Freshman Seminar: Civic Life and Ethics. (3.0 cr.; prerequisite Fr, fall, spring, offered periodically)
Reading, discussion, critical analysis, and writing about civic life and ethics. Intensive, small-group setting.

PSTL 1909W. Freshman Seminar: International Perspectives. (3.0 cr.; prerequisite freshman; fall, spring, offered periodically)
Reading, discussion, critical analysis, and writing about international perspectives. Intensive, small group setting.

PSTL 1910W. Freshman Seminar. (3.0 cr.; prerequisite freshman; fall, offered periodically)
Reading, discussion, critical analysis, and writing about technology and society. Intensive, small-group setting.

PSTL 1924. Freshman Seminar: Technology and Society. (3.0 cr.; prerequisite Fr, fall, spring, every year)
Reading, discussion, critical analysis, and writing about technology and society. Intensive, small-group setting.

PSTL 1990. Special Topics. (1.0-8.0 cr.; fall, spring, every year)
Topics related to instructor's areas of expertise. Prerequisite instructor consent, college consent.

PSTL 1993. Directed Study. (1.0-8.0 cr.; fall, spring, summer, every year)
Student-initiated project in consultation with faculty monitor.Student determines topic, sets goals, designs a course of study, and finds an appropriate faculty member to work collaboratively. Prerequisite instructor consent, college consent.

PSTL 1996. Internship. (1.0-8.0 cr.; fall, spring, every year)
Skills, techniques, and research in disciplinary content associated with college teaching. Goals/functions of public/community agencies. Career goals. Internships supervised by faculty monitor and site supervisor. Prerequisite instructor consent, college consent.

PSTL 2214W. Community Learning. (4.0 cr.; A-F only; fall, spring, every year)
Students spend 40 hours serving a demographic group or physical site, working with a government, nonprofit, or grassroots organization. Readings on volunteer experience and historical, socioeconomic, and political factors influencing community.
Students write observations, interviews, reflection, summaries, and final paper.

**PSTL 3010. Building Community: Public Service, Urban Settings, and the Ethics of Engagement.** (3.0 cr.; prereq None.; fall, spring, every year) Critical examination of community service. Consider ethical questions and public service as a response to social concerns.

**PSTL 3214. Community Action.** (4.0 cr.; A-F only; prereq 2214W or #; fall, spring, every year) Students design/implement collaborative projects that fulfill community-identified needs. Community-based learning/action, project planning, outcomes.

**PSTL 3324W. Writing in the Workplace for Education and Human Development Majors.** (4.0 cr.; prereq 60+ undergraduate credits, declared major; fall, spring, every year) Explore professional communication. Research/analysis writing, memos, reports, proposals, human resource-related documentation, letters or announcements, presentations.

**PSTL 3325V. Honors: Project-Based Writing For Education and Human Development Majors.** (4.0 cr.; A-F only; prereq CEHD Honors students only; fall, spring, every year) Writing project focused on problem or issue in field of study. Propose project, identify audience, gather information through primary/secondary research. Create product tailored to audience needs. Collaborative activities/assignments.

**PSTL 3325W. Project-Based Writing For Education and Human Development Majors.** (4.0 cr.; prereq 60+ undergraduate credits, declared major; fall, spring, every year) Writing project focused on problem or issue in field of study. Propose project, identify audience, gather information through primary/secondary research. Create product tailored to audience needs. Collaborative activities/assignments.

**PSTL 4218W. Senior Capstone.** (4.0 cr.; A-F only; prereq 4217 or #; fall, spring, every year) Students conduct research on a community-focused issue. The research is disseminated to and evaluated by key stakeholders.

**PSTL 5010. Diverse Learners in Postsecondary Education.** (1.0-3.0 cr. [max 6.0 cr.]; fall, spring, every year) Theories of teaching, learning, student development to diverse student populations in post-secondary settings.

**PSTL 5020. Directed Study: Postsecondary Teaching and Learning.** (1.0-6.0 cr. [max 12.0 cr.]; fall, spring, summer, every year) Directed study in postsecondary teaching and learning.

**PSTL 5105. Increasing Access and Success in Undergraduate Classrooms.** (3.0 cr.; A-F or Audit; fall, spring, summer, every year) Fundamentals and best practices for promoting student access, persistence, and retention within classroom. Focuses on traditionally under-represented/served populations.

**PSTL 5106. Multicultural Teaching and Learning in Diverse College Contexts.** (3.0 cr.; A-F only; prereq Grad student; fall, every year) Theory/pedagogy for culturally responsive teaching from perspectives of teachers/learners in postsecondary settings. Critical multicultural education, universal instructional design, integrated multicultural instructional design.

**PSTL 5196. Supervised Practicum in Multicultural Postsecondary Teaching and Learning.** (3.0 cr.; S-N only; prereq Grad student in PSTL certificate program or admitted to PSTL master's program; fall, spring, summer, every year) Postsecondary teaching experience in supervised settings. Weekly group supervision session. Classroom experiences, learning centers, and other postsecondary teaching venues.

**PSTL 5206. Action Research Methods to Improve College Teaching and Learning.** (3.0 cr.; A-F or Audit; prereq Grad student; spring, every year) Action research as method of improving teaching/learning at postsecondary level. Experience doing research in college classrooms. Relative strengths/challenges of different approaches to classroom research. Ethical issues.

**PSTL 5212. Multicultural Theories of College Student Development Applied to Teaching and Learning.** (3.0 cr.; A-F only; prereq Grad student; fall, spring, summer, every year) Multicultural student development theories/theorists. Implications for teaching/learning. Students reflect on The Student Personnel Point of View and Learning Reconsidered: Campus-wide Focus on the Student Experience and other collaborative efforts.

**PDES 3701. Creativity, Idea Generation, and Innovation.** (3.0 cr.; A-F only; fall, every year) Half semester course. Introduction to a variety of creativity and idea generation tools with an emphasis on innovative product concept development. Students apply different tools to an ongoing project. Starting with a general theme, students explore problems and concepts, practice using a variety of idea generation tools, and learn methods of evaluating/selecting concepts. Customer needs, benchmarking, and intellectual property.

**PDES 3702. Concept Sketching and Rendering.** (3.0 cr.; A-F only; fall, every year) Sketching and marker rendering for communication of conceptual product design. Free-hand 2-point perspective. Weekly drawing assignments/presentations. Students keep a sketchbook to develop ideas/drawings.


**PDES 3704. Innovative Computer Modeling and Rendering for Design.** (3.0 cr.; A-F only; =IDES 5704; spring, every year) Overview of how to make well-modeled, properly illuminated, carefully composed digital models of existing/conceptual objects.

**PDES 3711. Toy Product Design.** (4.0 cr.; A-F only; spring, every year) Product design process with a focus on creativity and designing for play. Project-centric. Students work in small teams of 5-6 members to design and prototype new toys with the help of local industry and children.

**PDES 3715. Design and Food.** (4.0 cr.; A-F only; fall, every year) Hands-on introduction to principles of creativity/design viewed through lens of food. Experiment/design with food to learn skills related to product design, graphic design, interaction design, designed environments, creativity, critique.

**PDES 4193. Directed Study in Product Design.** (1.0-4.0 cr. [max 8.0 cr.]; A-F or Audit; prereq Undergrad, #; fall, spring, summer, offered periodically) In-depth investigation of single specific topic announced in advance.

**PDES 5170. Topics in Product Design.** (1.0-4.0 cr. [max 8.0 cr.]; A-F or Audit; fall, spring, summer, offered periodically) In-depth investigation of single specific topic announced in advance.

**PDES 5193. Directed Study in Product Design.** (1.0-4.0 cr. [max 8.0 cr.]; A-F or Audit;
Students develop project proposal, identify objectives/resources, conduct research, accomplish an outcome, secure a narrative evaluation from project adviser/evaluator.

PIL 3252. Project 2. (5.0 cr.; S-N or Audit; prereq PIL student, %; fall, spring, summer, every year)

Students develop proposal, identify objectives/resources, conduct research, accomplish an outcome, secure a narrative evaluation from project adviser/evaluator.

PIL 3253. Project 3. (5.0 cr.; S-N or Audit; prereq PIL student, %; fall, spring, summer, every year)

Students develop a proposal, identify objectives/resources, conduct research, accomplish an outcome, secure a narrative evaluation from a project adviser/evaluator.

PIL 3254. Project 4. (5.0 cr.; S-N or Audit; prereq PIL student, %; fall, spring, summer, every year)

Students develop a proposal, identify objectives/resources, conduct research, accomplish an outcome, secure a narrative evaluation from a project adviser/evaluator.

PIL 3255. Project 5. (5.0 cr.; S-N or Audit; prereq PIL student, %; fall, spring, summer, every year)

Students develop a proposal, identify objectives/resources, conduct research, accomplish an outcome, secure a narrative evaluation from a project adviser/evaluator.

PIL 3256. Project 6. (5.0 cr.; S-N or Audit; prereq PIL student, %; fall, spring, summer, every year)

Students develop a proposal, identify objectives/resources, conduct research, accomplish an outcome, secure a narrative evaluation from a project adviser/evaluator.

PIL 3257. Project 7. (5.0 cr.; S-N or Audit; prereq PIL student, %; fall, spring, summer, every year)

Students develop a proposal, identify objectives/resources, conduct research, accomplish an outcome, secure a narrative evaluation from a project adviser/evaluator.

PIL 3258. Project 8. (5.0 cr.; S-N or Audit; prereq PIL student, %; fall, spring, summer, every year)

Students develop a proposal, identify objectives/resources, conduct research, accomplish an outcome, secure a narrative evaluation from a project adviser/evaluator.

PIL 3259. Project 9. (5.0 cr.; S-N or Audit; prereq PIL student, %; fall, spring, summer, every year)

Students develop a proposal, identify objectives/resources, conduct research, accomplish an outcome, secure a narrative evaluation from a project adviser/evaluator.

PIL 3260. Program Active. (1.0-5.0 cr.; S-N or Audit; prereq PIL student; fall, spring, summer, every year)

Registration maintains program activity and access to PIL advising and student service.

PIL 3281. Major Project. (5.0 cr.; S-N or Audit; prereq PIL student, %; fall, spring, summer, every year)

Students complete a major project as partial fulfillment of criterion for Primary Area Studies in their degree plans.

PIL 3291. Graduation Preparation. (5.0 cr.; S-N or Audit; prereq PIL student, %; fall, spring, summer, every year)

Students compile a graduation dossier for presentation to preliminary review committee. Dossier consists of criteria summary, introduction, transcripts, illustrative materials, project proposals, degree plan.

PIL 3293. Graduation Preparation. (4.0 cr.; S-N or Audit; prereq PIL student, %; fall, spring, summer, every year)

Students revise graduation dossier, present it to graduation review committee for BA or BS degree recommendation.

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**Psychology (PSY)**

**College of Liberal Arts**

PSY 1001. Introduction to Psychology. (4.0 cr.; =PSY 1001H, PSTL 1281; fall, spring, summer, every year)

Scientific study of human behavior. Problems, methods, findings of modern psychology.

PSY 1001H. Honors Introduction to Psychology. (4.0 cr.; =PSY 1001H, PSTL 1281; prereq Honors; fall, spring, every year)

Scientific study of human behavior. Problems, methods, findings of modern psychology.

PSY 1902. Freshman Seminar. (3.0 cr.; prereq Fr; fall, every year)

Topics specified in Class Schedule.

PSY 1905. Freshman Seminar. (3.0 cr. [max 6.0 cr.]; A-F or Audit; prereq Fr; fall, spring, every year)

Topics specified in Class Schedule.

PSY 1907W. Freshman Seminar. (3.0 cr. [max 6.0 cr.]; A-F or Audit; prereq freshman; fall, spring, offered periodically)

Topics specified in Class Schedule.

PSY 1910W. Freshman Seminar. (3.0 cr. [max 6.0 cr.]; A-F or Audit; prereq Fr; fall, spring, every year)

Topics specified in Class Schedule.

PSY 3001V. Honors Introduction to Research Methods. (4.0 cr.; =PSY 3001V; prereq [1001, [2081/3801 or equiv] or %, PSY major, honors student; spring, every year)

Concepts/procedures used to conduct/evaluate research, especially in social sciences. Benefits/limitations of traditional research methods. Evaluating scientific claims.

PSY 3001W. Introduction to Research Methods. (4.0 cr.; =PSY 3001W; prereq [1001, [2081/3801 or equiv] or %, fall, spring, summer, every year)

Concepts/procedures used to conduct/evaluate research, especially in social sciences.
Benefits/limitations of traditional research methods. Evaluating scientific claims.

**PSY 3011. Introduction to Learning and Behavior.** (3.0 cr.; prereq 1001; fall, every year) Methods/findings of research on learning and behavior change. Twentieth-century theoretical perspectives, including contemporary models. Emphasizes animal learning and behavioral psychology.

**PSY 3031. Introduction to Sensation and Perception.** (3.0 cr.; prereq PSY 1001; fall, spring, every year) Psychological, biological, and physical bases of sensory experience in humans and animals. Emphasizes senses of vision/hearing.

**PSY 3051. Introduction to Cognitive Psychology.** (3.0 cr.; prereq 1001; fall, spring, summer, every year) Scientific study of the mind in terms of representation and processing of information. Research and theory on cognitive abilities such as perception, attention, memory, language, and reasoning. Aspects of computational modeling and neural systems.

**PSY 3061. Introduction to Biological Psychology.** (3.0 cr.; =PSY 5061; prereq 1001 or BIOL 1009 or NSCI 1100; fall, spring, summer, every year) Neurophysiology/neuromodulation, neural mechanisms of motivation, emotion, sleep-wakefulness cycle, learning/memory in animals/humans. Neural basis of abnormal behavior, drug abuse.

**PSY 3101. Introduction to Personality.** (3.0 cr.; =PSY 5101; prereq 1001; fall, spring, summer, every year) Major theories, issues, facts about personality and personality assessment. Review of important historical/contemporary perspectives (e.g., psychoanalytic, humanistic psychology, trait psychology, behaviorism, evolutionary psychology) on human nature/individuality.

**PSY 3121. History and Systems of Psychology.** (3.0 cr.; prereq PSY 1001; spring, every year) Survey of the history, methods, and content of modern psychological theory, research, and application. Schools of psychology (e.g., structuralism, functionalism, behaviorism, Gestalt psychology) and central theories of psychology reviewed in their historical and philosophical context.

**PSY 3135. Introduction to Individual Differences.** (3.0 cr.; =PSY 5135; prereq [1001, [3801 or equiv]] or #; fall, spring, every year) Differential methods in studying human behavior. Psychological traits. Influence of age, sex, heredity, environment in individual/group differences in ability, personality, interests, social attitudes.

**PSY 3201. Introduction to Social Psychology.** (3.0 cr.; prereq 1001 or #; fall, spring, summer, every year) Overview of theories/research in social psychology. Attitudes/persuasion, social judgment, the self, social influence, aggression, prejudice, helping, and applications.

**PSY 3206. Introduction to Health Psychology.** (3.0 cr.; prereq 1001; spring, every year) Theories/research in health psychology. Bi-directional relationships between psychological factors and physical health. Stress/coping, adjustment to chronic illness. Psychological factors in etiology/course of disease. Health behavior change.

**PSY 3301. Introduction to Cultural Psychology.** (3.0 cr.; A-F or Audit; prereq 1001; fall, spring, every year) Theories/research on how culture influences basic psychological processes (e.g., emotion, cognition, psychopathology) in domains that span different areas of psychology (e.g., social, clinical, developmental, industrial-organizational) and of other disciplines (e.g., anthropology, public health, sociology).

**PSY 3511. Introduction to Counseling Psychology.** (3.0 cr.; prereq 1001, fall, spring, summer, every year) History, theories, and research related to counseling psychology. Development/ application of counseling theories to diverse populations. Psychological research on counseling process. Psychological mechanisms that promote change in people's lives.

**PSY 3604. Introduction to Abnormal Psychology.** (3.0 cr.; =PSY 5604H; prereq 1001; fall, spring, summer, every year) Diagnosis, classification, etiologies of behavioral disorders.

**PSY 3617. Introduction to Clinical Psychology.** (3.0 cr.; prereq 3604 or 5604H; fall, spring, every year) Historical developments, contemporary issues. Trends in psychological assessment methods, intervention strategies, and clinical psychology research. Theories behind, empirical evidence for, usefulness of psychological intervention strategies.

**PSY 3633. Happiness: Integrating Research Across Psychological Sciences.** (3.0 cr.; prereq 3001W or 3001V or #; fall, every year) Nature of human happiness/fulfillment. Insights from cognitive, personality, and social psychology, and from biology and economics. Integrative approach to feelings that make life worth living.

**PSY 3666. Human Sexuality.** (3.0 cr.; prereq 1001; fall, spring, offered periodically) Overview of theories, research, and contemporary issues in human sexual behavior from an interdisciplinary perspective. Sexual anatomy/physiology, hormones/sexual differentiation, cross-cultural perspectives on sexual development, social/health issues, and sexual dysfunction/therapy.

**PSY 3711. Psychology in the Workplace.** (3.0 cr.; prereq 1001, [2801/3801 or equiv] or SCO 2550 or #; fall, spring, every year) Application of psychological theory/research to recruitment, personnel selection, training, development, job design, work group design, work motivation, leadership, performance assessment, job satisfaction measurement.

**PSY 3801. Introduction to Psychological Measurement and Data Analysis.** (4.0 cr.; =PSY 3801H; prereq High school algebra, [PSY 1001 or equiv]; intended for students who plan to major in psychology; fall, spring, summer, every year) Descriptive/basic inferential statistics used in psychology. Measures of central tendency, variability, t tests, one-way ANOVA, correlation, regression, confidence intervals, effect sizes. Psychological measurement. Graphical data presentation. Statistical software.

**PSY 3801H. Honors Introduction to Psychological Measurement and Data Analysis.** (4.0 cr.; A-F only; =PSY 3801; prereq [1001 or equiv]; high school algebra, honors; intended for students who plan to major in psychology; fall, every year) Descriptive/basic inferential statistics in psychology. Measures of central tendency, variability, t tests, one-way ANOVA, correlation, regression, confidence intervals, effect sizes. Psychological measurement. Graphical data presentation. Statistical software.

**PSY 3901W. Major Project - Research Laboratory.** (3.0 cr.; A-F only; =PSY 3902W, PSY 3903W; prereq [3801 or equiv], 3001W, completion of five courses from three distribution areas, PSY major, senior; fall, spring, summer, every year) Completion of undergraduate major project.

**PSY 3902W. Major Project - Individual Interests.** (3.0 cr.; A-F only; =PSY 3901W, PSY 3903W; prereq [3801 or equiv], [3001W], completion of five courses from three distribution areas, PSY major, sr; fall, spring, summer, every year) Completion of undergraduate major project.

**PSY 3903W. Major Project - Community Engagement.** (3.0 cr.; A-F only; =PSY 3901W, PSY 3902W; prereq [3801 or equiv], [3001W], completion of five courses from three distribution areas, PSY major, senior; fall, spring, summer, every year) Completion of undergraduate major project.

**PSY 3960. Undergraduate Seminar in Psychology.** (1.0-5.0 cr. [max 45.0 cr.]; fall, every year) Undergraduate seminars in subjects of current interest in psychology.

**PSY 3993. Directed Study.** (1.0-6.0 cr. [max 24.0 cr.]; fall, spring, summer, every year) Independent reading leading to paper or oral or written exam. Prereq instr consent, dept consent, college consent.

**PSY 3996. Undergraduate Fieldwork and Internship in Psychology.** (1.0-6.0 cr. [max 12.0 cr.]; prereq 1001, #, %, @; fall, spring, summer, every year) Supervised fieldwork/internship in community/industry pertinent to formal academic training in psychology.

**PSY 4011. Applied Behavior Analysis.** (3.0 cr.; prereq 3011 or #; spring, every year)
Courses listed in this catalog are current as of December 12, 2014. For up-to-date information, visit www.catalogs.umn.edu
Theory, methods, and applications of research in human abilities. Intelligence, aptitude, achievement, specific abilities, information processing/learning and intelligence, aptitude/treatment interactions, and quantitative measurement issues.

PSY 5137. Introduction to Behavioral Genetics. (3.0 cr.; prereq 3001W or equiv or #; fall, every year) Genetic methods for studying human/animal behavior. Emphasizes nature/origin of individual differences in behavior. TWIN and adoption methods. Cytogenetics, molecular genetics, linkage/association studies.

PSY 5202. Attitudes and Social Behavior. (3.0 cr.; prereq 3201 or #; spring, offered periodically) Theory/research on social psychology of beliefs/attitudes. Persuasion principles.

PSY 5204. Psychology of Interpersonal Relationships. (3.0 cr.; A-F only; prereq Honors or grad student or #; fall, offered periodically) Introduction to interpersonal relationship theory/research findings.

PSY 5205. Applied Social Psychology. (3.0 cr.; prereq 3201 or grad student or #; spring, even years) Applications of social psychology research/theory to domains such as physical/mental health, education, the media, desegregation, the legal system, energy conservation, public policy.

PSY 5207. Personality and Social Behavior. (3.0 cr.; A-F or Audit; prereq 3101 or 3201 or honors or grad student or #; fall, every year) Conceptual/methodological strategies for scientific study of individuals and their social worlds. Applications of theory/research to issues of self, identity, and social interaction.

PSY 5501. Vocational and Occupational Health Psychology. (3.0 cr.; prereq 3001W or equiv or #; spring, every year) Survey of history, concepts, theories, methods, and findings of vocational/occupational health psychology. Burnout, personality, violence, stressors/stress-relations, counter productive behaviors, coping in workplace. Vocational development/assessment, career decision-making/counseling, person-environment fit.

PSY 5707. Personnel Psychology. (4.0 cr.; =PSY 5701) (4.0 cr.; =PSY 5701; prereq SPS 3001W or equiv); 3711) or #; fall, every year) Application of psychosocial research/theory regarding individual differences, psychological measurement, decision making, and learning to personnel selection, performance assessment, and occupational training. Job analysis, recruitment, selection decisions, performance appraisals, and training design, evaluation, and practice.

PSY 5708. Organizational Psychology. (3.0 cr.; =PSY 5702, PSY 5705; prereq 3001W, 3711) or psy grad or #; spring, every year) Psychological causes of behavior in work organizations. Consequences for individual fulfillment and organizational effectiveness. Individual differences, social perception, motivation, stress, job design, leadership, job satisfaction, teamwork, organizational culture.

PSY 5862. Psychological Measurement: Theory and Methods. (3.0 cr.; prereq 3801H or MATH 1271 or grad student; fall, every year) Types of measurements (tests, scales, inventories) and their construction. Theory/measurement of reliability/validity.


PSY 5960. Topics in Psychology. (1.0-4.0 cr.; max 8.0 cr.; prereq PSY 1001. [ir or or grad student]; fall, spring, summer, offered periodically) Special course or seminar. Topics listed in Class Schedule.

PSY 5993. Research Laboratory in Psychology. (3.0 cr.; max 18.0 cr.; prereq #, fall, spring, every year) Laboratory instruction and seminars in faculty research areas.

Public Affairs (PA)
Hubert H. Humphrey Institute of Public Affairs


PA 1021. Introduction to Microeconomics for Public Affairs. (1.0 cr. [max 2.0 cr.]; A-F only; prereq Students must be admitted to/attend to enroll in Humphrey School's masters program in development practice or public policy or urban and regional planning or science, technology, and environmental policy; summer, every year) Microeconomic behavior of consumers, firms, markets in domestic/world economy. Demand/supply, competition/monopoly, distribution of income, externalities, public goods/common resources, economic interdependencies in global economy, effects of global linkages on individual decisions.

PA 1401. Public Affairs: Community Organizing Skills for Public Action. (3.0 cr.; A-F only; spring, every year) Public affairs work, roles of citizens in democratic way of life. Community organizing skills, their importance for public affairs. Negotiations among diverse audiences, understanding different interests, mapping power relationships. Relevant public affairs and governance theory.

PA 1490. Topics in Social Policy. (1.0-3.0 cr. [max 9.0 cr.]; fall, spring, offered periodically) Topics in social policy.

PA 1907W. Freshman Seminar: Cultural Diversity. (1.0-3.0 cr. [max 6.0 cr.]; prereq freshman; fall, spring, every year) Reading, discussion, critical analysis, writing. Intensive, small-group setting.

PA 1961W. Personal Leadership in the University. (3.0 cr.; A-F only; =OLPD 1302, OLPD 1301W; fall, spring, summer, every year) Examine personal views of leadership, differences between personal/positional leadership, leadership ethics/values, personal leadership strengths/skills.

PA 1990. General Topics in Public Policy. (1.0-3.0 cr. [max 9.0 cr.]; spring, every year) General topics in public policy.


PA 3490. Topics in Social Policy. (1.0-3.0 cr. [max 9.0 cr.]; fall, spring, offered periodically)

PA 3961. Leadership, You, and Your Community. (3.0 cr.; A-F only; =OLPD 3302; prereq PA 1961W or CFAN 3480 or CFAN 1101 or EDPA 1301W or EDPA 1302 or OLPD 1301W or OLPD 1302; fall, spring, every year) "How do effective leaders create positive systemic change within complex systems?" "What is community and how does it shape the work of leadership?" Leadership from a multi-dimensional and multicultural perspective and of leadership theories in authentic, complex community settings.

PA 3971. Leadership Minor: Field Experience. (3.0 cr.; A-F only; =OLPD 3306) (3.0 cr.; =OLPD 3306; prereq PA 3961 or 3961W or EDPA 3302 or EDPA 3302W or OLPD 3302; fall, spring, every year) Students apply/integrate leadership theory in an experience grounded within the community. Students are challenged to think critically about their positional leadership roles, extrapolate the experience to future leadership issues within their specific fields, and to work through the challenges positional leadership offers.

PA 3981. American Institutions in Historical Perspective. (1.5 cr.; prereq Basic course in U.S. history preferred; spring, offered periodically) History of churches, fraternal organizations, charities, and institutions more directly related to government.
PA 3990. General Topics in Public Policy. (1.0-3.0 cr. [max 9.0 cr.]; spring, summer, every year) General topics in public policy.

PA 3991. Independent Study. (1.0-3.0 cr. [max 6.0 cr.]; fall, spring, summer, every year) Independent study.


PA 4144. Social Entrepreneurship. (3.0 cr.; A-F only; prereq Junior or senior; fall, every year) Introduction to field of social entrepreneurship. Prepares current/future managers/leaders to create, develop, lead socially entrepreneurial organizations/initiatives.

PA 4190. Topics in Public and Nonprofit Leadership and Management. (1.0-3.0 cr. [max 9.0 cr.]; fall, spring, summer, offered periodically) Topics in public/nonprofit leadership/management.

PA 4200. Urban and Regional Planning. (3.0 cr.; fall, spring, every year) Fundamental principles of urban/regional land-use planning. Introduction to planning theory and its applications. Political-economic context of urban/regional planning.

PA 4290. Topics in Planning. (1.0-3.0 cr. [max 9.0 cr.]; fall, spring, offered periodically) Topics in social policy.

PA 4414. Child Human Rights: Work and Education. (3.0 cr.; spring, even years) International child labor issues. Options for improving child well-being, including policies/programs that have potential to affect the lives of millions of children.

PA 4490. Topics in Social Policy. (1.0-3.0 cr. [max 9.0 cr.]; fall, spring, offered periodically) Topics in social policy.

PA 4890. Topics in Global Policy. (1.0-3.0 cr. [max 6.0 cr.]; fall, spring, offered periodically) Topics in global policy. Topics vary.

PA 4961W. Leadership for Global Citizenship. (3.0 cr.; A-F only; prereq 3971 or EdPA 3402 or OLPD 3306; fall, spring, every year) Leadership theory/practice. Experience working with diverse leaders. Mapping political contexts/planning global leadership path.

PA 4971. Directed Study, Leadership Minor. (1.0-4.0 cr. [max 15.0 cr.]; Student Option No Audit; prereq [3961 or OLPD 3302], consent of Leadership Minor Coordinator; fall, spring, summer, every year) Design/carry out independent study project under direction of leadership minor instructors/faculty.

PA 5001. Intellectual Foundations of Public Action. (1.5 cr.; fall, spring, offered periodically) Evolution of intellectual approaches that underlie public planning, management, and policy analysis in a democratic society. How decision making is shaped by knowledge/values. Role of rationality, Conceptual, descriptive/normative, and structure/process approaches.

PA 5002. Introduction to Policy Analysis. (1.5 cr.; A-F or Audit; prereq Major or minor in public policy or science/technology/environmental policy or #; fall, spring, every year) Process of public policy analysis from problem structuring to communication of findings. Commonly used analytical methods. Alternative models of analytical problem resolution.


PA 5004. Introduction to Planning. (3.0 cr.; A-F or Audit; prereq Major/minor in urban/regional planning or #; fall, every year) History/institutional development of urban planning as profession. Intellectual foundations, planning theory. Roles of urban planners in U.S./international settings. Scope, legitimacy, limitations of planning/planning process. Issues in planning ethics/settings of diverse populations/stakeholders.

PA 5011. Management of Organizations. (3.0 cr.; A-F or Audit; prereq Major/minor in public policy or #; fall, spring, every year) Challenges facing higher-level managers in public/nonprofit organizations in mixed economy/democratic republic. Distinctive features of public/nonprofit management, skills necessary for effective management, manager's role as creator of public value. Lectures, case discussions.

PA 5012. The Politics of Public Affairs. (3.0 cr.; A-F or Audit; prereq Major or Minor in public policy or [sci, tech, and environ policy] or public affairs PhD or #; spring, every year) Stages of policy making from agenda setting to implementation. Role/behavior of political institutions, citizens, social movements, interest groups. Concepts of political philosophy. Theories of state. Team taught, interdisciplinary course. Small discussion sections.

PA 5013. Law and Urban Land Use. (1.5 cr.; A-F or Audit; prereq Major or minor in urban/regional planning or #; fall, every year) Role of law in regulating/shaping urban development, land use, environmental quality, local/regional governmental services. Interface between public/private sector.

PA 5021. Economics For Policy Analysis and Planning I. (3.0 cr.; A-F or Audit; prereq [Econ 1101 or equiv], major or minor in public policy or science/technology/environmental policy or #; fall, every year) Introduction to tools useful for public policy. Intermediate microeconomics, macroeconomics, concepts of international trade.

PA 5022. Economics For Policy Analysis and Planning II. (1.5-3.0 cr. [max 4.5 cr.]; A-F or Audit; prereq [[5021 or equiv], public policy major] or #; spring, every year) Application of economic reasoning to various public policy issues. Cost-benefit analysis, nonmarket valuation, and tax analysis.


PA 5032. Regression Analysis. (2.0 cr.; A-F or Audit; prereq [5031 or equiv], major or minor in public policy or science/technology/environmental policy or #; spring, every year) Bivariate/multivariate models of regression analysis, assumptions behind them. Problems using these models when such assumptions are not met.

PA 5033. Multivariate Techniques. (2.0 cr.; A-F or Audit; prereq [5032 or equiv], major/minor in pub policy or sci/tech/env policy or #. May fulfill stats requirements in other programs.; spring, every year) Public affairs topics using maximum-likelihood estimation approaches.

PA 5035. Survey Research and Data Collection. (1.5 cr.; A-F only; prereq [5031 or equiv], [major in pub policy or sci, tech, environ policy or urban/regional planning] or #; spring, every year) Introduction to survey research methods. Emphasizes applications to policy/applied research. Research design choices (e.g., descriptive, experimental, case studies), sampling, variable specification, measurement. Conducting interviews, self-administered questionnaires. Qualitative techniques.

PA 5038. Analytics for Leaders I. (3.0 cr.; A-F only; prereq Major in public affairs or public affairs leadership certificate or #; fall, spring, every year) Skills to do basic quantitative analyses, evaluate research, develop evidence-based policy, and lead data-driven organizations. Descriptive statistics, research design. Ethical issues in interpretation, analysis, and use.

PA 5039. Analytics for Leaders II. (3.0 cr.; A-F only; prereq 5038; fall, spring, every year) Builds on 5038. Skills to do basic quantitative analyses, evaluate research, develop
PA 5041. Qualitative Methods for Policy Analysts. (4.0 cr.; A-F only; prereq Major or minor in public policy or science/technology/ environmental policy or #; fall, every year) Qualitative analysis techniques; examples of application. Meet with researcher. Hands-on experience in designing, gather, analyzing data.

PA 5042. Urban and Regional Economics. (2.0 cr.; A-F only; prereq [Major or minor in urban and regional planning, microeconomics course] or #; spring, every year) Evaluation of city growth/expansion using economics. Economic forces in development of cities. Economic analysis of urban areas/ land market. Economic analysis of planning issues in land use, transportation, housing, environment.

PA 5043. Economic and Demographic Data Analysis. (2.0 cr.; A-F only; prereq Major or minor in urban/regional planning or #; spring, every year) Economic/demographic data analysis techniques for planning. Exposure to most important data sources. Conceptual understanding of range of methods/hands-on experience in applying these methods.

PA 5044. Regression Analysis, Accelerated. (2.0 cr.; A-F only; prereq Major or minor in public policy or sci, tech, and environ policy, [5031 or equiv or #]; spring, every year) Bivariate/multivariate models used in regression analysis, including assumptions behind them/problems that arise when assumptions are not met. Course covers similar topics as PA5032 but uses more mathematical notation/delves deeper into theory/application of methods.

PA 5051. Cohort Leadership I. (2.0 cr.; A-F only; prereq Major in public affairs (cohort) or public affairs certificate (cohort); 5051-5052 must be taken in same academic yr; fall, every year) Leadership theories, tools, and strategies in global context for the mid-career student.

PA 5052. Cohort Leadership II. (2.0 cr.; A-F only; prereq Major in public affairs (cohort) or public affairs certificate (cohort); 5051-5052 must be taken in same academic yr; fall, every year) Leadership theories, tools, and strategies in global context for the mid-career student.

PA 5053. Cohort Policy Analysis I. (2.0 cr.; A-F only; prereq Major in public affairs (cohort) or public affairs certificate (cohort); 5053-5054 must be taken in same academic yr; fall, every year) Process of public policy analysis, including problem formulation, problem-solving, and communication of findings. Commonly used analytical methods. Use of multimedia mini-cases, including readings, cases, and simulation exercises.

PA 5054. Cohort Policy Analysis II. (2.0 cr.; A-F only; prereq Major in public affairs (cohort) or public affairs certificate (cohort); 5053-5054 must be taken in same academic yr; spring, every year) Continues 5053. Process of public policy analysis, including problem formulation, problem-solving, and communication of findings. Commonly used analytical methods. Use of multimedia mini-cases, including readings, cases, and simulation exercises.


PA 5056. Cohort Analytics for Leaders II. (2.0 cr.; A-F only; prereq Major in public affairs or public affairs certificate, [5055-5056 must be taken in same academic yr]; spring, every year) Problem-based learning approach to quantitative analysis. Frequency distributions, descriptive statistics, elementary probability, statistical inference. Hypothesis testing. Cross-tabulation, analysis of variance, correlation. Simple/multiple regression analysis. Data set development.

PA 5057. Executive Leadership I. (6.0 cr.; A-F only; prereq Executive Leadership postbaccalaureate certificate student; spring, every year) Institutional leadership, management, interdisciplinary studies. Emerging issues/public policy to develop executive leaders. Opportunities for practicing/reassessing leadership inside/outside workplace. Field-based management issues.

PA 5058. Executive Leadership II. (6.0 cr.; A-F only; prereq Executive leadership postbaccalaureate certificate; summer, every year) Institutional leadership, management, interdisciplinary studies. Emerging issues/public policy to develop executive leaders. Opportunities for practicing/reassessing leadership inside/outside the workplace. Field-based management issues.

PA 5080. Capstone Preparation Workshop. (1.0 cr.; S-N only; prereq 88081; fall, spring, summer, every year) Project management, qualitative research, and critical framework to complete Capstone course. Students write draft of client project group norms and client contract.

PA 5081. Working in Teams: Crossing Disciplines and Learning from Difference. (0.5 cr.; S-N only; prereq Major in development practice, public affairs, public policy, urban and regional planning, or sci, tech, and environ policy; fall, every year) Principles/skills necessary to create high-performing multi-disciplinary/multi-cultural teams.

PA 5101. Management and Governance of Nonprofit Organizations. (3.0 cr.; prereq Grad student or #; fall, every year) Theories, concepts, and real world examples of managerial challenges. Governance systems, strategic management practices, effect of funding environments, management of multiple constituencies. Types of nonprofits using economic/behavioral approaches.


PA 5103. Leadership and Change in an Innovation Society. (3.0 cr.; prereq Grad student or #; spring, odd years) Models of change/leadership. How leaders can promote personal, organizational, and societal change. Case studies, action research. Framework for leadership/change in an innovation society.

PA 5104. Strategic Human Resource Management. (3.0 cr.; A-F or Audit; prereq Grad student or #; fall, every year) Theory/practice of developing, utilizing, and aligning human resources to improve culture/outcomes of nonprofit/public organizations. HR strategy, individual diversity, leadership, selection, training, compensation, classification, performance appraisal, future HR practices.

PA 5105. Integrative Leadership Seminar. (3.0 cr.; Student Option No Audit; =MGMT 6402, PA 5130, OLPD 6402; prereq Grad student or #; spring, every year) Basic concepts, practices, people, and organizations associated with integrative leadership. Case materials, related readings, presentations, and interactive discussion.

PA 5106. Government, Ethics and the Public Will. (1.0-3.0 cr.; Student Option No Audit; prereq Grad student or #; spring, every year) Links between core ethical values/formation documents that have shaped democracy in United States or student's homeland. Ethics/agency. Ethics in context of leadership development. Compose narrative of ethical practice.

PA 5107. Leadership, Reflective Practice, and Critical Theory: A Practicum. (2.0 cr.; prereq Grad student or #; fall, every year) For students immersed in a cultural shift, organization, or leadership form who wish to learn how to negotiate international, cross-cultural/political contradictions. Critical approach to understanding adult learning. How to perceive and challenge dominant ideology, unmask power, contest hegemony, overcome alienation, and practice democracy.

PA 5108. Board leadership development. (1.5 cr.; S-N only; prereq Grad student or #; fall, every year) Nonprofit board governance. Governance models, roles/responsibilities, ethics/dynamics.


PA 5113. State and Local Public Finance. (3.0 cr.; prereq Grad or #; spring, every year) Theory/practice of financing. Providing public services at state/local level of government. Emphasizes integrating theory/practice, applying materials to specific policy areas, and documenting wide range of institutional arrangements across/within the 50 states.

PA 5122. Law and Public Affairs. (3.0 cr.; prereq Grad or #; spring, every year) Overview of evolution of American legal system. Role of courts, legislatures, and political actors in changing law. How law is used to change public policy.


PA 5132. Mediation Training. (3.0 cr.; prereq Grad or #; fall, spring, offered periodically) Creating an arena for mediation. Skills/expectations needed to mediate disputes between individuals, among groups: balanced (peer or colleague), imbalanced (power differentials). Role playing, group debriefing, critique. Cases.

PA 5144. Social Entrepreneurship. (3.0 cr.; A-F only; prereq Grad student or #; fall, spring, offered periodically) Introduction to field of social entrepreneurship. Prepares current/future managers/leaders to create, develop, lead socially entrepreneurial organizations/initiatives.

PA 5145. Civic Participation in Public Affairs. (3.0 cr.; A-F only; prereq Grad student or #; spring, every year) Critique/learn various approaches to civic participation in defining/addressing public issues. Readings, cases, classroom discussion, facilitating/experiencing engagement techniques. Examine work of practitioner, design engagement process.

PA 5180. Topics in Executive Leadership. (0.5-3.0 cr.; max 6.0 cr.; A-F only; prereq #: fall, spring, every year) Selected topics in executive leadership.

PA 5190. Topics in Public and Nonprofit Leadership and Management. (1.0-3.0 cr.; max 9.0 cr.; prereq Grad student or #: fall, spring, offered periodically) Selected topics.

PA 5203W. Geographical Perspectives on Planning. (4.0 cr.; =GEOG 3605V, GEOG 5605W, GEOG 3605W, GEOG 5605V; prereq Grad student or #: fall, every year) Includes additional weekly seminar-style meeting and bibliography project on topic selected in consultation with instructor.

PA 5204. Urban Spatial and Social Dynamics. (3.0 cr.; prereq urban/regional planning Major/minor in or public affairs PhD or #: spring, every year) Behavioral theories of internal spatial arrangement, functioning, characteristics of cities at macro level/how they produce system of cities. Factors influencing urban spatial structure over time. Urban form, land use/rent. Spatial expression of economic, social, political forces.

PA 5211. Land Use Planning. (3.0 cr.; A-F only; prereq Major or minor in urban/regional planning or #: fall, every year) Physical/spatial basis for land use planning at community/regional level. Role of public sector in guiding private development. Land use regulations, comprehensive planning, growth management, innovative land use planning/policies.

PA 5212. Managing Urban Growth and Change. (3.0 cr.; prereq Grad student or #: fall, every years) Theory/practice of planning, promoting, and controlling economic growth/change in urban areas. Economic development tools available to state/local policymakers, historic context of their use in the United States. Legal, social, and economic implementation constraints. Interactions among economic, social, and demographic trends.

PA 5213. Introduction to Site Planning. (3.0 cr.; prereq Grad student or #: fall, odd years) Analyzing/preparing graphic plans for development or redevelopment of property. Site planning issues, process, opportunities, details, and techniques. Hands-on preparation of a site plan. Site visits, lectures, research, presentations, exam, in-class exercises.

PA 5215. Computer Applications in Land Use Planning. (3.0 cr.; prereq Grad student or #: spring, every year) Geographical information system software, simulation modeling of land use/development, 3D software, the Internet. Project applications in citizen participation/decision-making. Meets weekly in mostly lab setting.

PA 5221. Private Sector Development. (3.0 cr.; prereq [Grad or #], college algebra required; spring, every year) Roles of various participants in land development. Investment objectives, effects of regulation. Overview of development process from private/public perspective.


PA 5232. Transportation Policy, Planning, and Deployment. (4.0 cr.; =CE 5212; prereq Sr or grad student or #: fall, odd years) Development of transportation policy, making of transportation plans, deployment of transportation technologies. Lectures, interactive case studies, role playing.

PA 5233. Sustainable Transportation. (3.0 cr.; A-F or Audit; prereq Grad or #: spring, even years) Concepts of sustainability in movement of people/goods in cities. Techniques/best practices/methods for planning/implementing interventions to improve social, economic, environmental sustainability of communities.

PA 5242. Environmental Planning, Policy, and Decision Making. (3.0 cr.; A-F only; prereq Grad or #: spring, offered periodically) Theory and practice. Ethical, legal, and institutional frameworks relative to a range of environmental issues. Innovative environmental decision making informed by collaboration, conflict resolution, adaptive management, and resilience thinking.

PA 5251. Strategic Planning and Management. (3.0 cr.; A-F or Audit; prereq Grad student or #: spring, offered periodically) Theory/practice of strategic planning/management for public/nonprofit organizations/networks. Strategic planning process, management systems, stakeholder analyses. Tools/techniques such as purpose expansions, SWOT analyses, oval mapping, portfolio analyses, and logic models.

PA 5253. Designing Planning and Participation Processes. (3.0 cr.; A-F only; prereq Major or minor in urban/regional planning or #: fall, every year) Theory/practice of design, implementation, evaluation of planning/participation processes. Types of planning. Stakeholders, including underrepresented groups. Costs/benefits of participation. Participant roles. Planning/participation tools/techniques.

PA 5261. Housing Policy. (3.0 cr.; A-F or Audit; =HSG 5463; prereq Grad or #: spring, every year) Institutional/environmental setting for housing policy in the United States. Competing views of solving housing problems through public intervention in the market. Federal/local public sector responses to housing problems.

PA 5271. Geographic Information Systems: Applications in Planning and Policy Analysis. (3.0 cr.; prereq Major in urban/regional planning or #: fall, every year)

PA 5281. Immigrants, Urban Planning and Policymaking in the U.S.. (3.0 cr.; A-F or Audit; prereq Grad student or #; fall, every year) Social, political, economic experiences of contemporary U.S. immigrants. Draws from sociology, economics, demography, political science, public affairs. Local government policies/plans. Cities/suburbs as contexts for immigrants. Interactions between immigrant communities/urban planners/policymakers.

PA 5290. Topics in Planning. (1.0-4.0 cr. [max 12.0 cr.]; prereq Grad student or #; fall, spring, offered periodically) Selected topics.

PA 5301. Population Methods & Issues for the United States & Global South. (3.0 cr.; =SOC 5511; prereq Grad student or #; spring, offered periodically) Basic demographic measures/methodology. Demographic transition, mortality, fertility. Perspectives on nonmarital fertility, marriage, divorce, cohabitation. Cultural differences in family structure, aging, migration, refugee movements, population policies. Discussion of readings.

PA 5311. Program Evaluation. (3.0 cr.; prereq Grad student or #; fall, spring, offered periodically) Principal methods, primary applications of evaluation research as applied to policies/programs in health/human services, education, or the environment. Conducting evaluations. Becoming a critical consumer of studies.

PA 5390. Topics in Advanced Policy Analysis Methods. (1.0-4.0 cr. [max 9.0 cr.]; prereq Grad student or #; fall, spring, offered periodically) Topics in advanced policy analysis methods.

PA 5401. Poverty, Inequality, and Public Policy. (3.0 cr.; prereq Grad or #; fall, every year) Nature/extent of poverty/inequality in the United States, causes/consequences, impact of government programs/policies. Extent/causes of poverty/inequality in other developed/developing countries.

PA 5405. Public Policy Implementation. (3.0 cr.; A-F or Audit; spring, even years) Theory, tools, and practice of the implementation of public policy, particularly in areas involving public, private, and nonprofit organizations. Analytical approach focuses on multiple levels in policy fields to pinpoint and assess implementation challenges and levers for improvement.

PA 5412. Aging and Disability Policy. (3.0 cr.; prereq Grad or #; fall, spring, offered periodically) Policy debates concerning populations that are aging or disabled. Students learn/practice analyses in context of important health, social, and economic policy debates. Readings on current theory/evidence.


PA 5414. Child Human Rights: Work and Education. (3.0 cr.; prereq Grad student or #; spring, offered periodically) International child labor issues. Options for improving child well-being, including policies/ programs that have potential to affect the lives of millions of children.

PA 5421. Racial Inequality and Public Policy. (3.0 cr.; prereq Grad or #; fall, spring, offered periodically) Historical roots of racial inequality in American society. Contemporary economic consequences. Public policy responses to racial inequality. Emphasizes thinking/analysis that is critical of strategies offered for reducing racism and racial economic inequality.


PA 5431. Public Policies on Work and Pay. (3.0 cr.; =HRIR 5655; prereq [IPA 5301 or equiv], grad student) or #; spring, every year) Public policies affecting employment, hours of work, and institutions in labor markets. Public policies impacting wages, unemployment, training, collective bargaining, job security, and workplace governance. Policy implications of the changing nature of work.


PA 5442. Policy Design for Education and Human Development. (3.0 cr.; prereq Grad or #; fall, spring, offered periodically) Designing effective educational policies. Using interdisciplinary approaches to identify/understand core variables (economic, psychological, etc.) Work on policy design.

PA 5451. Immigrant Health Issues. (3.0-4.0 cr.; A-F only; =PUBH 6281; prereq Grad student or #; fall, every year) How to access demographic, health, background information on U.S. immigrants. Characteristics and health needs of immigrants. Designing culturally competent health programs. How to advocate for change to promote immigrant health. Community visits required. Online course.

PA 5452. Immigration and Public Policy. (3.0 cr.; prereq Grad student or #; fall, spring, offered periodically) How to employ an analytical framework to analyze a current immigration policy proposal. Topics vary (e.g., president's guest worker proposal, democratic alternative proposals).

PA 5480. Topics in Race, Ethnicity, and Public Policy. (1.0-3.0 cr. [max 9.0 cr.]; prereq Jr or sr grad student or #; fall, spring, offered periodically) Link between race/ethnicity and public policy. How to identify/make sense of policy/ethnic disparities and their historical/cultural origins and policy impacts and to craft politically feasible remedies. Topics may include criminal justice, housing, child welfare, and education.

PA 5490. Topics in Social Policy. (1.0-4.0 cr. [max 9.0 cr.]; prereq Grad student or #; fall, spring, offered periodically) Selected topics.

PA 5501. Theories and Policies of Development. (3.0 cr.; prereq Grad student or #; fall, every year) What makes some countries wealthier than others, one group of people healthier and more educated than another? How does the behavior of rich nations affect poor nations? Origins of development thought, contemporary frameworks and policy debates. Economic, human, and sustainable development.

PA 5503. Economics of Development. (3.0 cr.; A-F or Audit; prereq PA 5501 or &PA 5501; fall, every year) Economic growth, inequality, poverty, rural/urban labor markets, risk/insurance. Investments in human capital, credit markets, gender/household economics, governance/institutional issues. Microfinance, conditional cash transfers, labor/education policies.

PA 5511. Community Economic Development. (3.0 cr.; prereq Grad or #; fall, every year) Contexts/motivations behind community economic development activities. Alternative strategies for organizing/initiating economic development projects. Tools/techniques for economic development analysis/planning (market analysis, feasibility studies, development plans). Implementation at local level.

PA 5521. Development Planning and Policy Analysis. (4.0 cr.; prereq 5031 or equiv recommended or #; spring, every year) Techniques of development planning/policy analysis at national, regional, and project levels. Effects of external shocks and government interventions on national/regional economies. Macroeconomic modeling, input-output analysis, social accounting matrices/multipliers, project evaluation.

PA 5522. International Development Policy, Families, and Health. (3.0 cr.; prereq Grad student or #; spring, offered periodically) Implications of paid/unpaid labor for development policy, using household as prism.

PA 5561. Gender and International Development. (3.0 cr.; prereq Grad or #; spring, offered periodically)
Women and men are affected differently by development and participate differently in policy formulation and implementation. Gender-sensitive perspective. Historical, political context. Global South. Policy, practice, and experience (theory and measurement; international, national, local stakeholders; effects of policy and practice on development).

PA 5590. Topics in Economic and Community Development. (1.0-3.0 cr. [max 9.0 cr.]; prereq Grad student or #; fall, spring, offered periodically)
Selected topics.

PA 5601. Global Survey of Gender and Public Policy. (3.0 cr.; prereq Grad or #; fall, offered periodically)
Examine gender/sexuality/public policy from local, national, global perspective. Policy areas include women's human rights, girls' education, gender/military service, electoral systems.

PA 5621. Board Service in Women and Public Policy. (1.0 cr.; S-N only; prereq #; fall, offered periodically)
Students serve as full members of a board of directors for a women's movement organization. Organizational leadership. How to be an effective board member. Twin Cities feminist nonprofit organizations.

PA 5690. Topics in Women and Public Policy. (1.0-3.0 cr. [max 9.0 cr.]; prereq Grad student or #; fall, spring, offered periodically)
Selected topics.

PA 5701. Science and State. (3.0 cr.; prereq Grad or #; fall, spring, offered periodically)

PA 5711. Science and Technology Policy. (3.0 cr.; prereq Grad student or #; fall, every year)
Impact of energy production/consumption choices on environmental quality, sustainable development, and other economic/social goals. Emphasizes public policy choices for energy/environment, linkages between them.

PA 5722. Environmental and Resource Economics Policy. (3.0 cr.; [APEC 5651]; prereq Intermediate microeconomics, intermediate policy analysis, grad student or #; fall, every year)

PA 5723. Water Policy. (3.0 cr.; [WRS 5101]; prereq Grad student or #; spring, every year)
Sociocultural, legal, economic, and environmental forces affecting supply/use of water by individuals, sectors, and governance institutions. Historical trends; water laws in United States and internationally. Institutional structures for managing water at federal, state, and local levels. Current water-related issues/policies.

PA 5731. Emerging Technologies and Society. (3.0 cr.; A-F only; prereq Grad student or #; fall, spring, offered periodically)
Legal, public policy, social, economic, and ethical implications of emerging technologies (such as nanotechnology). Perspective of stakeholders (federal agencies, public, industry, environment, international organizations) and public policies. Statutory objectives/regulatory. Diversity of policy problems. Research methodologies.

PA 5741. Risk Analysis and Policy. (3.0 cr.; prereq Grad student or #; fall, spring, offered periodically)
Interplay between risk analysis, decision making, and risk policy. Role of S&T: Assessment methods; risk management processes, issues and methods; role/treatment of uncertainty; factors in decision making; risk-based rule making; public values; risk communication and perception. Scientific, technical, social, political, and ethical issues.

PA 5751. Urban Infrastructure Systems for Sustainable and Healthy Cities. (3.0 cr.; A-F or Audit; prereq Grad student or #; summer, every year)
Study social actors, engineered infrastructures/natural systems as they, together, shape health/sustainability outcomes for cities. Understand role of infrastructure design, planning, policy in sustainable cities. Learn sustainability systems concepts, local-to-global linkages, inter-disciplinary, inter-cultural skills.

PA 5790. Topics in Science, Technology, and Environmental Policy. (1.0-3.0 cr. [max 9.0 cr.]; prereq Grad or #; fall, spring, offered periodically)
Selected topics.

PA 5801. Global Public Policy. (3.0 cr.; prereq Grad or #; spring, every year)

PA 5802. Global Economic Policy. (3.0 cr.; prereq Major in [public affairs or public policy] or #; fall, every year)
Economic logic of globalization, national policy objectives, international finance/financial institutions, international trade and agreements including regional pacts and the WTO, global environmental and resource governance, immigration and emigration, and development challenges.

PA 5821. Humanitarianism. (3.0 cr.; prereq Grad student or #; fall, spring, offered periodically)
Foundations, logic, dynamics, dilemmas, and consequences of humanitarianism, a form of governance that operates in the name of—and for—the international community.

PA 5822. International Security. (3.0 cr.; A-F only; prereq Grad student or #; fall, spring, offered periodically)

PA 5841. Women, Violence, and Armed Conflict. (3.0 cr.; A-F only; prereq Grad student or #; fall, spring, offered periodically)
Role of women in recent armed conflicts/how women are affected by wartime as combatants, civilians, victims, and perpetrators of war violence. Conflicts in Sierra Leone, Liberia and El Salvador, where women participated in fighting forces in large numbers, as well as women's roles in the Abu Ghraib scandal, female suicide bombers, wartime sexual violence. Policy solutions offered by policymakers and NGOs to deal with problems of gender-based violence.

PA 5880. Exploring Global Cities. (1.0-3.0 cr. [max 6.0 cr.]; Student Option No Audit; prereq Grad student or #; spring, every year)
Study abroad offered in cities across globe. Opportunities to study policy/planning issues in varied contexts from comparative/inter-cultural perspective. Study/work with practitioners/peers in field. Tanzania odd years/Austria even years. Additional countries may be added in future.

PA 5890. Topics in Foreign Policy and International Affairs. (1.0-5.0 cr. [max 9.0 cr.]; prereq Grad student or #; fall, spring, offered periodically)
Selected topics.

PA 5910. Developing Your Public Service Career. (1.0 cr.; S-N or Audit; prereq [Major in [public affairs or public policy or urban/ regional planning] or [science, technology/ environmental policy] or development practice]] or #; fall, every year)
PA 5912. Politics of Public Affairs and Civic Engagement. (3.0 cr.; A-F only; prereq Grad student or #; spring, every year) Potential for public affairs professionals to be agents/architects of democracy in a radically changing, diverse, global landscape of governance.

PA 5920. Skills Workshop. (0.5-4.0 cr. [max 12.0 cr.]; prereq Grad student or #; fall, spring, every year) Topics on public policy or planning skills. Topics specified in Class Schedule.

PA 5924. Intercultural Competence. (3.0 cr.; A-F only; prereq Grad student or #; spring, every year) Interacting with/working effectively with diverse populations. Researching ancestry. Analyzing cross-cultural communication issues in organizations. Prejudice, discrimination, group belonging. Analyze intercultural competence of global leader.

PA 5925. Creating a Professional Online Portfolio. (1.0 cr.; S-N only; prereq [MDP, MPA, MPP, MS-STEP, MURP] or #; spring, every year) Build electronic portfolio reflecting knowledge/skills learned in coursework, internships, volunteer efforts, leadership roles, research activities. Promote professional selves using social networking platform.

PA 5941. Leadership for the Common Good. (3.0 cr.; A-F only; prereq Major in development practice or public affairs or public affairs leadership certificate or minor in integrative leadership or #; fall, spring, every year) Personal, team, organizational, visionary, political, ethical aspects of leadership. Building/ experiencing learning community.

PA 5952. Global Commons Seminar II. (2.0 cr.; A-F only; prereq HHH International fellow; spring, every year) Research/presentations related to professional development projects. Each week selected students assign readings, deliver a presentation on their professional development project, and distribute a summary of the talk. Presentations are developed in collaboration with at least one faculty specialist in the subject area.

PA 5980. Topics in American Election Administration. (0.5-3.0 cr. [max 9.0 cr.]; prereq Grad student or #; summer, offered periodically) Selected topics in American election administration.

PA 5981. American Institutions in Historical Perspective. (1.5 cr.; prereq Grad student or #; basic US history course recommended; spring, offered periodically) History of churches, fraternal organizations, charities, and institutions more directly related to government.

PA 5990. Topics: Public Affairs--General Topics. (0.0-3.0 cr. [max 9.0 cr.]; prereq Grad student or #; fall, spring, offered periodically) General topics in public policy.

Public Health (PUBLIC) School of Public Health

PUBH 20. Community Engagement. (0.0 cr.; No Grade Associated; prereq Academic faculty adviser consent; fall, spring, summer, every year) Registration for course is officially documented on transcript.

PUBH 1001. Success Over Stress (SOS). (1.0 cr.; prereq Undergrad or PSEO student; fall, spring, every year) Increases students’ understanding of stress/ how to manage it and empower them to help others manage their stress. Holistic health perspective/impact of stress on all aspects of life. Causes, effects, and consequences of stress for students and society at large. Tools and resources to manage stress during college and throughout life.

PUBH 1003. Alcohol and College Life (ACL). (1.0 cr.; prereq Fr or soph or PSEO; fall, spring, summer, every year) How alcohol affects college life. Personal prevention strategies. Maximizing campus safety. Students receive instructions at their umn.edu e-mail accounts on how to access/ start course. Due dates for assignments.

PUBH 1004. Sexuality Matters. (1.0 cr.; prereq Undergrad or PSEQ student; fall, spring, summer, every year) Knowledge/skills to lead healthy sexual lives. Unbiased, medically accurate, evidence-based information/programs. Communication skills. Dispel sexuality/relationships myths.

PUBH 1005. Sleep, Eat, and Exercise. (1.0 cr.; prereq [Undergrad or PSEQ] student; fall, spring, every year) Living a balanced life while in college. Nutrition, sleep, physical activity. Techniques to promote self-awareness, reflection, goal setting, and action toward wellness.

PUBH 3000. Topics: Public Health. (0.5-4.0 cr. [max 80.0 cr.]; fall, spring, summer, offered periodically) New courses or topics of interest in public health.

PUBH 3001. Personal and Community Health. (2.0 cr.; fall, spring, every year) Fundamental principles of health conservation and disease prevention.

PUBH 3003. Fundamentals of Alcohol and Drug Abuse. (2.0 cr.; [PUBH 6003, PUBH 3005, PUBH 3004]; fall, spring, every year) Scientific, sociocultural, and attitudinal aspects of alcohol and other drug abuse problems. Emphasizes incidence, high-risk populations, prevention, and intervention.

PUBH 3004. Basic Concepts in Personal and Community Health. (4.0 cr.; [PUBH 6003, PUBH 3003, PUBH 3005]; fall, spring, every year) Scientific, sociocultural, and attitudinal aspects of communicable and degenerative diseases, environmental and occupational health hazards, and alcohol and drug problems. Role of education in health conservation, disease control, and drug abuse.

PUBH 3005. Fundamentals of Alcohol and Drug Abuse for Teacher Education. (1.0 cr.; [PUBH 6003, PUBH 3003, PUBH 3004]; prereq Undergrad in agricultural educ or business/marketing educ or career/technical educ or foundations of educ or [kinesthesiology, pre-PE] or technology educ or music educ; fall, spring, summer, every year) Scientific/socio-cultural aspects of alcohol/ drug problems. Emphasizes role of education in health conservation and drug abuse prevention.

PUBH 3010. Public Health Approaches to HIV/AIDS. (2.0 cr.; [PUBH 6010]; fall, every year) Primary, secondary, and tertiary prevention. Community responses to HIV/AIDS in Minnesota. Medical, social service, and political responses.

PUBH 3040. Dying and Death in Contemporary Society: Implications for Intervention. (2.0 cr.; [PUBH 6040]; prereq Jr or sr or #; spring, every year) Concepts, attitudes, ethics, and lifestyle management in relation to dying, death, grief, and bereavement. Emphasizes intervention/educational aspects for community health/ helping professionals and educators.

PUBH 3050. Practicum in Peer Education I. (2.0 cr.; A-F or Audit; prereq Selected to serve as a hlth advocate, #; spring, every year) Multiple factors that influence health. Through various health promotion strategies, students build upon or gain skills such as public speaking, needs assessments, program planning, interpersonal communication, and program evaluation.

PUBH 3052. Practicum in Peer Education II. (2.0 cr.; A-F or Audit; prereq Undergrad student, demonstrated hlth sci or hlth ed interest, selected to serve as a hlth advocate, #; spring, every year) Multiple factors that influence health. Through health promotion strategies, students gain/ build skills such as public speaking, needs assessments, program planning, interpersonal communication, and program evaluation.

PUBH 3093. Directed Study: Public Health. (1.0-4.0 cr.; prereq #; fall, spring, summer, every year) Directed study in selected public health problems or current issues.

PUBH 3100. Topics: Environmental Health. (1.0-2.0 cr. [max 40.0 cr.]; Student Option No Audit; fall, spring, summer, every year) Topics of interest in environmental health.

PUBH 3102. Issues in Environmental and Occupational Health. (3.0 cr.; [PUBH 6102]; fall, every year) Scope of the field of environmental health. Concepts upon which environmental interventions are based. Consulting literature to
identify appropriate interventions for community environmental health problems. Online course.

**PUBH 3104. Environmental Health Effects: Introduction to Toxicology.** (2.0 cr.; =PUBH 6104; prereq Basic science coursework; undergrad coursework in [biology, chemistry, biochemistry] recommended; fall, every year) Environment as determinant of disease in humans. Identifying biological mechanisms/effects of chemical, biological, and physical agents on human health. Principles of toxicology applied to toxicant-human interactions.

**PUBH 3106. Making Sense of Health Studies.** (2.0 cr.; =PUBH 6106); fall, spring, every year) How to critically evaluate health news (and the health research reports on which they are based) to make good, well informed decisions about your health and well-being.

**PUBH 3107. Global Public Health and the Environment.** (2.0 cr.; A-F only; prereq [3001 or 3004 or 3202], [3106 or 3350], public health minor, #: fall, every year) Environmental determinants of health/well-being of populations. Role of environment in public health. Population burden of disease. Variation of environmental public health determinants across globe. Interconnectedness of activities/actions of people in different countries.

**PUBH 3202. What is Public Health?.** (2.0 cr.; Student Option No Audit; fall, every year) Overview of public health: what it is, its origins, evolution, how it is structured/administered in the U.S. Mission, concepts, principles, and practices of population-based public health. Case studies. Career opportunities.

**PUBH 3205. The Matrix of Global Health.** (2.0 cr.; A-F only; prereq [3001 or 3202 or 3004], 3350 or 3106 strongly recommended; summer, every year) Basic principles of global health, including social influences on health/health disparities. How health is measured, how global burden of morbidity/mortality varies throughout world. Investigate relationship between social, political, economic, health systems that interface to influence health outcomes.

**PUBH 3300. Topics: Clinical Research.** (1.0-4.0 cr.; [max 20.0 cr.]; prereq Jr or Sr or #: fall, spring, summer, offered periodically) New course offerings or topics.

**PUBH 3345. Introduction to Clinical Trials - Online.** (3.0 cr.; A-F only; prereq PUBH 3155 enrollees must have one semester of undergraduate level introductory biostatistics or statistics (STAT 3011, EPSY 3264, SOC 3111, BIOL 3272, or #) AND junior or senior standing or #: fall, spring, every year) Phases of trials, hypotheses/endpoints, choice of intervention/control, ethical considerations, blinding/randomization, data collection/monitoring, sample size, analysis strategies. Protocol development/implementation, interactive discussion boards.

**PUBH 3600. Topics: Maternal and Child Health.** (1.0-6.0 cr. [max 12.0 cr.]; prereq Undergrad student; spring, offered periodically) New course offerings or topics of interest pertaining to maternal/child health.

**PUBH 3601. Maternal and Child Health Global Public Health Issues.** (2.0 cr.; A-F only; prereq Public Health minor requirements or #: [3202 or 3001 or 3004], [3350 or 3106]; spring, every year) Introduction to global health. Health of mothers, infants, children, adolescents. History of MCH, global burden of disease/premature death. Effect of globalization. Programmatic/policy efforts to address health needs of MCH populations.

**PUBH 3639. Prevention: Theory, Practice, and Application in Public Health Services.** (3.0 cr.; prereq Jr or Sr; spring, every year) Current issues/controversies centered on prevention and health promotion. How they relate to health services and program implementation.

**PUBH 3801. Health Economics and Policy.** (3.0 cr.; =APEC 3801); prereq Course on microeconomics, course on basic statistics; spring, every year) Economics of health care markets. Problems faced by consumers/health care services. Builds on principles of supply/demand for health, health care/insurance, and role of government. Theoretical/empirical models/applications.


**PUBH 3807. Global Health, Relief, Development and Religious and Non-religious NGOs.** (3.0 cr.; [max 6.0 cr.]; spring, every year) Intersection of global health, relief, development/roles. Interaction of intergovernmental/governmental agencies, religious/non-religious NGOs in humanitarian response, development/social welfare generation supporting global health.

**PUBH 3893. Directed Study: Health Services Research and Policy.** (1.0-4.0 cr. [max 16.0 cr.]; prereq #: fall, spring, summer, offered periodically) TBD

**PUBH 3900. Topics: Public Health Nutrition.** (1.0-6.0 cr. [max 12.0 cr.]; prereq Undergrad student; fall, spring, summer, offered periodically) Topics pertaining to public health nutrition.

**PUBH 3905. Nutrition for Public Health Promotion and Disease Prevention.** (2.0 cr.; =PUBH 6905); prereq Jr or Sr or #: fall, every year) Topics of contemporary interest. Concepts/facts about science of human nutrition discussed in relation to personal/community nutrition problems/concerns. Applied introductory course with labs.

**PUBH 3940. Concepts and Controversies in Public Health Nutrition and Health Promotion.** (1.0 cr.; =PUBH 6905); prereq Jr or Sr or #: fall, every year) Societal issues around public health nutrition and health promotion. Socioecological framework. Levels of influence on dietary intake, food choices, related health outcomes. Policy initiatives related to public health nutrition, health promotion and disease prevention.

**PUBH 3950. From Kid to Community: Personal, Social and Environmental Influences on Youth Obesity.** (2.0 cr.; prereq Students should have completed one basic, introductory nutrition course or equivalent or permission by instructor; fall, every year) Public health strategies for prevention of pediatric obesity. Includes overview of epidemiology of child/adolescent obesity focusing on social-ecological risk factors. Discussion of implications of risk factors for developing environmentally-focused interventions/programs.

**PUBH 3955. Using Policy to Address Child & Adolescent Obesity Prevention.** (1.0 cr.; prereq basic nutrition course or #: spring, every year) Overview of federal, state, local policy approaches. National initiatives for prevention of child/adolescent obesity. Specific policies will be discussed at local, state, federal levels. Extensive discussion on evidence of impact of policies on child/adolescent weight.

**PUBH 4010. Summer Institute in Biostatistics.** (4.0 cr.; A-F only; prereq Student participant in the Division of Biostatistics SIBS (Summer Institute for Training in Biostatistics) research program.; summer, every year) Introduction to biostatistics for undergraduate students. Meets every weekday, all day, for six weeks summer between junior or senior year. Fundamentals of biostatistics/epidemiology, statistical computing in R/SAS, clinical trials/statistical genetics.
RTT 4581. Principles and Practices of Radiation Therapy II. (4.0 cr.; A-F or Audit; prereq 3581, BAS RTT student; fall, every year)
Advanced principles of applying virtual simulations, three dimensional planning, conformal treatments, including intensity modulated radiation therapy. Natural history, diagnosis/management of cancer disease sites. Technical issues relating to simulation, treatment techniques, electronic record keeping.

RTT 4596. Clinical Practicum III. (6.0 cr.; A-F or Audit; prereq 3596, 3696; fall, every year)

RTT 4601. Project. (1.0 cr.; A-F or Audit; prereq 3696, BAS RTT student; summer, every year)
Guided independent study project. Students research a topic of their choice and present their paper to faculty/students. Students are encouraged to submit paper for publication. Faculty provide guidance/input into development of project.

RTT 4696. Clinical Practicum IV. (3.0 cr.; A-F or Audit; prereq 3596, 3696, 4596, 4596; fall, every year)
Practice of clinical competencies, completion of required advanced level clinical competency exams: methodology behind treatment technique; critical thinking. Students rotate through dosimetry and participate in radiation treatment planning.

RTT 4796. Clinical Practicum V. (3.0 cr.; A-F or Audit; prereq 3596, 3696, 4596, 4696, BAS RTT student; spring, every year)

RTT 5281. Scientific Foundations. (3.0 cr.; A-F or Audit; prereq 5281, PT 6281; prereq Registered rehab science or PT student)

Radiography (RAD)

RAD 120. X-Ray Conference. (0.0 cr.; fall, every year)

RAD 121. Medical Roentgenologic Conference. (0.0 cr.; fall, spring, summer, every year)

RAD 123. Surgical Roentgenologic Conference. (0.0 cr.; fall, spring, summer, every year)
RAD 124. Neurosurgical-Roentgenologic Conference. (0.0 cr.; fall, spring, summer, every year)

RAD 125. Cardiovascular Roentgenologic Conference. (0.0 cr.; fall, spring, summer, every year)

RAD 126. Roentgenologic Conference on Chest Diseases. (0.0 cr.; fall, every year)

RAD 220. Nuclear Medicine: Clinical Conference. (0.0 cr.; fall, every year)

Recreation, Park, and Leisure Studies (REC)

College of Education and Human Development

REC 1501. Orientation to Leisure and Recreation. (3.0 cr.; A-F only; fall, spring, every year)
Opportunities to explore field of recreation/role it plays in society/human development. Visit recreation facilities representing public, quasi-public, for-profit agencies. Overview of recreation field/foundation for continuing on to more advanced recreation courses.

REC 1901. Freshman Seminar: Environmental Issues. (3.0 cr.; Student Option No Audit; prereq Fr; fall, spring, offered periodically)
Reading, discussion, critical analysis, and writing about environmental issues. Intensive, small-group setting.

REC 1905. Freshman Seminar. (1.0-3.0 cr. [max 6.0 cr.]; Student Option No Audit; prereq Fr; fall, spring, offered periodically)
Interdisciplinary seminar. Topics specified in Class Schedule.

REC 2151. Outdoor and Camp Leadership. (3.0 cr.; A-F only; spring, every year)
Practical/theoretical study of leading/educating diverse groups in outdoor settings. Outdoor leadership styles/methods, how these translate to general leadership methods in other settings/careers. How leadership styles impact learning processes.

REC 3281. Research and Evaluation in Recreation, Park, and Leisure Studies. (4.0 cr.; A-F only; prereq Rec major or #; fall, every year)
Social research/evaluation methodology. Survey of present status of recreation/park research, evaluation.

REC 3321. Outdoor Recreation 3-Season Skills. (3.0 cr.; A-F only; prereq Student will not receive credit if they have previously taken REC 4900/5900 - Special Topics with this topic title; fall, every year)
Introduction to essential outdoor technical skills as they relate to outdoor leadership/programming. Focus on teaching students to lead/instruct in outdoor classroom.

REC 3541W. Recreation Programming. (3.0 cr.; A-F only; prereq REC major or #; fall, every year)
Methods, skills, materials needed for planning, developing, implementing, evaluating professional recreation programs for diverse populations in various settings.

REC 3551. Administration and Finance of Leisure Services. (4.0 cr.; A-F only; prereq [3541W or #], rec major; spring, every year)
Principles/practices of financing/managing leisure service agencies in public/private sector.

REC 3601W. Leisure and Human Development. (3.0 cr.; A-F only; prereq REC major or #; spring, every year)
Explore issues associated with roles of leisure throughout life span. Principles/procedures for designing programs, services, facilities relative to individual values, attitudes, identity, culture, age, gender.

REC 3796. Senior Internship in Recreation, Park, and Leisure Studies. (9.0 cr.; S-N only; prereq Rec major, completion of most core courses, sr, #, fall, spring, summer, every year)
On-the-job supervised practical experience under specialist in a field directly related to student's academic program.

REC 3993. Directed Study in Recreation, Park, and Leisure Studies. (1.0-9.0 cr.; A-F only; prereq Rec major, #; fall, spring, summer, every year)
Work with faculty or grad students on research or scholarly or creative activities. Students usually assist with faculty scholarship or carry out projects under faculty supervision. Topic leads to new learning or discovery or contributes to student's academic program.

REC 4161. Recreation Land Policy. (3.0 cr.; A-F only; prereq REC Major or ORE minor or #; spring, every year)
Historical development of recreational land policy in United States. Related contemporary issues in policy, management, interpretation, research.

REC 4191. Adventure Recreation, Tourism, and Eco-Tourism. (3.0 cr.; A-F only; spring, every year)
Development of adventure recreation programs, including emphasis on tourism industry.

REC 4271. Community Leisure Services for Persons with Disabilities. (3.0 cr.; A-F only; prereq REC major or #; fall, every year)
Exploration/application of concepts/techniques of normalization. Least restrictive environment strategies to leisure service delivery in inclusive community settings for range of individuals with disabilities.

REC 4301. Wilderness and Adventure Education. (4.0 cr. [max 12.0 cr.]; A-F only; spring, every year)
Rationale for, methods in applying wilderness/adventure education programs in education, recreation, corporate, human service settings. Emphasizes adventure/wilderness program management.

REC 4311. Programming Outdoor & Env Ed. (3.0 cr.; A-F only; prereq REC major or ORE minor or #; spring, every year)
Methods, materials, settings for developing/conducting environmental/outdoor education programs.

REC 4900. Special Topics: Contemporary Issues in Leisure Services. (1.0-12.0 cr.; fall, spring, summer, every year)
Contemporary issues emphasizing administrative and supervisory functions for recreation and allied professionals; individual offerings, to be determined by faculty, focus on special issues and professional groups.

REC 5111. Sports Facilities. (3.0 cr.; A-F or Audit; prereq Kin or Rec major or #; fall, spring, summer, offered periodically)
Steps in planning and building facilities for athletics, physical education, and sport for college, professional, and public use.

REC 5115. Event Management in Sport. (3.0 cr.; A-F or Audit; prereq = Kin 5115; Grad student, #; spring, summer, every year)
Techniques/principles of planning, funding, and managing sport events. Collegiate championships, non-profit events/benefits, professional events.

REC 5371. Sport and Society. (3.0 cr.; A-F or Audit; prereq [3126W, grad student] or #; fall, offered periodically)
Sport, sporting processes, social influences, systems, and structures that have affected and exist within/among societies, nations, and cultures. Issues concerning social differentiation. Social concerns such as violence and honesty.

REC 5421. Sport Finance. (3.0 cr.; A-F or Audit; prereq Grad student or #; fall, every year)
Introduction to financial analysis in sport. Cash flow statements, budgeting issues, traditional/innovative revenue producing strategies available to sport organizations. Discussion, practical analysis of current market.

REC 5461. Foundations of Sport Management. (3.0 cr.; A-F or Audit; prereq Kin or rec or postbac or grad student or #; fall, spring, summer, every year)
Theories/techniques in administering/managing sport enterprises. Organizational theory/policy. Practical examples of sport management skills/strategies.

REC 5511. Sport and Gender. (3.0 cr.; A-F only; = Kin 5511; fall, every year)
Critically examines women's involvement in/contributions to sport, physical activity, and leisure.

REC 5601. Sport Management Ethics and Policy. (3.0 cr.; A-F or Audit; prereq Grad student or # #;)
Ethical concepts that underpin or inform sport policies. Evaluating sport policies from a normative point of view. Selected sport policy issues are used to illustrate relevance of ethical considerations in policy development, ethical implications of sport policy.
Courses listed in this catalog are current as of December 12, 2014. For up-to-date information, visit www.catalogs.umn.edu
Present. (3.0 cr.; =[AMST 1011]; fall, every year)
Political/cultural watersheds of last 60 years. Debates within/between religious traditions/communities. How gender, race, class, sexuality have shaped relationships between religion/politics. Tensions between secularism/religiosity, liberalism/fundamentalism.

RELS 1034. Introduction to Jewish History and Civilization. (3.0 cr.; =[HIST 3534, JWST 1034, RELS 3034, JWST 3034, HIST 1534]; fall, every year)
Jewish history, society, and culture from Second Temple period (5th century BCE) to modern era as illuminated by literature, philosophy, art, film, music, religious law/custom, and artifacts of daily life. Emphasizes political, social, and cultural contexts that shaped development of Jewish ideas, practices, and institutions.

RELS 3070. Topics in Religious Studies. (3.0 cr. [max 6.0 cr.]; fall, spring, summer, every year)
Topics specified in Class Schedule and Course Guide.

RELS 3071. Honors Course: Greek and Hellenistic Religions. (4.0 cr.; fall, offered periodically)

RELS 3072. The New Testament. (3.0 cr.; =[CNES 3072]; fall, every year)
Early Jesus movement in its cultural and historical setting: origins in Judaism; traditions about Jesus; Paul, his controversies and interpreters; questions of authority, religious practice, and structure; emergence of the canon of scripture. Contemporary methods of New Testament study.

RELS 3073. Roman Religion and Early Christianity. (3.0 cr.; spring, offered periodically)

RELS 3074. Age of Constantine the Great. (3.0 cr.; =[CLAS 1023]; fall, offered periodically)
Change/continuity in Roman Empire from 2nd-century zenith through 3rd-century crisis, first Christian emperor (306 to 337 A.D.), and beyond. Replacement of classical paganism by Christianity. Beginnings of monasticism. Superpower relations between Roman, Persian empires.

RELS 3076. The Apostle Paul: Life, Letters, and Legacy. (3.0 cr.; fall, spring, odd years)
How/what can we know about Paul. What his message was. What he was fighting. How he was later understood by friends/foes.

RELS 3078. Jews of the Islamic Mediterranean and Christian Europe, 7th-17th Centuries. (3.0 cr.; =JWST 3778, HIST 3778); fall, spring, offered periodically)

RELS 3079. Muslims and Jews: Conflict and Coexistence in the Middle East and North Africa since 1700. (3.0 cr.; =JWST 3511, HIST 3511); fall, odd years)
Diversity of social/cultural interactions between Muslims and Jews, and between Islam and Judaism, since 1700. What enabled the two religious communities to peacefully coexist. Causes of conflict. Why history of Muslim-Jewish relations is so acontested.

RELS 3111. Too Jewish? The Complex Construction of the Jewish American Psyche in Literature, Art, and Film. (3.0 cr.; A-F or Audit; fall, every year)
Questions about image/location of Jews in American arts and pop culture. Examples from literature, music, film.

RELS 3115. Midrash: Jewish Biblical Interpretation. (3.0 cr.; =JWST 3115, CNES 5115, RELS 3115, JWST 5115); fall, spring, offered periodically)
Jewish law studied as a mirror of society and as a way to actualize its value. Consideration of original socioreligious contexts and current applications. Selections include biblical interpretations addressing moral, theological, legal, and literary problems.

RELS 3126. Judaism in the Modern World. (3.0 cr.; fall, offered periodically)

RELS 3201. The Bible: Context and Interpretation. (3.0 cr.; =[CNES 3201, JWST 1201, RELS 3201, CNES 1201, JWST 3201]; fall, spring, offered periodically)

RELS 1082. Jesus in History. (3.0 cr.; fall, every year)
Jesus of Nazareth in his original setting. Modern approaches to the historical Jesus. Perspectives and needs of early gospel writers and effects of portrayals of Jesus. Shifting representations of Jesus in new historical and cultural situations. Meets with RelA 1182.

RELS 1082H. Honors Course: Jesus in History. (4.0 cr.; prereq honors; fall, every year)

RELS 1201. The Bible: Context and Interpretation. (3.0 cr.; =[CNES 3201, JWST 1201, RELS 3201, CNES 1201, JWST 3201]; fall, spring, offered periodically)

**RELS 3204. Dead Sea Scrolls.** (3.0 cr.; = [JWST 5204, JWST 3204, RELS 5204, CNES 5204, CNES 3204]; spring, even years) Introduction to Dead Sea Scrolls and Qumran. Contents of Dead Sea Scrolls, significance for development of Bible. Background of Judaism and Christianity. Archaeological site of Qumran.

**RELS 3205. Women, Gender, and the Hebrew Bible.** (3.0 cr.; = [CNES 3205, JWST 3205]; spring, even years) How men, women, gender, sexuality is portrayed in Hebrew Bible. Social/religious roles/status of women in ancient Israel. Read biblical texts from academic point of view.


**RELS 3322. Introduction to Aztec, Maya, and Inka Art, from Ancient Times to the Colonial Period.** (3.0 cr.; = [ARTH 3205, AMIN 3205, ANTH 3205]; fall, even years) Art/architecture of native peoples of Americas from twelfth century B.C. until arrival of Europeans. Ways that people living in South America/Mesoamerica prior to Spanish conquest produced, shaped, used art/architecture.

**RELS 3371. Buddhism.** (3.0 cr.; = [ALL 3672, ALL 5672, RELS 5371]; summer, odd years) Historical and contemporary account of the Buddhist religion in Asia/world in terms of its rise, development, various schools, practices, philosophical concepts, and ethics. Current trends in the modern faith and the rise of “socially engaged” Buddhism.

**RELS 3372. Reading Asian Cultures.** (3.0 cr.; = [A-F or Audit; spring, even years) Introduction to primary Asian texts in translation. Introducing/applying methods of interpretation to particular text in sequence. Close reading, methodological rigor. Practice, application.

**RELS 3373. Religion and Society in Imperial China.** (3.0 cr.; = [HIST 3466, ALL 3373]; fall, spring, offered periodically) Introduction to Buddhism, Daoism, Confucianism, and popular religion; their relation to society. Role of gender. Conceptualizing relations with the divine. Ritual and its goals. Position of monks/Daost priests. Readings.

**RELS 3415W. Art of India.** (4.0 cr.; = [ALL 3014W, ARTH 3014W, ARTH 3014V]; fall, spring, summer, every year) Indian sculpture, architecture, and painting, from prehistoric Indus Valley civilization to present.


**RELS 3502. Ancient Israel: From Conquest to Exile.** (3.0 cr.; = [CNES 5502, JWST 3502, HI 3502, CNES 3502]; prereq Hebrew not required; 3501 recommended; spring, offered periodically) Israelite history in context of what is known from Egyptian, Canaanite, Mesopotamian sources. Focuses on issues raised by archaeological data related to Israelite conquest of Canaan.

**RELS 3503. History and Development of Israelite Religion I.** (3.0 cr.; prereq No knowledge of Hebrew required; fall, every year) Survey of the evolution of Israelite religion. Cultic practices, law and religion, prophecy, religion and historiography. Relationship to surrounding religious systems.

**RELS 3504. Development of Israelite Religion II.** (3.0 cr.; fall, offered periodically) Ancient Judaism from the Persian restoration (520 BCE) to Rome times (second century CE). Religious, cultural, and historical developments are examined to understand Jewish life, work, and worship under a succession of foreign empires: Persian, Greek, and Roman.


**RELS 3535. Death and the Afterlife in the Ancient World.** (3.0 cr.; = [CNES 5535, CNES 3535]; fall, odd years) Beliefs, attitudes, and behaviors related to death and afterlife found in cultures of ancient Mediterranean and Near East. Literature, funerary art/epitaphs. Archaeological evidence for burial practices and care of dead.

**RELS 3541. Age of St. Augustine of Hippo.** (3.0 cr.; = [CLAS 1024]; fall, spring, offered periodically) Cultural diversity (A.D. 363 to circa 500 A.D.). Replacement of Roman Empire in Western Europe by barbarian kingdoms, consolidation of Constantinople. Literature, art, thought resulting from Christianity and Augustine of Hippo. Meets with CNES 3108.

**RELS 3542. The Age of Justinian and Muhammad (c.500-c.700 A.D.).** (3.0 cr.; = [CNES 3109]; spring, offered periodically) Uses sources written between 500 and 700 A.D. to consider history, art, religion, and architecture of Golden Age of Byzantium, its superpower relations with Persian Empire. Way that Arab invasions from mid-7th century altered configuration of Mediterranean world and Near East.


**RELS 3612. Baroque Rome: Art and Politics in the Papal Capital.** (3.0 cr.; = [ARTH 5335, HIST 3706, ARTH 3335, RELS 5612]; fall, even years) Center of baroque culture—Rome—as city of spectral and pageantry. Urban development. Major works in painting, sculpture, and architecture. Ecclesiastical/private patrons who transformed Rome into one of the world’s great capitals.

**RELS 3621. The Christian Right and Left in America: Protestant Liberals, Evangelicals, and Fundamentalists.** (3.0 cr.; = [RELS 5621]; spring, odd years) Religious, historical, social, and scientific thought/practice across three main U.S. Protestant groups since 1820. Historical processes that brought about diverse understandings of Christianity, theologies, and worship. Theological left/right views of views of society, history, and science, that influence public debates.


**RELS 3671. Hinduism.** (3.0 cr.; = [HIST 3492, ALL 3671, RELS 5671, ALL 5671]; fall, spring, offered periodically)


RELS 3708. The Cultures of the Silk Road. (3.0 cr.; [HIST 3504, ALL 3872]; fall, spring, every year) Past/present state of cultures that flourished in Central Asia (present-day CA republics, Iran, Afghanistan) after Alexander the Great. Decline with opening of sea routes.

RELS 3709. Ancient Iran. (3.0 cr.; [CAS 3511, HIST 3503, MELC 3511]; fall, spring, offered periodically) Development of ancient Iranian culture under Achaemenians and Sassanians. Impact of Zoroastrian religion on Iranians, on Hellenism, and on domains such as Bactria. Iran's contribution to cultures of Silk Road.


RELS 3713. Modern Iran: Nationalism, Religion, and the Struggle to Create Modern Iran. (3.0 cr.; [HIST 3506]; spring, even years) Iranian history from the fall of the Sassanids (7th C. CE) to the present. Shi'ite Islam in a world context. Iranian dynasties. Iran's entrance into modern world politics.

RELS 3714. Islam and the West. (3.0 cr.; [CAS 3533, GLOS 3643, HIST 3546]; fall, spring, offered periodically) Cultural/intellectual trends that have defined differences between Islam and the West. Development of historical, philosophical, and intellectual mindset of both spheres. Factors in tension, anxiety, and hatred between Muslim world and Europe and the United States.


RELS 3716. Gender and the Family in the Islamic World. (3.0 cr.; A-F only; [SOC 3681, GLOS 3681, GWSS 3681]; prereq at least soph.; spring, offered periodically) Experiences of Muslim women/families from a historical/comparative perspective. Gender/family power relations in colonial representations, sexual politics, family, education/health, paid work, human rights, and Islamic feminism.

RELS 3717. Christians, Muslims, and Jews in the Middle Ages. (3.0 cr.; [HIST 3606, JWST 3606]; fall, spring, even years) Muslim/Christian expansion, jihad/crusade, anti-Jewish violence/persecution. Trade, intellectual exchange, religious dialogue.

RELS 3718W. Christ in Islamic Thought. (3.0 cr.; spring, offered periodically) Christ in Islamic Thought from Qur'an to 21st Century. Examine engagement from beginnings in Qur'an/Hadith into medieval/early modern periods.


RELS 3801. Philosophy of Religion. (3.0 cr.; fall, offered periodically) Conceptual problems that arise from attempts to provide rational justification for religious belief.

RELS 3970. Supplemental Discussion in Religious Studies. (1.0-4.0 cr.; offered periodically) Extra discussion section attached to a religious studies course/event.

RELS 3973. Directed Studies. (1.0-4.0 cr.; spring, fall, every year) Prereq 1005 or ANTH 1003 or #; fall, spring, summer, every year) Student studies with faculty on a subject decided upon by both.

RELS 4049. Religion and Culture. (3.0 cr.; prereq 1005 or ANTH 1003 or #; fall, spring, every year) Religious beliefs and world views cross-culturally. Theories of origins, functions, and forms (e.g. myth, ritual, symbolism) of religion.


RELS 4952. Final Project. (1.0-4.0 cr.; A-F or Audit; prereq Limited to RELS majors. Please see director of Undergraduate Studies for permission.; fall, spring, every year) Independent research/writing under supervision of faculty sponsor. In-depth research paper/comparable project to be completed in conjunction with RELS course.

RELS 5001. Theory and Method in the Study of Religion: Critical Approaches to the Study of Religion. (3.0 cr.; [RELS 3001W]; prereq Sr or grad student or #; spring, every year) Theoretical/methodological issues in academic study of religion. Theories of origin, character, and function of religion as a human phenomenon. Psychological, sociological, anthropological, and phenomenological perspectives.

RELS 5070. Topics in Religious Studies. (3.0 cr.; [max 18.0 cr.]; fall, spring, summer, offered periodically) Topics specified in Class Schedule and Course Guide.


RELS 5076. Apostle Paul: Life, Letters, and Legacy. (3.0 cr.; fall, spring, odd years) How/what we can know about Paul. What his message was. What he was fighting. How he was later understood by friends/foes.

RELS 5077. Religious Violence in the Early Roman Empire: Jews, Christians, and Pagans. (3.0 cr.; [CNES 3077, CNES 3077, RELA 3077, RELS 3077]; spring, every year) Methodological strategies for understanding discourses of violence. Ways religious
Ancient Judaism from the Persian restoration (520 B.C.E.) to Roman times (2nd century C.E.). Religious, cultural, and historical developments are examined to understand Jewish life, work, and worship under a succession of foreign empires: Persian, Greek, Roman.

RELS 5513W. Scripture and Interpretation in Israelite Religion and Judaism. (3.0 cr.; A-F or Audit; prereq BAS religious studies; fall, spring, every year) 
Beliefs, attitudes, and behaviors related to death and afterlife found in cultures of ancient Mediterranean and Near East Literature, funerary art/epitaphs, Archaeological evidence for burial practices and care of dead.

RELS 5535. Death and the Afterlife in the Ancient World. (3.0 cr.; A-F only; fall, every year) 

RELS 5525. Art and Archaeology of Early Christianity and the Late Roman Empire. (3.0 cr.; [ARTH 5188]; fall, spring, offered periodically) 

RELS 5526. Art of the Inka and their Ancestors. (3.0 cr.; [ARTH 5325, ANTH 5325]; spring, every year) 
Art/architecture of Nahua-speaking Aztecs of Central Mexico, from first appearance in archaeological record until Spanish invasion in 1521. Major scholarly problems, theoretical/methodological approaches. Analysis of scholarly writing.

RELS 5503. History and Development of Israelite Religion I. (3.0 cr.; fall, every year) 
Survey of the evolution of Israelite religion. Cultic practices, law and religion, prophecy, religion and historiography. Relationship to surrounding religious systems.

RELS 5504. Development of Israelite Religion II. (3.0 cr.; fall, offered periodically) 
Continued clinical rotations at Mayo Medical Center, Rochester. Nine intensive care units, operating room, emergency room, general floor care.
center, smoking cessation clinic, pulmonary rehabilitation program, home care, outpatient clinic. Adult, perinatal, and pediatric critical resp care.

RC 3401. Seminar in Respiratory Care I: Case reports and Fundamentals of Research. (1.0 cr.; A-F or Audit; prereq 2210; fall, every year) Critical review of professional medical literature re scientific method and clear writing style. Patient cases for problem solving and critical thinking issues. Collaborative class research project leading to abstract submission. Weekly case conference (pulmonary/critical care medicine or combined critical care). Two-hour seminar.

RC 3402. Seminar in Respiratory Care II: Case reports and Fundamentals of Research. (1.0 cr.; A-F or Audit; prereq 3401, BAS RC student; spring, every year) Weekly conferences and seminar of significant respiratory care cases in professional medical literature. Case reviews from standpoint of scientific method and clear writing style. Problem solving, critical thinking strategies. Collaborative class research project leading to submission of abstract.

RC 3501. Advanced Cardiopulmonary Respiratory Physiology and Pathophysiology. (3.0 cr.; A-F or Audit; prereq 3201, BAS RC student; spring, every year) Physiology of cardiovascular/pulmonary systems. Adult, pediatric, and perinatal pulmonary and cardiac disorders. Emphasizes presenting assessment, lab evaluation, major pathology, pathophysiologic manifestations, and treatment. Lab observation/measurement of normal and simulated abnormal cardiopulmonary physiology.

RC 3601. Clinical Research Concepts and Practice. (3.0 cr.; A-F or Audit; prereq RC or RTT major; summer, every year) Health science applications. Statistics (descriptive, inferential). Research study design, problem statement, protocol/hypothesis development, feasibility, sampling methods/instruments, data management, data analysis/interpretation, dissemination of research.


RC 4201. Subspecialization in Respiratory Care: Advanced Perinatal and Pediatric Respiratory Care. (2.0 cr.; A-F or Audit; prereq 3102, BAS RC student; fall, every year) Role of perinatal/pediatrics specialist as defined by National Board for Respiratory Care (NBRC). Literature on mechanical ventilation, monitoring applied. Emphasizes evidence-based care. Case studies of strategies for extended mechanical ventilation or other forms of long-term support.


RC 4203. Subspecialization in Respiratory Care: Cardiopulmonary Rehabilitation, Disease Prevention, Case Mgmt. (1.0 cr.; A-F or Audit; prereq 3102, BAS RC student; fall, every year) Care for chronically ill patients with lung/heart disorders. Emphasizes respiratory care in the hospital, extended care, and the home. Clinical testing, exercise prescriptions, and practice guidelines for management. Case management and responsibilities unique to respiratory therapist. Preparation for role of certified asthma educator.

RC 4301. Seminar: Research Project and Publication. (2.0 cr.; A-F or Audit; prereq 3102, BAS respiratory care major; spring, every year) Students prepare a research project for submission, including assembling a poster, abstract, or manuscript of original research. Research mentors are assigned to allow guided independent study.

RC 4496. Subspecialty Clinical Practicum in Advanced Respiratory Care I. (3.0 cr.; S-N or Audit; prereq 3302, BAS respiratory care major; fall, every year) Competencies in areas of advanced-level respiratory care, including clinical subspecialties and related areas important to respiratory care practitioner. A rotation is eight weeks/120 hours of directed clinical experience at facilities within Mayo Health System and UM-affiliated institutions. Maximum two rotations per semester.

RC 4596. Subspecialty Clinical Practicum in Advanced Respiratory Care II. (3.0 cr.; S-N or Audit; prereq 3302, BAS respiratory care major; spring, every year) Continued competencies in areas of advanced-level respiratory care, including clinical subspecialties and related areas important to respiratory care practitioner. A rotations is eight weeks/120 hours of directed clinical experience at facilities within Mayo Health System and UM-affiliated institutions. Maximum two rotations per semester.


RC 4993. Directed Study. (1.0-4.0 cr.; prereq Respiratory care major; fall, spring, summer, every year) Independent project. Topic arranged with and supervised by respiratory care faculty.

Retail Merchandising (RM) College of Design

RM 1201. Fashion, Ethics, and Consumption. (3.0 cr.; fall, spring, every year) Apparel business. Multiple steps in the process of creating/merchandising apparel, and the ethical positions reflected in decision making at each step.

RM 2196. Work Experience in Retail Merchandising. (1.0-4.0 cr. [max 8.0 cr.]; S-N only; prereq Plan submitted/approved by [adviser, internship supervisor], written approval of supervisor, #; fall, spring, summer, every year) Supervised work experience in business, industry, or government, related to student's area of study. Integrative paper or project.

RM 2215. Introduction to Retail Merchandising. (3.0 cr.; A-F or Audit; spring, every year) Overview of retail management. Aspects of retailing management in global, multi-channel retail environment. Strategies/tactics to make decisions to operate retail business. Retail management principles covered.

RM 3196. Field Study: National or International. (1.0-4.0 cr.; [max 10.0 cr.]; A-F or Audit; prereq #; fall, spring, summer, every year) Faculty-directed field study in national or international setting.

RM 3201. Career and Internship Preparation for Retail Merchandising. (1.0 cr.; A-F only; prereq Retail merchandising major; fall, spring, every year) Research career opportunities related to retail industry, set career objectives based on an assessment of individual skills/interests, and identify job search skills to implement a transition from college to employment.

RM 3242. Retail Buying. (3.0 cr.; A-F or Audit; prereq [2215 or DHA 2215 or 3245], [MATH 1031 or MATH 1051 or MATH 1142 or MATH 1151 or MATH 1155 or MATH 1271], [jr or sr], retail merchandising [major or minor]) [or #]; fall, every year) Principles/mathematics of merchandise inventory control, merchandise selection.

RM 3243. Visual Merchandising. (3.0 cr.; A-F or Audit; prereq 2215, [DHA major or minor or #]; spring, summer, every year) Retail store environment. Physical/psychological effects that initiate/motivate consumer behavior. Merchandise display: creativity, department layout, fixturing, lighting, cross merchandising, visual resources, signing, maintenance.

RM 4117W. Retail Environments and Human Behavior. (3.0 cr.; A-F only; prereq 2215 or
Courses listed in this catalog are current as of October, 15th 2014. For up-to-date information, visit www.catalogs.umn.edu.
Speaking, reading, and understanding Russian. Reading contemporary texts.

**RUSS 4111. Advanced Russian I.** (2.0 cr.; [max 4.0 cr.;] = [RUSS 3101]; prereq 3002 or 4104 or #; fall, every year)
Advanced grammar, conversation, composition, reading.

**RUSS 4112. Advanced Russian II.** (2.0 cr.; = [RUSS 3102]; prereq 3101 or 4111 or #; spring, every year)
Advanced grammar, conversation, composition, reading.

**RUSS 5404. Tolstoy in Translation.** (3.0 cr.; = [RUSS 3404]; spring, odd years)
Novels, stories, and philosophical writings of Leo Tolstoy.

**RUSS 5407. Stories and Plays of Anton Chekhov in Translation.** (3.0 cr.; = [RUSS 3407]; spring, every year)
Study of literary devices and themes in selected stories and major plays using the intrinsic approach.

**RUSS 5411. Dostoevsky in Translation.** (3.0 cr.; = [RUSS 3411]; spring, odd years)
Russian literature from about 1000 A.D. to mid-19th century; emphasizing writers of the first half of the 19th century.

**RUSS 5421. Literature: Middle Ages to Dostoevsky in Translation.** (3.0 cr.; = [RUSS 3421]; fall, every year)
Survey of Russian literature from mid-19th century to the present: realism, modernism, feminism and other trends.

**RUSS 5900. Topics in Russian Language, Literature, and Culture.** (1.0-4.0 cr.; [max 3.0 cr.;] = [RUSS 1102]; topic may focus on a specific author, group of authors, genre, period, or subject matter. Topic specified in Class Schedule. Readings in translation for non-majors.

**RUSS 5933. Directed Studies.** (1.0-4.0 cr.; [max 16.0 cr.;] = [RUSS 1102]; topic may focus on a specific author, group of authors, genre, period, or subject matter. Topic specified in Class Schedule. Readings in translation for non-majors.

**SCAN 3670. Topics in Scandinavian Studies.** (3.0 cr.; [max 9.0 cr.;] = [SCAN 5634]; fall, spring, offered periodically)
Topics may focus on a specific author, group of authors, genre, period, or subject matter. Topic specified in Class Schedule. Readings in translation for non-majors.

**SCAN 3670. Topics in Scandinavian Languages.** (2.0 cr.; = [SCAN 3611]; fall, spring, offered periodically)
Guided individual study. Prereq instr consent, dept consent, college consent.

**SCAN 3608. The Icelandic Saga.** (3.0 cr.; = [SCAN 3011]; fall, odd years)
Major literary works from the Middle Ages to the present. Readings in translation.

**SCAN 3505. Scandinavian Fiction From 1890 to Present.** (3.0 cr.; fall, spring, odd years)
Modernists search for new forms to represent changing historical situations. Ibsen, Strindberg, Hamsun, Selma Lagerlof, Hjalmar Bergman, Paar Lagerkvist, Karen Blixen, Moa Martinson, Tarjei Vesaas, Edith Sodergran, Ingmar Bergman, Lars Gustafsson. All readings in translation.

**SCAN 3602. The Literary Fairy Tale in Scandinavia.** (3.0 cr.; fall, odd years)
Literary fairy tales from Scandinavia, especially Hans Christian Andersen. Readings in translation for non-majors.

**SCAN 3605. The Scandinavian Short Story.** (3.0 cr.; = [SCAN 3605]; fall, spring, even years)
Short stories by 19th-20th century authors from all five Scandinavian countries. Genre theory/practical criticism. Readings in English for non-majors.

**SCAN 3613. Children’s Literature in Scandinavia.** (3.0 cr.; fall, even years)
Analysis and discussion of representative works in Scandinavian children’s literature from picture books to young adult books using a variety of critical methods of interpretation. Taught in English.

**SCAN 3614. Blood on Snow: Scandinavian Thrillers in Fiction and Film.** (3.0 cr.; = [SCAN 3614]; fall, spring, offered periodically)
Scandinavian crime novels/films against background of peaceful welfare states. Readings in translation for non-majors.

**SCAN 3634. Scandinavian Women Writers.** (3.0 cr.; = [SCAN 5634]; spring, even years)
Investigation of issues important to women as articulated by Scandinavian women writers. Historical overview of women's writing in Scandinavia and in-depth investigation of texts by contemporary women writers. All readings in translation.

**SCAN 3609. Thrillers in Fiction and Film.** (3.0 cr.; = [SCAN 5649]; fall, spring, offered periodically)
Scandinavian crime novels/films against background of peaceful welfare states. Readings in translation for non-majors.

**SCAN 3502. Scandinavian Myths.** (3.0 cr.; fall, spring, odd years)
Literary and cultural investigations of the popular beliefs, myths, and religion of the medieval Scandinavians; the interaction of paganism and Christianity; the reflection of myths in Old Scandinavian literature and art. All readings in English.

**SCAN 3503. Scandinavian Folklore.** (3.0 cr.; fall, spring, odd years)
Literary and folkloristic investigation of Scandinavian folktales and legends. Readings in translation for non-majors.

**SCAN 3504. The Immigrant Experience.** (3.0 cr.; fall, spring, every year)
Issues of origin/language, immigration/settlement, traditions/values, culture/politics, and transgressions of boundaries from the old to the new studied through photos, diaries, letters, stories, and novels by Moberg, Rolvaag, Ager, and other pioneers. All readings in translation.

**SCAN 3505. Scandinavian Fiction From 1890 to Present.** (3.0 cr.; fall, spring, odd years)
Modernists search for new forms to represent changing historical situations. Ibsen, Strindberg, Hamsun, Selma Lagerlof, Hjalmar Bergman, Paar Lagerkvist, Karen Blixen, Moa Martinson, Tarjei Vesaas, Edith Sodergran, Ingmar Bergman, Lars Gustafsson. All readings in translation.

**SCAN 3506. The Scandinavian Short Story.** (3.0 cr.; = [SCAN 5606]; fall, spring, even years)
Short stories by 19th-20th century authors from all five Scandinavian countries. Genre theory/practical criticism. Readings in English for non-majors.

**SCAN 3509. Thrillers in Fiction and Film.** (3.0 cr.; = [SCAN 5649]; fall, spring, offered periodically)
Scandinavian crime novels/films against background of peaceful welfare states. Readings in translation for non-majors.

Courses listed in this catalog are current as of December 12, 2014. For up-to-date information, visit www.catalogs.umn.edu
SW 1501. Introduction to Peace Studies. (3.0 cr.; A-F only; fall, spring, every year) Interdisciplinary field that considers questions such as how human conflicts can be resolved in ways that promote justice/peace. Definitions, conditions, and causes of violence, nonviolence, war, and peace between nations, groups, or individuals.

SW 1905. Freshman Seminar. (1.0-3.0 cr.; [max 6.0 cr.]; prereq Fr, fall, spring, every year) Interdisciplinary seminar. Topics specified in Class Schedule.

SW 1910W. Freshmen Seminar. (1.0-3.0 cr.; [max 6.0 cr.]; prereq Fr; fall, spring, every year) Interdisciplinary seminar. Topics specified in Class Schedule.

SW 2501W. Introduction to Social Justice. (4.0 cr.; A-F only; fall, spring, every year) Meanings of social justice. Ways in which social justice advocates work for social change. Criminal justice, globalization, and social welfare. Students do service learning in a social justice organization.

SW 3301. GLBT Social Movements. (3.0 cr.; A-F only; spring, every year) Development of gay, lesbian, bisexual, and transgender (GLBT) social movement historically. Current state of GLBT movement. Readings draw on social movement theory, and GLBT Studies. Interdisciplinary course with classroom and community service learning.


SW 3702. Introduction to Adult Intimate Partner Violence: Intervention and Prevention. (3.0 cr.; fall, spring, every year) Theories, research, intervention, and prevention strategies regarding violence against women and the abuse of vulnerable adults in the United States. Issues of gender, race, culture, age, physical ability, SES, and sexual orientation. Includes service learning.

SW 3703. Gender Violence in Global Perspective. (3.0 cr.; fall, spring, every year) Theories/research on violence in intimate domestic relationships examined through multiple lenses. Overview of interventions in Minnesota, United States, and other societies.

SW 3810. Special Topics. (1.0-4.0 cr. [max 10.0 cr.]; A-F or Audit; fall, spring, every year) Topics specified in Class Schedule.

SW 4501. Senior Seminar in Social Justice. (4.0 cr.; A-F only; prereq 2501, 3501; spring, every year) Capstone course. Students complete a social justice portfolio, do service learning in a social justice organization.

SW 4693. Directed Studies. (1.0-10.0 cr.; prereq #; fall, spring, summer, every year) Guided individual reading or study related to social issues, social work methods, or social work history.

SW 4694. Directed Research. (1.0-10.0 cr.; prereq #; fall, spring, summer, every year) Guided research related to social issues, social work methods, or social work history.

SW 5051. Human Behavior and the Social Environment. (2.0-3.0 cr.; A-F or Audit; prereq Grad student or 8 cr social sciences or #; fall, spring, every year) Social, psychological, biological, and cultural factors of individual and group development as applied to social work practice. Behavior and life-cycle development focusing on diversity and each stage of life. Discuss development in terms of the individual, and in terms of overlapping social systems such as the multigenerational family, culture, community, and society.

SW 5101. Historical Origins and Contemporary Policies and Programs in Social Welfare. (3.0-4.0 cr.; A-F or Audit; prereq Grad or 8 sem cr of social sciences; fall, spring, every year) Contemporary policies and programs in social welfare are examined in light of their historical origins and evolution. A framework is then developed for analysis of concepts and principles in contemporary social policy for social welfare programs and services. The emergence of the profession of social work also examined.

SW 5105. Women and Public Policy. (3.0 cr.; ) Study of feminist organizations; issues and conflicts within organizations and movements; methods and sources for studying feminism.

SW 5309. Case Management with Special Populations. (3.0 cr.; prereq Grad or non-degree seeking student or #; fall, spring, offered periodically) Examines case and principles of case management practice with special populations such as older adults, persons with developmental disabilities, and persons with serious and persistent mental illness. The core functions of case management practice in a range of settings are addressed in relationship to issues of diversity, vulnerability, and empowerment.


SW 5313. Social Work with Older Adults. (2.0 cr.; prereq Grad or non-degree seeking student or #; fall, spring, offered periodically) The practice components of social work with older adults including assessment, intervention, and case management. Taught from the perspective of bio-psycho-social strengths and...
a strategic fund-raising plan. Researching sources of support, developing relationships with grant makers, preparing/submitting grant requests.

**SW 5514. Strategic Risk Management in Agencies. (1.0 cr.; prereq MSW student or #; spring, summer, every year)**

Strategies to minimize risk to agency, its assets, and its resources. Relationship between mission, risk management, and board role. Agency internal systems, controls, and prevention strategies. Liability/insurance. Agency exposure to risk, including volunteer program management.

**SW 5562. Global Social Work and Social Development. (3.0 cr.; fall, every year)**

Theories/strategies of social work and social development in industrial/developing countries. Applying international perspective and comparative framework to analyze basic human needs, social problems, and social work and social development strategies in different countries.

**SW 5801. Policies and Programs in American Social Welfare. (2.0 cr.; A-F or Audit; fall, every year)**

Major policies and programs of social welfare, distinguishing between programs of social insurance and public assistance. Develops skills for analyzing social problems/policies that respond to those problems. Concepts for defining and measuring poverty and social disparity.

**SW 5802. Social Welfare History. (3.0 cr.; fall, every year)**

Policies/programs in social welfare. Historical evolution, along with themes that have shaped development over time. Contributions of population subgroups to the development of the welfare state, and the impact of policies and programs on such groups. History of social work profession.

**SW 5810. Seminar: Special Topics. (1.0-4.0 cr. [max 10.0 cr.]; fall, spring, every year)**

Topics specified in Class Schedule.

**SW 5813. Child Welfare and the Law. (2.0 cr.; prereq 2nd yr MSW or advanced standing or #; fall, offered periodically)**

Social work practice in juvenile court. Child abuse/neglect reporting laws, risk assessment, reasonable efforts, case plan, custody proceedings, permanency planning, termination of parental rights, child testimony, social worker testimony, adoption laws.

**SW 5903. Substance Abuse and Social Work. (2.0 cr.; prereq Grad student or #; spring, every year)**

Students gain skills in eliminating the detrimental impact of substance use disorders at multiple levels (families, groups, organizations, and communities) through an ability to identify, assess, intervene, and evaluate those struggling with substance abuse and dependency throughout the life span.

**SW 5904. Facilitation & Conflict Mgmt: Humanistic Approach. (2.0 cr.; fall, spring, summer, every year)**

Humanistic approach to facilitating meetings in small human service organizations and units within large bureaucratic structures. Managing conflict among individuals, groups, and communities in multiple settings.

**SW 5905. Permanency in Child Welfare. (2.0 cr.; prereq Grad student or #; spring, every year)**

Depth/breadth in knowledge/skill acquisition in achieving permanency for children receiving services within public, tribal, and private child welfare systems. Out-of-home/permanency placements, specific permanency interventions, and child/family responses to different permanency options.

**SW 5906. Advanced Ethical Decision Making. (1.0 cr.; prereq Grad student or #; spring, every year)**

Identify ethical issues, resolve ethical dilemmas, make ethical decisions when confronted with conflicting duties/choices that occur within the context of professional social work at all levels of practice.

**SW 5907. School Social Work. (1.0 cr.; prereq Grad student or #; fall, spring, summer, every year)**

Apply social work knowledge/skills in school settings through prevention, assessment, intervention, and evaluation from an ecological multilevel approach focused on students, families, and the school community.

**SW 5908. Technology and Communication in Social Work. (1.0 cr.; prereq Grad or non-degree seeking student or #; fall, spring, every year)**

Online course explores the influence of technology in social work practice/society. Appropriate community or direct interventions using new technologies. Introduction to effective communication and public relations.

**SW 5909. Social Work With Involuntary Clients. (2.0 cr.; prereq Grad or non-degree seeking student or #; fall, spring, summer, every year)**

Includes theory, ethics, effectiveness, and intervention methods for work with client systems that experience involuntary contact with a social worker. Interventions at micro, mezzo, and macro levels are included. Practice in varied settings such as child welfare, mental health, corrections, and public schools as well as practice related to organizational responses to change.

**SW 5912. Grief & Loss in Social Work Practice. (1.0 cr.; fall, spring, summer, every year)**

Review current concepts of grief/loss. Historical/modern views, symptoms of grief, implications of diverse losses, including expected, sudden, or traumatic losses, ambiguous grief.

**SW 5913. Working with Immigrant Populations. (2.0 cr.; fall, spring, summer, every year)**

SW 5991. Independent Study in Social Work. (1.0-4.0 cr.; fall, spring, summer, every year) Independent study in areas of special interest to students and faculty.

Social and Administrative Pharmacy (SAPH)

College of Pharmacy

SAPH 5100. Pro-Seminar. (1.0 cr.; A-F or Audit; fall, every year) History, foundational frameworks, and key research domains for social and administrative pharmacy through examining landmark literature. Students think critically, reflect on important works, and create a cognitive map of the discipline and their own focus for study.

SAPH 5610. Pharmacoepidemiology. (2.0 cr. [max 3.0 cr.]; A-F only; fall, odd years) Application of epidemiologic principles to study/use. Beneficial/adverse outcomes of drugs in human populations.

Sociology (SOC)

College of Liberal Arts

SOC 1001. Introduction to Sociology. (4.0 cr.; [SOC 1011V, SOC 1012W]; prereq Soc majors/minors must register A-F; fall, spring, summer, every year) Scientific study of human societies/behavior. Major theories, methods, concepts, research findings. Characteristics of basic social units, their patterns of interrelation, processes of change.

SOC 1011V. Honors: Introduction to Sociology. (4.0 cr.; A-F only; [SOC 1012W, SOC 1001]; prereq honors; fall, spring, every year) Scientific study of human societies/behavior. Major theories, methods, concepts, research findings. Characteristics of basic social units, their patterns of interrelation, processes of change.

SOC 1001H. Honors: Introduction to the Criminal Justice System. (3.0 cr.; A-F only; fall, spring, summer, every year) Components, dynamics, philosophical underpinnings of criminal justice/agencies (law enforcement, courts, corrections). Honors students expected to demonstrate greater depth of discussion, depth, length of writing assignments, presentations, leadership of students.

SOC 1002. Introduction to Criminal Behavior and Social Control. (3.0 cr.; prereq Soc majors/minors must register A-F; fall, spring, every year) Issues in science of crime as a social phenomenon. Creation/use of laws, patterns/causes of crime.


SOC 3211W. American Race Relations. (3.0 cr.; A-F or Audit; prereq Soc majors/minors must register A-F; fall, spring, every year) Conceptual/theoretical tools sociologists use to study race relations in the United States. Historical experiences among racial/ethnic groups. American Indians, African-Americans, Latinos, Asian-Americans, and white ethnics.

SOC 3221. Sociology of Gender. (3.0 cr.; A-F or Audit; [GWSS 3201]; prereq 1001 recommended; soc majors/minors must register A-F; fall, every year) Organization, culture, and dynamics of gender relations as major features of social life. Gender/racial inequalities in workplace. Relationships between gender/race. Gender and culture. Sexuality, gendered politics, and women's movement.

SOC 3251W. Sociological Perspectives on Race, Class, and Gender. (3.0 cr.; A-F or Audit; [AAS 3251W, AFRO 3251W]; prereq Soc majors/minors must register A-F; fall, spring, summer, every year) Race, class, and gender as aspects of social identity and as features of social organization. Experiences of women of color in the United States. Family life, work, violence, sexuality/reproduction. Possibilities for social change.

SOC 3301W. Politics and Society. (3.0 cr.; A-F or Audit; prereq 1001 recommended; soc majors/minors must register A-F; spring, offered periodically) Ideas of citizenship. Relationship between politics and society. Public sphere, civil society. Research practicum volunteering at policy-relevant site using participant observation methods.

SOC 3311W. Hard Times & Bad Behavior: Homelessness & Marginality in the United States. (3.0 cr.; prereq 1001, soc majors/minors must register A-F; spring, odd years) Themes of marginality in US. Rootlessness produced by labor market, love-hate relationship between elites/marginal populations, complex mixture of freedom/deprivation of people on edge.

SOC 3322W. Social Movements, Protests, and Change. (3.0 cr.; [GLOS 3322W]; prereq 1001 or #; soc majors/minors must register A-F; spring, even years) Origins, dynamics, and consequences of social movements. Challenges facing movement organizations. Relationship between movements and political institutions. Role of movements in bringing about social change. Theoretical issues, case studies.

SOC 3411W. Organizations and Society. (3.0 cr.; A-F or Audit; prereq 1001 recommended; soc majors/minors must register A-F; spring, odd years) Formal organizations as major social influences in work lives, personality development, social change, and conflict. Life-course analysis of enterprises, bureaucracies, and voluntary organizations. Organizational control, conflict, coordination, and inter-organizational sets/relationships.

SOC 3412. Social Networking: Theories and Methods. (3.0 cr.; A-F only; [SOC 3412H]; spring, odd years) Introduces theories/methods for studying social networks, ties connecting people, groups, organizations. Friendship, communication, small group, health, sexual, corporate, social movement, public policy, innovation diffusion, criminal/terrorist, Internet networks.

SOC 3412H. Honors: Social Networking: Theories and Methods. (3.0 cr.; A-F only; [SOC 3412]; spring, odd years) Introduces theories/methods for studying social networks, ties connecting people, groups, organizations. Friendship, communication,
small group, health, sexual, corporate, social movement, public policy, innovation diffusion, criminal/terrorist, internet networks. Honors students are expected to demonstrate greater depth of discussion, depth and to a degree length of writing assignments, presentations, and leadership of the students.

SOC 3415. Consume This! The Sociology and Politics of Consumption. (3.0 cr.; A-F or Audit; prereq 1001 recommended; soc majors/minors must register A-F; fall, offered periodically)

How symbols are created, acquired, diffused, and used for organizing personal identity and maintaining group boundaries. Fashion. Socialization. Structure of retail trade. Role of mass media, advertising, marketing/production strategies. Implications of worldwide markets.

SOC 3421W. Sociology of Work: Good Jobs, Bad Jobs, No Jobs?. (3.0 cr.; A-F only; prereq Soc majors/minors must register A-F; spring, offered periodically)


SOC 3451V. Honors: Cities & Social Change. (3.0 cr.; A-F only; prereq Soc majors/minors must register A-F; spring, even years)


SOC 3451W. Cities & Social Change. (3.0 cr.; A-F only; prereq Soc majors/minors must register A-F; fall, every year)


SOC 3452. Education and Society. (3.0 cr.; prereq Soc majors/minors must register A-F; fall, spring, offered periodically)


SOC 3501. Sociology of Families. (3.0 cr.; prereq 1001 or #; soc majors/minors must register A-F; fall, spring, even years)

Families in contemporary American society. Historical/cross-cultural comparisons. Interrelationships of families with other social institutions. Race, class, and gender in shaping family experiences. Topics may include marriage, divorce, childbearing, parenthood, family violence, gay/lesbian families.

SOC 3503. Asian American Identities, Families & Communities. (3.0 cr.; [AAS 3503, SOC 3503H]; prereq 1001 recommended; spring, every year)

Overview of Asian American identities, families/communities. Racial/ethnic identity formation, immigration, intergenerational relationships, dating/family formation, transnational adoption, popular culture, educational/work experiences, ethnic enclaves/activism.

SOC 3503H. Honors: Asian American Identities, Families & Communities. (3.0 cr.; A-F only; [AAS 3503, SOC 3503]; prereq 1001 recommended; spring, every year)

Overview of Asian American identities, families/communities. Racial/ethnic identity formation, immigration, intergenerational relationships, dating/family formation, transnational adoption, popular culture, educational/work experiences, ethnic enclaves/activism.

SOC 3505. Transnational Migration: Networks of People and Places. (3.0 cr.; A-F only; [GLOS 3705]; prereq Soc majors/minors must register A-F; fall, spring, even years)

How migration affects sending/receiving societies. How transnationalisms or cross-border social/economic relations of individuals/households is maintained/perpetuated. Current debates on transnationalism at this stage of globalization.

SOC 3511. World Population Problems. (3.0 cr.; [SOC 3511H]; prereq Soc majors/minors must register A-F; credit will not be granted if credit has been received for 3511H; fall, every year)

Population growth, natural resources, fertility/mortality in less developed nations, population dynamics/forecasts, policies to reduce fertility.

SOC 3511H. Honors: World Population Problems. (3.0 cr.; A-F only; [SOC 3511]; prereq Credit will not be granted if credit has been received for 3511; fall, every year)

Population growth, natural resources, fertility/mortality in less developed nations, population dynamics/forecasts, policies to reduce fertility.

SOC 3613V. Honors: Stuffed and Starved: The Politics of Eating. (3.0 cr.; A-F only; [GLOS 3613W, SOC 3613W, GLOS 3613V]; fall, every year)

Food issues from sociological perspective. Cross-cultural differences in how groups/societies think about/relate to food.

SOC 3613W. Stuffed and Starved: The Politics of Eating. (3.0 cr.; A-F only; [GLOS 3613W, SOC 3613V, GLOS 3613V]; prereq Soc majors/minors must register A-F; fall, every year)

Food issues from a sociological perspective. Cross-cultural differences in how groups/societies think about and relate to food.

SOC 3681. Gender and the Family in the Islamic World. (3.0 cr.; A-F only; [GLOS 3681, RELS 3716, GWSS 3681]; prereq At least soph; 1001 recommended; spring, offered periodically)

Experiences of Muslim women/families from historical/comparative perspective. Gender/family power relations in colonial representations, sexual politics, family, education/health, paid work, human rights, and Islamic feminism.

SOC 3701. Social Theory. (4.0 cr.; A-F or Audit; prereq 1001 recommended; soc majors/minors must register A-F; fall, spring, summer, every year)

Traditions of social theory that have been basic to sociological knowledge. How they have expanded in contemporary theory. Their applications in selected areas of empirical research.

SOC 3721. Principles of Social Psychology. (3.0 cr.; prereq 1001 recommended; soc majors/minors must register A-F; fall, spring, offered periodically)

Impact of social location on individual attitudes/behaviors. Dynamics of interpersonal relationships and small groups. Processes of social interaction.

SOC 3801. Sociological Research Methods. (4.0 cr.; prereq 1001 recommended; soc majors must register A-F; fall, spring, summer, every year)

Principles/practice of research design, sampling, data collection including field observation/surveys. Data management/analysis, reporting of quantitative/nonquantitative data. Ethics/administration in sociological research. Lab.

SOC 3811. Basic Social Statistics. (4.0 cr.; [SOC 5811]; prereq 1001 recommended, Undergraduates with strong math background who have completed Soc 3801 are encouraged to register for 5811 in lieu of 3811. Currently, 5811 only offered in fall. Credit will not be granted if credit has been received for 5811. Soc majors/minors must register A-F; fall, spring, summer, every year)

Descriptive statistics. Measures of central tendency, deviation, association. Inferential statistics focusing on probability/hypothesis testing. T-tests, Chi-square tests, variance analysis, bivariate regression. Statistical software used to analyze sociological data.

SOC 4090. Topics in Sociology. (3.0 cr. [max 6.0 cr.]; prereq Soph or above or #; 1001 recommended; soc majors/minors must register A-F; credit will not be granted if cr has been received for the same topics title; fall, spring, offered periodically)

Topics specified in Class Schedule.

SOC 4090W. Topics in Sociology. (3.0 cr. [max 6.0 cr.]; prereq Soc majors and minors must register A-F; credit not granted if credit has been received for the same topics title.; fall, spring, offered periodically)

Topics specified in Class Schedule.

SOC 4093. Directed Study. (1.0-4.0 cr. [max 12.0 cr.]; fall, spring, summer, every year)

Guided individual reading or study at junior or senior level. Prereq instr consent, dept consent, college consent; soc majors/minors must register A-F.

SOC 4094W. Directed Research: Senior Project. (4.0 cr.; A-F or Audit; prereq Soc majors/minors must register A-F; fall, spring, summer, every year)
Guided research experience at junior/senior level.

**Soc 4101v. Honors: Sociology of Law.** (3.0 cr.; A-F or Audit; =[SOC 4101V]; prereq [1001, 3101, 3102] or 3701 recommended, soc majors/minors must register A-F; fall, spring, every year)

Sociological analysis of law/society. Why people obey law. Social forces involved in creating law (civil/criminal). Procedures of enforcement. Impact of law on social change. Honors students expected to demonstrate greater depth of discussion, presentations, leadership of students.

**Soc 4101W. Sociology of Law.** (3.0 cr.; A-F or Audit; =[SOC 4101W]; prereq [1001, 3101, 3102] or 3701 recommended, soc majors/minors must register A-F; fall, spring, every year)


**Soc 4102. Criminology.** (3.0 cr.; A-F or Audit; =SOC 4102H, SOC 4103; prereq [3101 or 3102 or #], soc majors/minors must register A-F; spring, every year)


**Soc 4102H. Honors: Criminology.** (3.0 cr.; A-F only; =SOC 4102, SOC 4103; prereq Honors student, [3101 or 3102 or #], soc majors/minors must register A-F; spring, every year)


**Soc 4104. Crime and Human Rights.** (3.0 cr.; =SOC 4104H, GLOS 4104, GLOS 4104H; prereq 1001, at least one 3xxx SOC or GLOS course recommended, soc majors/minors must register A-F; fall, spring, offered periodically)


**Soc 4104H. Honors: Crime & Human Rights.** (3.0 cr.; A-F only; =GLOS 4104, GLOS 4104H, SOC 4104; prereq 1001, at least one 3xxx SOC or GLOS course recommended; fall, spring, offered periodically)


**Soc 4105. Sociology of Punishment and Corrections.** (3.0 cr.; A-F or Audit; prereq 3101 or 3102 or 3111 or #; soc majors/minors must register A-F; spring, offered periodically)

Correctional strategies such as prison, probation, and parole. Theories/structures of diversion, probation, parole, and other community corrections programs. U.S. penal policies/practices compared with those in other countries.

**Soc 4108. Current Issues in Crime Control.** (3.0 cr.; prereq Soc majors/minors must register A-F; spring, summer, offered periodically)

Selected current criminal justice policies from perspectives of courts, legislature, community, and interest groups. Impact of criminal justice policy changes on society and on social control agencies.

**Soc 4109. Domestic Criminal Violence.** (3.0 cr.; prereq 3101 or 3102 or 3111 or #; soc majors/minors must register A-F; fall, spring, offered periodically)


**Soc 4111. Deviant Behavior.** (3.0 cr.; A-F or Audit; prereq [3101 or 3102 or 3111 or #; soc majors/minors must register A-F; fall, offered periodically)

Definition/nature of deviant behavior. Social processes associated with deviant careers and social reintegration. Relationship of deviant behavior to social control.

**Soc 4125. Policing America.** (3.0 cr.; A-F or Audit; prereq [3101 or 3102 recommended or #], soc majors/minors must register A-F; fall, spring, offered periodically)

Forms, dynamics, philosophical underpinnings of policing/surveillance agencies (formal/informal). Legal limitations, police culture, community relations, aims of policing, state power.

**Soc 4135. Sociology of White-Collar Crime.** (3.0 cr.; prereq 3101 or 3102 or 3111 or #; soc majors/minors must register A-F; spring, offered periodically)

Causes/consequences of white-collar crime. Control issues, including public perception, legislation, criminal law responses (enforcement, sentencing, punishment), and alternative control mechanisms.

**Soc 4141. Juvenile Delinquency.** (3.0 cr.; A-F or Audit; =SOC 4141H; prereq [3101 or 3102 or 3111 or #], soc majors/minors must register A-F; fall, offered periodically)

Applying theories to relationships within family, school, peer group. Institutional responses to delinquency. Evaluating programs for treatment, prevention, control.

**Soc 4141H. Honors: Juvenile Delinquency.** (3.0 cr.; A-F only; =SOC 4141; prereq honors student, [3101 or 3102 or #], soc majors/minors must register A-F; fall, offered periodically)


**Soc 4142. Juvenile Law.** (3.0 cr.; prereq [3101 or 3102 or 3111 or #]; soc majors/minors must register A-F; fall, every year)

Evolution of juvenile court. Organizational relationships among court, police, and other agencies. Policies regarding serious/status offenders. Intake, diversion, pretrial detention, waiver to adult court, sentencing. Conflicts over due process/treatment. Movements to abolish juvenile justice system.

**Soc 4145. Youth Punishment & Corrections.** (3.0 cr.; fall, spring, odd years)

Development/ transformation of juvenile justice systems/related institutions. Racial/gender disparities in treatment, transfer of young people from juvenile to criminal court. Incarceration of juvenile offenders in adult prisons, collateral sanctions, crime desistance, re-entry.

**Soc 4149. Killing.** (3.0 cr.; prereq jr or sr or grad student or instr consent; soc majors/minors must register A-F; fall, every year)

Purposes of criminal law and of principles of criminal liability, justification, and excuse. Applications to law of criminal homicide, sexual assault, drugs, and crimes against property, public order, and morals.

**Soc 4161. Criminal Law in American Society.** (3.0 cr.; prereq 3101 or 3102 or 3111 or #; soc majors/minors must register A-F; fall, every year)

How constitutional democracy balances need to enforce criminal law and rights of individuals to be free of unnecessary government intrusion.

**Soc 4170. Sociology of International Law.** (3.0 cr.; A-F or Audit; =GLOS 4406; prereq 1001 or 3101 or 3102 or 3111 or #; soc majors/minors must register A-F; spring, offered periodically)

Cultural values/practices in a globalized world. Role of international law. Immigration, terrorism, Americanization, structure of international legal system.

**Soc 4190. Topics in Sociology With Law, Criminology, and Deviance Emphasis.** (3.0 cr. [max 8.0 cr.]; prereq [1001, 3101 or 3102] recommended; soc majors/minors must register A-F; cr will not be granted if cr has been received for the same topics title; fall, spring, summer, offered periodically)

Topics specified in Class Schedule.

**Soc 4246. Sociology of Health and Illness.** (3.0 cr.; A-F or Audit; prereq One sociology course or #; soc majors/minors must register A-F; spring, offered periodically)

Context of social, political, economic, and cultural forces and medical knowledge. Social
SOC 4305. Environment & Society: An Enduring Conflict. (3.0 cr.; A-F or Audit; =GLOS 4305); prereq 1001 or environmental course recommended; [soc majors/minors must register A-F; fall, every year]

SOC 4309. Religion in American Public Life: Culture, Politics, & Communities. (3.0 cr.; =SOC 4309H, RELS 4309); prereq Soc majors/minors must register A-F; spring, every year)
How diversity/vitality of American religion shape public life. How religious groups engage in political action, foster understandings of democracy/styles of civic participation. Volunteering/service activities. Race, poverty, the family, sexuality.

SOC 4309H. Honors: Religion in American Public Life - Culture, Politics, & Communities. (3.0 cr.; A-F only; =RELGS 4309; Soc majors/minors must register A-F; spring, every year)
How diversity/vitality of American religion shape public life. How religious groups engage in political action, foster understandings of democracy/styles of civic participation. Volunteering/service activities. Race, poverty, the family, sexuality.

SOC 4311. Power, Justice & the Environment. (3.0 cr.; A-F only; =GLOS 4311); prereq Soc 1001 recommended; spring, every year)
Global debates over nature is produced, consumed, degraded, sustained, and defended. Analytics of race/class. Politics of North-South relations.

SOC 4321. Globalize This! Understanding Globalization through Sociology. (3.0 cr.; A-F or Audit; =GLOS 4221); prereq Soc majors/minors must register A-F; fall, every year)

SOC 4411. Terrorist Networks and Counterterror Organizations. (3.0 cr.; A-F or Audit; =SOC 4411H); prereq 1001 recommended; fall, spring, offered periodically)
Theories/evidence about origins, development, and consequences of terrorist networks. Efforts to prevent, investigate, and punish terrorists by use of law enforcement, security, and military forces.

SOC 4411H. Honors: Terrorist Networks and Counterterror Organizations. (3.0 cr.; A-F only; =SOC 4411); prereq 1001 recommended; fall, spring, offered periodically)
Theories/evidence about origins, development, and consequences of terrorist networks. Efforts to prevent, investigate, and punish terrorists by use of law enforcement, security, and military forces.

SOC 4451. Sport and Society. (3.0 cr.; =SOC 4451H); prereq 1001 recommended, soc majors/minors must register A-F; spring, offered periodically)
How sport is socially organized, what role(s) it plays in society, and what sporting practices tell us about contemporary social life in general.

SOC 4451H. Honors: Sport and Society. (3.0 cr.; A-F only; =SOC 4451); prereq 1001 recommended, soc majors/minors must register A-F; spring, offered periodically)
How sport is socially organized, what role(s) it plays in society, and what sporting practices tell us about contemporary social life in general. Honors students expected to demonstrate greater depth of discussion, presentations, leadership of students.

SOC 4461. Sociology of Ethnic and Racial Conflict. (3.0 cr.; prereq 1001 recommended; soc majors/minors must register A-F; fall, odd years)

SOC 4511. Coming of Age in a Changing World. (3.0 cr.; prereq [1001 or #]; soc majors/minors must register A-F; fall, offered periodically)

SOC 4521. Love, Sex, & Marriage. (3.0 cr.; =SOC 4521H); prereq [1001 or #]; soc majors/minors must register A-F; fall, offered periodically)

SOC 4521H. Honors: Love, Sex, & Marriage. (3.0 cr.; A-F only; =SOC 4521); prereq Honors Student, [1001 or #]; soc majors/minors must register A-F; fall, offered periodically)

SOC 4551. Sociology of Sexualities. (3.0 cr.; =SOC 4551H); prereq Soc majors/minors must register A-F; spring, every year)
Sexual attitudes, behaviors, identities. Taken-for-granted beliefs about naturalness of sexual phenomena. How social forces shape sexual lives. Diversity of thought, behavior, lived experience with regard to sexuality.

SOC 4551H. Honors: Sociology of Sexualities. (3.0 cr.; A-F only; =SOC 4551); prereq Soc majors/minors must register A-F; spring, every year)
Sexual attitudes, behaviors, identities. Taken-for-granted beliefs about naturalness of sexual phenomena. How social forces shape sexual lives. Diversity of thought, behavior, lived experience with regard to sexuality. Honors students expected to demonstrate greater depth of discussion.

SOC 4703. Contemporary American Culture. (3.0 cr.; prereq 1001 or #; soc majors/minors must register A-F; spring, odd years)
Key changes in cultural life in the United States and internationally. Theories that have been developed to understand them. Topics may include work, family, social movements, media and popular culture, and politics.

SOC 4966W. Major-Project Seminar. (4.0 cr.; A-F or Audit; prereq 3701, 3801, 3811, 12 cr upper div sociology, %; fall, spring, summer, every year)

SOC 4967W. Advanced Senior Project Independent Study. (1.0 cr.; A-F or Audit; prereq 3701, 3801, 3811, 12 additional upper div sociology cr; %; fall, spring, every year)
Guided individual research for the sociology major's senior project requirement, conducted in conjunction with enrollment in an upper-division sociology course.

SOC 4977V. Senior Honors Proseminar I. (3.0 cr.; A-F or Audit; prereq 3701, 3801, 3811, 9 additional upper div sociology cr, sr soc honors major, %; fall, every year)

SOC 4977V. Senior Honors Proseminar II. (3.0 cr.; A-F or Audit; prereq [4977V or #], 3701, 3801, 3811, at least 9 additional upper div soc cr, sr soc honors major, %; spring, every year)
Developing the methodology of senior project, researching it, and writing the thesis. Students work individually or in small groups in consultation with seminar director and other faculty. Group discussion of individual projects.

SOC 5090. Topics in Sociology. (1.0-3.0 cr.; max 9.0 cr.;) prereq Undergrad soc majors/minors must register A-F; spring, offered periodically)
Topics specified in Class Schedule.

SOC 5455. Sociology of Education. (3.0 cr.; =OLPD 5041); prereq 1001 or equiv or #; soc majors/minors must register A-F; spring, offered periodically)
Structures/processes within educational institutions. Links between educational organizations and their social contexts, particularly as these relate to educational change.

SOC 5511. World Population Problems. (3.0 cr.; =[PA 5501]; prereq Soc majors/minors must register A-F, credit will not be granted
if credit has been received for PA 5301; fall, every year)
Population growth, natural resources, fertility/ mortality in less developed nations, population dynamics/forecasts, policies to reduce fertility.

SOC 5811. Intermediate Social Statistics. (4.0 cr.; =SOC 3611; prereq Primarily for 1st-yr soc grad students, [undergraduates with strong math background who have completed 3801 are encouraged to register for 5811 in lieu of 3811 or #]; soc majors/minors must register A-F; fall, every year)
Measurement, theory of probability, bivariate statistics. Multiple regression analyses of sociological data.

Software Engineering (SENG)
Institute of Technology

SENG 5115. Graphical User Interface Design, Evaluation, and Implementation. (3.0 cr.; A-F or Audit; prereq Grad SEng major; fall, spring, every year)
Design and evaluation of interactive application interfaces, user- and task-centered approaches to design, guidelines for graphical design, interface evaluation techniques, current interface trends, including web interfaces and information visualization. Group projects that include designing, prototyping, and implementing an application interface.

SENG 5116. Graphical User Interface Toolkits. (2.0-3.0 cr.; A-F or Audit; prereq Grad SEng major; )
Toolkit-centered introduction to GUI implementation technology. Students learn to use a GUI toolkit to implement a graphical application. Introduction to advanced techniques, including constraint-based data management, 3D visualization tools, and toolkit structure and design.

SENG 5131. Distributed Application Design and Development. (3.0 cr.; A-F or Audit; prereq Grad SEng major; spring, every year)
Java programming, concurrent programming, workflow, distributed database, security, collaborative computing, object-oriented architecture/design, network publishing, messaging architecture, distributed object computing, and intranet.

SENG 5199. Topics in Software Engineering. (2.0-3.0 cr. [max 6.0 cr.]; A-F or Audit; prereq SEng grad student; spring, every year)
Topics specified in Class Schedule.

SENG 5511. Artificial Intelligence. (2.0-3.0 cr.; A-F or Audit; prereq Grad SEng major; spring, offered periodically)

SENG 5551. Introduction to Intelligent Robotic Systems. (3.0 cr.; A-F or Audit; prereq Grad SEng major; )
Transformations, kinematics and inverse kinematics, dynamics, and control. Sensing (robot vision, force control, tactile sensing), applications of sensor-based robot control, robot programming, mobile robotics, and micro-robots.

SENG 5707. The Principles of Database Systems. (3.0 cr.; A-F or Audit; prereq Grad SEng major; fall, every year)
Fundamental concepts; representing instances; prototypic model shapes; model evolution; interviewing user skills, reverse engineering; mapping to DBMS schema; database querying.

SENG 5708. Data Analysisics. (2.0-3.0 cr.; A-F or Audit; prereq Grad SEng major; spring, every year)

SENG 5801. Software Engineering I: Overview, Requirements, and Modeling. (3.0 cr.; A-F or Audit; prereq Grad SEng major; fall, every year)
Software engineering as a discipline. Preview of topics to be covered in subsequent courses in master of science in software engineering program; in-depth study of requirements engineering; modeling techniques applicable to requirements and specification, including UML and formal modeling.

SENG 5802. Software Engineering II: Software Design. (3.0 cr.; A-F or Audit; prereq Grad SEng major; spring, every year)
Software design quality, processes that produce quality design, graphical and textual representations, including UML, common problems and patterns that solve them, refactoring. Students develop fluency in object-oriented design, and ability to read, critique, and advocate design ideas. Students work in teams to complete a multiphase project.

SENG 5811. Software Testing and Verification. (2.0 cr.; A-F or Audit; prereq 5801, grad SEng major; spring, every year)
Theoretical/practical aspects of testing software. Analyzing a requirements document for test conditions. Writing a test plan. Designing, creating, and executing test cases. Recording defects. Writing a test report.

SENG 5831. Software Development for Real-Time Systems. (2.0-3.0 cr.; A-F or Audit; prereq Grad SEng major; )
Analysis, design, verification, and validation of real-time systems. Periodic, aperiodic, and sporadic processes, scheduling theory. Pragmatic issues.

SENG 5841. Model-based Development. (3.0 cr.; A-F or Audit; prereq Grad SEng major; spring, every year)
Formal specification of software artifacts. Applicability of formal specifications. Methods such as Z, SCR, and Statecharts. Formal analysis. Theorem proving. Reachability analysis. Model checking. Tools such as PVS, Statemate, SPIN, and SMV.

SENG 5851. Software Project Management. (3.0 cr.; A-F or Audit; prereq Grad SEng major; fall, spring, every year)
Concepts used to manage software projects. Project management cycle: initiation, planning/ control, status reporting, review, post-project analysis. Leadership and motivation strategies. Lecture, discussion, individual/team presentations/projects.

SENG 5852. Quality Assurance and Process Improvement. (3.0 cr.; A-F or Audit; prereq Grad SEng major; fall, spring, every year)
Theory and application of capability maturity model: process assessment, modeling, and improvement techniques. Life cycle issues related to development and maintenance; quality, safety, and security assurance; process management; and automated support environments. Group projects and case studies.

SENG 5861. Introduction to Software Architecture. (3.0 cr.; A-F or Audit; prereq 2nd year, MSSE grad student; )
Software/systems architecture. Representation/design, how they fit into software engineering process. Description of architectures, including representation and quality attributes.

SENG 5899. Software Engineering Seminar. (1.0 cr. [max 2.0 cr.]; prereq Grad SEng major; ; fall, every year)
Software engineering trends. Talks by invited speakers, selected readings.

SENG 5900. Directed Study. (1.0-3.0 cr.; fall, spring, every year)
Directed study/research in software engineering. Topics/scope decided in collaboration with instructor.

Soil, Water, and Climate (SOIL)
College of Food, Agricultural and Natural Resource Sciences

SOIL 1125. The Soil Resource. (4.0 cr.; =SOIL 5125, SOIL 2125); fall, spring, every year)
Basic physical, chemical, and biological properties of soil. Soil genesis classification and principles of soil fertility. Soil survey information (WEB Soil Survey) used to make a land-use plan. WWW used for lab.

SOIL 2125. Basic Soil Science. (4.0 cr.; A-F orAudit; =SOIL 5125, SOIL 1125); prereq [CHEM 1015, CHEM 1017] or CHEM 1021 or equiv; fall, spring, every year)
Basic physical, chemical, and biological properties of soil. Soil genesis classification, principles of soil fertility. Use of soil survey information to make a land-use plan. WWW used for lab preparation information.

SOIL 2601. The Social Life of Soil. (3.0 cr.; A-F only; fall, every year)
Plants. Microorganisms that plague/protect them. Online only but requires interaction/collegiate learning.

SOIL 3416. Plant Nutrients in the Environment. (3.0 cr.; prereq 2125; fall, spring, every year)

**SOIL 3521. Soil Judging.** (1.0 cr. [max 3.0 cr.]; A-F or Audit; prereq 4511; fall, every year) Learn about collegiate soil judging by participating in a regional or national soil judging contest.

**SOIL 4093. Directed Study.** (1.0-7.0 cr. [max 20.0 cr.]; prereq #; fall, spring, summer, every year) Research, readings, and instruction.

**SOIL 4094. Directed Research.** (1.0-7.0 cr. ; prereq #; fall, spring, summer, every year) Research under the direction of department faculty.

**SOIL 4111. Introduction to Precision Agriculture.** (3.0 cr.; A-F or Audit; prereq Basic sciences, statistics, soil, agronomy; spring, every year) Soil, landscape, and crop spatial variability. GIS, DEM, GPS technologies. Variable rate machinery, PA software, remote sensing. Geostatistics, sampling, experimental designs. Precision integrated crop management. Data acquisition, processing, and management. Socio-economic and e-marketing aspects.

**SOIL 4505. Soil Geography: Soil Variability on Planet Earth.** (2.0 cr.; prereq 1125 or 2125 or equiv; spring, every year) Distribution/formation of soils on earth's surface. Soil variability/taxonomy. How various soils interact with water, plants, microorganisms, and pollutants. Use/management of land via appreciation of earth's varied soil resources.

**SOIL 4511. Field Study of Soils.** (2.0 cr.; A-F or Audit; prereq 2125; fall, spring, summer, every year) Learn to write soil profile descriptions in the field. Class requires hands-on experience to determine soil texture, color, and horizon designations in the field.

**SOIL 5111. Practicum Internship in Precision Agriculture.** (2.0-5.0 cr.; S-N or Audit; fall, spring, every year) Practical experience in precision agriculture in agri-industry/business. Content and extent of work at the internship site is jointly decided by the instructor, host business representative, and student's principal adviser.

**SOIL 5125. Soil Science for Teachers.** (3.0 cr.; [SOIL 1125, SOIL 2125]; fall, spring, every year) Basic physical, chemical, and biological properties of soil. Soil genesis classification and principles of soil fertility. WWW used for lab. Soil survey information used to make a land-use plan. Similar to 2125 with less emphasis on chemistry.

**SOIL 5232. Vadose Zone Hydrology.** (3.0 cr.; prereq [Math 1271 or equiv], [Phys 1042 or equiv]; fall, every year) Basic soil physical properties/ processes governing transport of mass/energy in soils. Emphasizes water/solute transport through unsaturated root/vadose zones, their impact on subsurface hydrology and on water quality. Lectures, hands-on laboratory exercises, discussion of real world problems, problem solving.

**SOIL 5555. Wetland Soils.** (3.0 cr.; A-F or Audit; [ESPM 5555]; prereq 1125 or 2125 or equiv or #; & 4511 recommended; fall, every year) Morphology, chemistry, hydrology, formation of mineral/organic soils in wet environments. Soil morphological indicators of wet conditions, field techniques of identifying hydric soils for wetland delineations. Peatlands. Wetland benefits, preservation, regulation, mitigation. Field trips, lab, field hydric soil delineation project.

**SOIL 5611. Soil Biology and Fertility.** (3.0 cr.; prereq 2125, Biol 1009 or equiv, Chem 1021 or equiv, sr or grad; BioC 3xxx, Micb 3xxx recommended; fall, offered periodically) Soil microbial populations and biodiversity. Soil microorganisms. Biogeochemical cycles. Macro and micronutrient fertilization, and element function in plants and microbes. Composts, sludge and manures in fertilization. Plant microbe associations: nitrogen fixation, mycorrhizal fungi, and biological control of root pathogens. Pollution and bioremediation.

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**Somali (SMLI)**

**SMLI 1221. Beginning Somali.** (5.0 cr.; A-F or Audit; fall, spring, summer, every year) Comprehension, speaking, reading, writing.

**SMLI 1222. Beginning Somali II.** (5.0 cr.; A-F only; prereq 2211; fall, spring, summer, every year) Comprehension, speaking, reading, writing.

**SMLI 2225. Accelerated Beginning Somali I.** (5.0 cr.; A-F only; prereq Ability in basic spoken Somali; fall, spring, every year) Review of grammar/usages, practice in reading/writing. Introduction to Somali literature and formal writing. Topics in Somali culture.

**SMLI 2226. Accelerated Beginning Somali II.** (5.0 cr.; A-F only; prereq 1225 or #; fall, spring, every year) Review of grammar/usages, practice in reading/writing. Introduction to Somali literature and formal writing. Topics in Somali culture.

**SMLI 3227. Intermediate Somali I.** (5.0 cr.; A-F only; prereq Beginning Somali I, II or #; fall, spring, every year) Intermediate level Somali language for undergraduate students.

**SMLI 3228. Intermediate Somali II.** (5.0 cr.; prereq 3227; fall, spring, every year) Intermediate Somali language for undergraduate students.

**SMLI 4227. Intermediate Somali I.** (2.0 cr.; A-F only; fall, every year) Intermediate Somali language course for graduate students. Prereq Grad student or instr consent.

**SMLI 4228. Intermediate Somali II.** (2.0 cr.; A-F only; spring, every year) Intermediate Somali II for graduate students.

**Spanish (SPAN)**

**SPAN 144. Intermediate Medical Spanish.** (0.0 cr.; S-N or Audit; prereq [1st yr college-level Spanish or equiv]; %; fall, every year) Vocabulary of Spanish medical terms, skills in report writing, proper format for medical communications. Developing conversational fluency for medical-related topics.

**SPAN 221. Reading Spanish.** (0.0 cr.; S-N or Audit; spring, odd years) Intensive reading of a variety of texts to provide a basic reading knowledge of Spanish. At the end of the semester students may take the equivalent of the Spanish Graduate Reading Examination.

**SPAN 344. Advanced Medical Spanish.** (0.0 cr.; S-N or Audit; prereq Span 1044, 2 yrs. Spanish College Level or equiv, %; spring, every year) 0 cr. course designed to further develop and strengthen the language skills and cultural awareness students have been exposed to and acquired in Intern Med Span 1044, a course designed to help care professionals communicate with patients who speak Spanish.

**SPAN 1001. Beginning Spanish.** (5.0 cr.; prereq Less than 2 yrs of high school Spanish, %, no college-level Spanish; fall, spring, summer, every year) Listening, speaking, reading, writing. Emphasizes development of communicative competence. Cultural readings.

**SPAN 1002. Beginning Spanish.** (5.0 cr.; [SPAN 4022]; prereq 1001 completed at UMNTC, %; fall, spring, summer, every year) Listening, speaking, reading, writing. Emphasizes development of communicative competence. Cultural readings.

**SPAN 1003. Intermediate Spanish.** (5.0 cr.; [MADR 1003]; prereq [1002 or 1022] or EPT placement; fall, spring, summer, every year) Speaking/comprehension. Developing reading/writing skills based on materials from Spain/Spanish America. Grammar review. Compositions, oral presentations.

**SPAN 1004. Intermediate Spanish.** (5.0 cr.; [SPAN 1044, SPAN 1014, SPAN 4014]; prereq 1003 or EPT placement; fall, spring, summer, every year) Speaking/comprehension. Developing reading/writing skills based on materials from Spain/Spanish America. Grammar review. Compositions, oral presentations.

**SPAN 1014. Business Spanish.** (5.0 cr.; [SPAN 1004, SPAN 1044, SPAN 4014]; prereq 1003; fall, spring, summer, every year) Vocabulary, report writing skills. Proper format for business communications. Conversational fluency on trade-related topics.

**SPAN 1022. Alternate Second-Semester Spanish.** (5.0 cr.; [SPAN 4002]; prereq Placement above 1001; fall, spring, every year)
For students who have studied Spanish in high school or at community college, or who are transfer students. Begins with accelerated review of 1001 followed by material covered in 1002.

SPAN 1044. Advanced Medical Spanish. (4.0 cr.; prereq [[1004 or 1014 or 1044 or equiv.], Span LPE] or #, spring, every year) How to communicate more effectively in linguistic/cultural terms with Spanish speaking patients. Advanced/specific medical vocabulary, communication strategies, and related cultural aspects. Conducting patient interviews/medical history. Using vocabulary/conversation to conduct physical exams. Latin American views on health/health care.

SPAN 3104W. Introduction to the Study of Hispanic Literatures. (3.0 cr.; A-F only; =[[TLDO 3023]; prereq 3015, Spanish [major or minor] or Span-Port major; fall, spring, summer, every year) Cultural issues pertaining to Spain or Spanish America.

SPAN 3105W. Introduction to the Study of Hispanic Cultures. (3.0 cr.; =[[TLDO 3105W]; prereq 3015, Spanish [major or minor] or Span-Port; fall, spring, summer, every year) Structure of Spanish. Phonetics, phonology, morphology, syntax, pragmatics, language acquisition, language/gender, sociolinguistics. History of Spanish.

SPAN 3211. Discourses of Imperial Spain, 1492-1800. (3.0 cr.; =[[TLDO 3211]; prereq 3015, [3104W or TLDO 3104 or VENZ 3104 or #]; fall, every year) Novels, places, poems, aphorisms, emblems, letters, and political treatises. Questions of ethnicity, gender, class, colonization, early mass culture, and subjectivity.

SPAN 3212. Discourses of Modern and Contemporary Spain, 1800-Present. (3.0 cr.; prereq 3015, [3104W or TLDO 3104 or VENZ 3104 or #]; spring, every year) Wide variety of texts. Questions of gender, class, subjectivity, representation, art, and politics.

SPAN 3221. Latin American Colonial Discourses: Empire and Early Modernity. (3.0 cr.; prereq 3015, [3104W or TLDO 3104 or VENZ 3104 or #]; fall, every year) Conquest, colonization, and forms of resistance in Latin America.

SPAN 3222. Discourses of Modern and Contemporary Latin America. (3.0 cr.; =[[TLDO 3222]; prereq 3015, [3104W or TLDO 3104 or VENZ 3104 or #]; spring, every year) Late modern and contemporary discourses in literature, popular culture, mass media, and film.

SPAN 3300H. Honors Seminar in Spanish and Portuguese Studies. (3.0 cr.; A-F only; prereq honors student, 3015, [3104W or 3105W or TLDO 3104 or TLDO 3105 or VENZ 3104 or VENZ 3105 or #]; fall, every year) Topics related to cultural studies, literature, linguistics in Iberian/Latin American milieus. Taught in Spanish. May be cross-listed with another department.


SPAN 3404. Medical Spanish and Community Health Service. (3.0 cr.; prereq 3015 with grade of at least B- or [1044, high pass on at least three sections of LPE]; fall, spring, summer, every year) Creating materials for effective communication with and education of Spanish-speaking patients. Students engage in service learning with community health care partners that serve the Chicoano/Latino population.

SPAN 3501. Roots of Modern Spain and Latin America. (3.0 cr.; =[[SPAN 3501H]; prereq 3015, [3105W or TLDO 3105 or VENZ 3105 or #]; fall, every year) Historical/cultural events leading to nation building in early modern Spain and Spanish speaking America.

SPAN 3502. Modern Spain. (3.0 cr.; prereq 3015, [3105W or TLDO 3105 or VENZ 3105 or #]; spring, every year) Spanish culture, from beginning of 19th century to present. Cultural change and its conflicts as represented in Spanish art, literature, film, and diverse political developments.

SPAN 3503. Pre-modern Spanish Culture and Literature. (3.0 cr.; prereq 3105W; fall, odd years) Notions of nation, empire, and race precipitated by presence of Muslims, Jews, and Christians in Iberia in 12th/13th centuries. Toledo as center of translation, technology, innovation, design, and philosophical inquiry for all of Europe. How Iberian literary works differed from those produced in the rest of Western Europe. Readings from Saint Isidore, Ibn Hazm, Averroes (Ibn Rushd), and Maimonides.

SPAN 3510. Issues in Hispanic Cultures. (3.0 cr.; =max 9.0 cr.; A-F or Audit; prereq 3015, [3105W or TLDO 3105 or VENZ 3105 or #]; fall, spring, summer, every year) Analysis of practices that have shaped cultural identity of Spanish or Portuguese-speaking areas. Topics vary.

SPAN 3512. Modern Latin America. (3.0 cr.; A-F or Audit; prereq 3015, [3105W or TLDO 3105 or VENZ 3105 or #]; fall, summer, every year) Impact of various forms of modernization on cultural production in Latin American racial, ethnic, class relations, institutional, and ideological structures.

SPAN 3603. Jews and Muslims in Medieval Iberia. (3.0 cr.; =[[RELS 3719, JWST 3603]; spring, every years)


SPAN 3612. Don Quijote and the Novel. (3.0 cr.; spring, odd years) How Cervantes’ text enters in dialogue with prevalent novelistic and social discourses of Spain’s Renaissance and Baroque periods (sixteenth/seventeenth century). How novel has managed to interest succeeding generations of readers. Taught in English.

SPAN 3653. Contemporary Latin and Latin American Drama Written in English. (3.0 cr.; prereq SPAN 1001 or equiv; spring, every year) Contextual, theoretical, and thematic contributions and formal dimensions of U.S. Latino theater. Issues of gender, identity, class, and cultural politics. Taught in English.

SPAN 3699. Study of Advanced Spanish Language Abroad. (1.0-5.0 cr.; prereq Two yrs college-level Spanish; %; fall, spring, every year) Study of advanced Spanish language in a Spanish-speaking country.

SPAN 3701. Structure of Spanish: Phonology and Phonetics. (3.0 cr.; =[SPAN 3701H]; prereq 3015, [3107W or TLDO 3107 or VENZ 3107 or VENZ 3107 or #]; fall, spring, offered periodically) Analysis of phonetics/phonology of modern Spanish. Regional/social variants of the language in Spain and Spanish America. Emphasizes improving Spanish pronunciation.

SPAN 3702. Structure of Spanish: Morphology and Syntax. (3.0 cr.; =[SPAN 3702H]; prereq 3015, [3107W or TLDO 3107 or VENZ 3107 or VENZ 3107 or #]; fall, spring, offered periodically) Using linguistic concepts such as morpheme, flexional affix, noun phrase, subject, subordination, and coordination to identify different morphological/syntactic components of Spanish.

SPAN 3703. Origins and History of Spanish and Portuguese. (3.0 cr.; prereq 3015, [3107W or TLDO 3107 or VENZ 3107 or #]; fall, spring, every year) Development of Spanish from its Latin roots. Phonetic, morphological, syntactic, and sociolinguistic aspects of language variations over time.

SPAN 3704. Sociolinguistics of the Spanish-Speaking World. (3.0 cr.; =[SPAN 3704H]; prereq 3015, [3107W or TLDO 3107 or VENZ 3107 or #]; spring, every year) Spanish dialects. Spanish in contact with other languages. Bilingualism, language attitudes. Pragmatic analysis of Spanish. Impact of recent cultural, political, and socioeconomic transformations on language.

SPAN 3706. Spanish Applied Linguistics. (3.0 cr.; prereq 3015, [3107W or TLDO 3107 or VENZ 3107 or #]; spring, every year) Introduction to second language acquisition processes as they relate to fundamental analysis of linguistic concepts of Spanish. Features that present difficulties for English speakers. Sociolinguistic aspects of language learning. Application to Spanish language teaching.

SPAN 3707. Linguistic Accuracy Through Translation. (3.0 cr.; A-F only; prereq 3015, [3104W or 3105W or 3107W or TLDO 3104 or TLDO 3105 or TLDO 3107 or VENZ 3104 or VENZ 3107 or VENZ 3512 or #]; spring, every year) Analysis of style/audience/lexicon of various texts in Spanish (popular press, business, academic) examined as framework for training to communicate with accuracy in different contexts. Students apply lexical/grammatical choices in translating texts.

SPAN 3730. Topics in Hispanic Linguistics. (3.0 cr. [max 9.0 cr.]; A-F only; prereq 3015, [3107W or TLDO 3107 or VENZ 3107 or VENZ 3107 or #]; fall, spring, summer, every year) Topics specified in Class Schedule.

SPAN 3800. Film Studies in Spanish. (3.0 cr. [max 9.0 cr.]; A-F only; prereq 3015, [3104W or 3105W or 3107W or TLDO 3104 or TLDO 3105 or VENZ 3104 or VENZ 3512 or #]; fall, spring, summer, every year) Films from Spain or Spanish-speaking world in their historical, (geo)political, and socioeconomic contexts. Films analyzed under interdisciplinary frameworks, noting aspects related to cinematography/rhetoric.

SPAN 3972W. Graduation Seminar. (3.0 cr.; A-F or Audit; =[SPAN 3972V]; prereq 31 cr of 3xxx, #; fall, spring, summer, every year) Completion of a research paper on cultural, literary, or artistic issue in Spanish or Portuguese speaking worlds or on topic related to Hispanic linguistics. In-depth research/consultation with instructor.

SPAN 4001. Beginning Spanish. (2.0 cr.; prereq Grad student; fall, spring, every year) Meets concurrently with 1001. See 1001 for course description.

SPAN 4002. Beginning Spanish. (2.0 cr.; =[SPAN 1002]; prereq Grad student; spring, summer, every year) Meets concurrently with 1002. See 1002 for course description.

SPAN 4003. Intermediate Spanish. (2.0 cr.; prereq Grad student; fall, spring, summer, every year) Meets concurrently with 1003. See 1003 for course description.

SPAN 4004. Intermediate Spanish. (2.0 cr.; =[SPAN 1004]; prereq Grad student; fall, spring, summer, every year) Meets concurrently with 1004. See 1004 for course description.

SPAN 4014. Business Spanish. (2.0 cr.; =[SPAN 1004, SPAN 1044, SPAN 1014]; spring, every year) Vocabulary, report writing skills. Proper format for business communications. Conversational fluency on trade-related topics. (Meets concurrently with SPAN 1014.)

SPAN 4022. Alternate Second-Semester Spanish. (2.0 cr.; =[SPAN 1002]; prereq Grad student; fall, spring, summer, every year) Meets concurrently with 1022. See 1022 for course description.

SPAN 5110. Discursive Formations at the Threshold of 20th-Century Spain. (3.0 cr.; prereq Grad student or #; fall, spring, offered periodically) Theory and representative examples of the realist/naturalist novel (Galdós, Paral Blankaz) in the context of its antecedents ("costumbrismo"), opposites (the idealist/sentimental novel), and turn-of-the-century innovations of modernism and the "generation of 1898,"


SPAN 5160. Medieval Iberian Literatures and Cultures. (3.0 cr.; prereq Grad student or #; fall, spring, offered periodically) The major literary genres developed in Spain from the Reconquest to 1502, with reference to the crucial transformations of the Middle Ages, including primitive lyric, epic, clerical narrative, storytelling, debates, collections, chronicles, "exempla," and the Celestina (1499-1502).
SPAN 5180. Don Quixote. (3.0 cr.; prereq Grad student or #; spring, offered periodically) Analysis of Cervantes' 'Don Quixote' in its sociohistorical context; focus on the novel's reception from the romantic period to postmodern times.

SPAN 5190. The Crisis of the Old Regime: Spanish Literature of the Enlightenment and Romanticism. (3.0 cr.; prereq Grad student or #; fall, spring, offered periodically) Major literary works/intellectual movements/conflicts represented in written culture, of 18th/ early 19th centuries (1680-1845), examined as expressions of long crisis of Spain's Old Regime and rise of bourgeois liberalism.

SPAN 5316. Spanish Picaroesque Narratives. (3.0 cr.; prereq Grad student or #; fall, offered periodically) Literary autobiography, residual elements of Erasman humanism, post-Tridentine repression/censorship. Picaro's critique of imperial Spain's system of values/authority. Cultural critics' challenge to rediscover popular texts of early modern period.

SPAN 5531. Hispanic Literature of the United States. (3.0 cr.; prereq Grad student or #; fall, offered periodically) Interdisciplinary approach providing a framework for deconstructing issues of national identity, marginalization, and gender. U.S. Hispanic theatre/literature and its ethnic diversity, regional variations, cultural links, and scope of its genres.


SPAN 5701. History of Ibero-Romance. (3.0 cr.; prereq Grad student or #; spring, offered periodically) Origins and developments of Ibero-Romance languages; evolution of Spanish, Portuguese, and Catalan.

SPAN 5711. The Structure of Modern Spanish: Phonology. (3.0 cr.; prereq Grad student or #; fall, offered periodically) Formulating and evaluating a phonological description of Spanish. Approaches to problems in Spanish phonology within metrical, autosegmental, and lexical phonological theories.

SPAN 5714. Theoretical Foundations of Spanish Syntax. (3.0 cr.; prereq Grad student or #; fall, spring, offered periodically) Linguistic types/processes that appear across languages. Grammatical relations, word order, transitivity, subordination, information structure, grammaticalization. How these are present in syntax of Spanish.

SPAN 5715. The Structure of Modern Spanish: Semantics. (3.0 cr.; prereq Grad student or #; fall, offered periodically) Applying semantic theory to Spanish: conceptual organization and the structuring of experience; meaning and cultural values; semantic fields; categorization and prototypes; cognitive model theory; metaphor, metonymy, and mental imagery as source and change of meaning.


SPAN 5717. Spanish Sociolinguistics. (3.0 cr.; prereq Grad student or #; spring, offered periodically) Sociolinguistic variation, cross-dialectal diversity in different varieties of Spanish in Latin America and Spain. Impact of recent cultural, political, and socioeconomic transformations on language.

SPAN 5718. Spanish Language Contact. (3.0 cr.; prereq Grad student or #; fall, spring, offered periodically) Analysis of different types/results of Spanish language contact globally, taking into account varying social conditions under which contact occurs.

SPAN 5721. Spanish Laboratory Phonology. (3.0 cr.; A-F or Audit; prereq Grad student or #; fall, spring, offered periodically) Core literature on Spanish laboratory phonology. Phonology from a laboratory perspective. Students evaluate laboratory research methodologies, perform basic acoustic analyses, and design laboratory phonology studies.

SPAN 5910. Topics in Spanish Peninsular Studies. (3.0 cr. [max 9.0 cr.]; prereq Grad student or #; fall, spring, every year) Crucial moment or characters, works, or events marking beginning of new phase in literary/cultural landscape.

SPAN 5920. Topics in Spanish-American Studies. (3.0 cr. [max 9.0 cr.]; prereq Grad student or #; fall, spring, summer, offered periodically) Spanish-American literature analyzed according to important groups, movements, trends, methods, and genres. Specific approaches depend on topic and instructor. Topics specified in Class Schedule.

SPAN 5930. Topics in Ibero-Romance Linguistics. (3.0 cr. [max 9.0 cr.]; prereq Grad student or #; spring, summer, offered periodically) Problems in Hispanic linguistics; a variety of approaches and methods.

SPAN 5970. Directed Readings. (1.0-4.0 cr. [max 9.0 cr.]; fall, spring, every year) Students must submit reading plans for particular topics, figures, periods, or issues. Readings in Spanish and/or Spanish-American subjects. Prereq Grad student or instr consent.

SPAN 5985. Sociolinguistic Perspectives on Spanish in the United States. (3.0 cr.; prereq Grad student or #; spring, offered periodically) Sociolinguistic analysis of issues such as language maintenance/shift in U.S. Latino communities, code switching, attitudes of Spanish speakers toward varieties of Spanish and English, language change in bilingual communities, and language policy issues.

SPAN 5990. Directed Research. (1.0-4.0 cr. [max 9.0 cr.]; fall, spring, every year) Directed research. Prereq Grad student or instr consent.

SPAN 5991. The Acquisition of Spanish as a First and Second Language. (3.0 cr.; prereq Grad student or #; spring, offered periodically) Analysis of issues such as the acquisition of Spanish and English by bilingual children; Spanish in immersion settings; developmental sequences in Spanish; classroom language learners' attitudes, beliefs, and motivation; development of pragmatic competence.

SPAN 5995. Directed Readings. (1.0-4.0 cr.; =SPPT 5995; prereq Grad student or #; spring, summer, offered periodically) Approaches depend on topic and instructor.

SPAN 5996. Directed Readings. (1.0-4.0 cr.; =SPPT 5996; prereq Grad student or #; spring, summer, offered periodically) Approaches depend on topic and instructor.

SPAN 5997. Directed Readings. (1.0-4.0 cr.; =SPPT 5997; prereq Grad student or #; spring, summer, offered periodically) Approaches depend on topic and instructor.

SPAN 5998. Directed Readings. (1.0-4.0 cr.; =SPPT 5998; prereq Grad student or #; spring, summer, offered periodically) Approaches depend on topic and instructor.

SPAN 5999. Directed Readings. (1.0-4.0 cr.; =SPPT 5999; prereq Grad student or #; spring, summer, offered periodically) Approaches depend on topic and instructor.

SPAN 5999. Directed Readings. (1.0-4.0 cr.; =SPPT 5999; prereq Grad student or #; spring, summer, offered periodically) Approaches depend on topic and instructor.

SPAN 5999. Directed Readings. (1.0-4.0 cr.; =SPPT 5999; prereq Grad student or #; spring, summer, offered periodically) Approaches depend on topic and instructor.

SPAN 5999. Directed Readings. (1.0-4.0 cr.; =SPPT 5999; prereq Grad student or #; spring, summer, offered periodically) Approaches depend on topic and instructor.

SPAN 5999. Directed Readings. (1.0-4.0 cr.; =SPPT 5999; prereq Grad student or #; spring, summer, offered periodically) Approaches depend on topic and instructor.
How the brain produces/understands speech/language, including various aspects of the nervous system involved in producing/understanding speech/language. Differences in brain structure/function among individuals with and without brain injury, based on scientific versus historical, mass media and literature portrayals.

SLHS 1902. Freshman Seminar. (3.0 cr.; A-F or Audit; prereq freshman; fall, spring, offered periodically) Topics vary. See class schedule.

SLHS 1905. Freshman Seminar. (3.0 cr.; A-F or Audit; prereq Fr; fall, spring, offered periodically) Freshman seminar.

SLHS 1942. Freshman Seminar. (3.0 cr.; A-F or Audit; prereq Freshman; fall, spring, offered periodically) Topics specified in Class Schedule.

SLHS 3302. Anatomy and Physiology of the Speech and Hearing Mechanisms. (3.0 cr.; fall, every year) Gross anatomy and basic physiology of the nervous, auditory, respiratory, laryngeal, velopharyngeal, and orofacial systems with emphasis on normal communication processes.

SLHS 3303. Language Acquisition and Science. (3.0 cr.; spring, every year) Survey of typical language development, major theoretical perspectives about development. Applications of current theory to analysis of children’s language.


SLHS 3305W. Speech Science. (3.0 cr.; fall, every year) Survey of theories, methods, and research in speech science. Speech acoustics, speech perception, speech production.


SLHS 3401. Communication Differences and Disorders. (3.0 cr.; =[SLHS 1401]; fall, spring, every year) Disorders of spoken communication, their functional effect on quality of life for individuals with communication disorders. Intervention techniques for specific disorders of speech/language in context of social, cultural, linguistic diversity.

SLHS 3402V. Major Project in Speech-Language-Hearing Sciences. (3.0 cr. [max 6.0 cr.]; A-F only; prereq SLHS major, jr or sr, honors; spring, every year) Seminar for completion of undergraduate major project.

SLHS 3402W. Major Project in Speech and Hearing Science. (3.0 cr.; S-N or Audit; prereq Jr or Sr or CDIS or SLHS major; spring, every year) Seminar for completion of undergraduate major project.

SLHS 3555H. Honors Thesis. (1.0-2.0 cr.; A-F or Audit; prereq See dir of Undergrad studies for [thesis adviser, forms]; fall, spring, every year) Research/writing under direction of faculty member. Details of work are determined in consultation with faculty thesis adviser selected based on availability/topic.

SLHS 3994. Directed Research. (1.0-12.0 cr. (max 24.0 cr.; prereq Undergrad doing research; fall, spring, summer, every year) TBD

SLHS 4301. Introduction to the Neuroscience of Human Communication. (3.0 cr.; fall, offered periodically) Basic neuroanatomy and neurophysiology, especially as they relate to normal speech, language, and hearing processes.

SLHS 4402. Assessment and Treatment in Speech-Language Pathology. (3.0 cr.; A-F or Audit; prereq [3302, 3303, 3304, 4301 (either before registration for 4402 or &4402)], or grad student, or #; fall, every year) Introduction to clinical methods/issues in communication disorders. Professional/legal mandates, collection/analysis of clinical data, principles/models of intervention with adults/children, clinical reporting.

SLHS 4502. Atypical Speech and Language. (3.0 cr.; spring, every year) Language conveyed through speech. Normal variation in speech/language that guides understanding of individual differences among speakers will be studied. Breakdowns in speech/language across lifespan in context of cultural/linguistic diversity.

SLHS 4602. Communication and Problem Behavior. (3.0 cr.; fall, every year) Social/environmental variables on young children’s propensity for problem behavior. Communication strategies that have been validated as a component in reducing problem behavior.

SLHS 4801. Hearing Measurement and Disorders. (3.0 cr.; prereq [3302, 3305W] or #; fall, every year) Introduction to theory, administration, and interpretation of behavioral/physiological hearing tests for all age groups. Immittance, pure tone, speech, otocoustic emissions, evoked potential measures. Hearing-screening protocols.

SLHS 4802. Rehabilitative Audiology. (3.0 cr.; prereq [3305, 4801] or [CDIS 3305, CDIS 4801] or #; spring, every year) Survey of sensory aids/methods used in rehabilitation across life span after diagnosis.
of hearing loss. Degree of hearing loss, developmental level, communication modalities, client/family choice, disability, cultural considerations.

SLHS 5401. Counseling and Professional Issues. (3.0 cr.; prereq [5872 or 8820], grad student recommended; fall, every year) Basic counseling principles and current professional issues in communication disorders. Application of counseling theory to clinical practice. Analysis of regulation, practice, and future direction of communication disorders.


SLHS 5503. Fluency and Motor Speech Disorders. (3.0 cr.; prereq graduate SLHS student or department permission, [3305, 4301] or #; fall, every year) Theory/research related to nature, assessment, treatment of motor speech disorders in children.

SLHS 5504. Dysphagia. (2.0 cr.; prereq current SLHS graduate major; fall, every year) Normal/disordered aspects of swallowing. Organic/functional voice disorders, laryngectomy, cleft palate. Nature and clinical management of these disorders.

SLHS 5505. Language and Cognitive Disorders in Children. (3.0 cr.; prereq 3303 or CDIS 3303 or equiv or grad student or #; fall, spring, offered periodically) Language assessment, teaching procedures used with children/adolescents. Procedures apply to children who face language disabilities such as developmental delays, autism, learning disabilities.

SLHS 5506. Language and Cognitive Disorders in Adults. (3.0 cr.; prereq [3302, 4301] or [CDIS 3302, CDIS 4301] or #; fall, spring, offered periodically) Neurogenic communicative and cognitive disorders in adults, including aphasia, right-hemisphere syndrome, traumatic brain injury, and dementia. Consideration of neurologic substrates, assessment and diagnosis, and clinical intervention.


SLHS 5801. Audiolingual Assessment I. (3.0 cr.; prereq 4801 or CDIS 4801 or #; fall, every year) Basic audiolingual battery, including pure tones, speech, masking, and immittance in adults. Industrial audiology, otocoustic emissions.

SLHS 5802. Hearing Aids I. (3.0 cr.; prereq [3305, 4801] or [CDIS 3305, CDIS 4801], SLHS grad or #; fall, every year) Survey of modern hearing aids including history of development, electroacoustic functions, clinic and laboratory measurement techniques, sound field acoustics, techniques for selection.

SLHS 5803. Hearing Loss in Children: Diagnosis. (3.0 cr.; prereq [4801 or CDIS 4801], SLHS grad or #; fall, every year) Behavioral, physiological approaches to assessment and identification, development of the auditory mechanism, etiologies of hearing losses in infants, children, selection of sensory aids, principles of case management with children and families.

SLHS 5804. Cochlear Implants. (3.0 cr.; A-F or Audit; prereq [4802, 5801, 5802] or [CDIS 4802, CDIS 5801, CDIS 5802], SLHS grad or #; spring, offered periodically) Implantable auditory prostheses. History of device development, including cochlear implants and auditory brainstem implants. Signal processing. Techniques for selection, fitting, and rehabilitation. Behavioral/ physiological changes across life span.


SLHS 5806. Auditory Processing Disorders. (3.0 cr.; A-F or Audit; prereq [4802 or CDIS 4802, SLHS grad] or #; spring, odd years) Normal/disordered auditory processing abilities. Anatomy/physiology of central auditory pathway, assessments to evaluate auditory processing skills, techniques to address auditory processing weaknesses. Current/historical theories/controversies surrounding auditory processing assessment.

SLHS 5807. Clinical Research and Practice: Grand Rounds. (1.0-2.0 cr. or max 5.0 cr.; prereq [4801 or CDIS 4801, SLHS grad] or #; fall, spring, every year) Intensive study of clinical methods in audiology. Supplements didactic courses in audiology curriculum. Laboratory study, individually or in small groups.

SLHS 5820. Clinical Research and Practice: Grand Rounds. (1.0-2.0 cr. or max 5.0 cr.; prereq [4801 or CDIS 4801, SLHS grad] or #; fall, spring, every year) Intensive study of clinical methods in audiology. Supplements didactic courses in audiology curriculum. Laboratory study, individually or in small groups.

SLHS 5830. Clinical Foundations in Audiology. (1.0-8.0 cr. [max 24.0 cr.]; S-N or Audit; prereq Grad SLHS major; fall, spring, summer, every year) Clinical foundations in audiology for first year AuD graduate students.

SLHS 5900. Topic in Speech-Language-Hearing Sciences. (1.0-4.0 cr. [max 8.0 cr.]; prereq SLHS grad student or #; fall, spring, offered periodically) Topics listed in Speech-Language-Hearing Sciences office.

SLHS 5993. Directed Study. (1.0-12.0 cr. [max 18.0 cr.]; prereq SLHS grad or #; fall, spring, summer, every year) Directed readings and preparation of reports on selected topics.

Sport Management (SMGT)

College of Education and Human Development

SMGT 1701. Introduction to Sport Management. (2.0 cr.; A-F or Audit; fall, spring, every year) Scope/motive of the study of sport from sociological, psychological, historical, economic, and scientific perspective. Issues in sport.

SMGT 1904. Freshman Seminar: Global Perspectives. (3.0 cr.; prereq Fr; fall, spring, offered periodically) Reading, discussion, critical analysis, writing about global perspectives. Intensive, small-group setting.

SMGT 1905. Freshman Seminar. (1.0-3.0 cr. [max 6.0 cr.]; Student Option No Audit; prereq Fr; fall, spring, every year) Interdisciplinary seminar. Topics specified in Class Schedule.

SMGT 3111. Sports Facility and Event Management. (3.0 cr.; A-F or Audit; prereq SMGT major or #; fall, spring, every year)
Aspects of managing sport facilities/events. Conceptualization of sports events. Event management planning process, budgeting, site selection, booking, ticketing, sponsorship.

SMGT 3143. Organization and Management of Sport. (3.0 cr.; A-F or Audit; prereq SMGT major; fall, spring, every year)
Principles, policies, and procedures in administration/management of sports programs at interscholastic/intercollegiate levels.

SMGT 3421. Business of Sport. (3.0 cr.; A-F or Audit; prereq SMGT or kin or rec major or #; fall, spring, every year)

SMGT 3501. Sport in a Diverse Society. (3.0 cr.; A-F only; fall, spring, every year)
Relationship between sport and contemporary social institutions. Groups/individuals who have historically been marginalized or excluded from sport participation. Race, sex, social class, sexual orientation, physical (dis)abilities.

SMGT 3501H. Sport in a Diverse Society: Honors. (3.0 cr.; A-F only; prereq Honors student; fall, spring, every year)
Pervasive and significant relationships between social constructions of sport and physical activity to contemporary social institutions such as politics, religion, economics, education, and mass media. Social issues related to sport. How specific social categories (e.g., age, gender, race, social class) intersect to influence participation/experiences of individuals within sport/physical activity contexts.

SMGT 3601. Ethics and Values in Sport. (2.0 cr.; A-F or Audit; prereq SMGT major; fall, spring, every year)
Violence, demonstrative behavior, sportsmanship. Ethical issues in playing of sport and in management/governance of sport industry.

SMGT 3631. Sport Marketing. (3.0 cr.; A-F or Audit; prereq SMGT major or #; fall, spring, every year)
Fundamental theories/issues in sport marketing, grounded in traditional marketing principles. Unique applications to sport business industry.

SMGT 3632. Sport Sales and Fund-raising. (3.0 cr.; A-F only; prereq Sport Management major or #; fall, spring, summer, every year)
Foundation of revenue production in sport management. Necessary skills related to revenue production and sales processes as they apply to the business of sport.

SMGT 3861. Sport and Recreation Law. (3.0 cr.; A-F only; prereq SMGT or REC major or #; fall, spring, every year)
U.S. legal system, its structure/terminology. Sport and Recreation legal aspects of contract law, statutory law, constitutional law, intellectual property, negligence, risk management. Managerial analysis, decision making.

SMGT 3881W. Senior Seminar in Sport Management. (3.0 cr.; A-F or Audit; prereq SMGT major; completion of major coursework, #; fall, spring, every year)
Presentations/discussions on sport-related topics of interest.

SMGT 3993. Directed Study in Sport Management. (1.0-3.0 cr.; A-F only; prereq Undergrad, #; fall, spring, summer, every year)
Students work with faculty and grad students on research, scholarly, or creative activities. Students assist with faculty scholarship or carry out projects under faculty supervision.

SMGT 3996. Practicum: The Sport Experience. (2.0-8.0 cr.; S-N only; prereq 3881; SMGT major; #; fall, spring, summer, every year)
Practical experience in one or more sport settings.

Statistics (STAT)

College of Liberal Arts

STAT 1001. Introduction to the Ideas of Statistics. (4.0 cr.; prereq Mathematics requirement for admission to University; fall, spring, summer, every year)
Graphical/numerical presentations of data. Judging the usefulness/reliability of results/inferences from surveys and other studies to interesting populations. Coping with randomness/variation in an uncertain world.

STAT 1905. Freshman Seminar. (3.0 cr. [max 6.0 cr.]; A-F or Audit; fall, offered periodically)
Topics specified in Class Schedule.

STAT 3011. Introduction to Statistical Analysis. (4.0 cr.; #=STAT 5021, ANSC 3011, ESPM 3012); fall, spring, summer, every year)

STAT 3021. Introduction to Probability and Statistics. (3.0 cr.; prereq Math 1272; fall, spring, summer, every year)
Elementary probability, probability distributions. Sampling, elements of statistical inference. Regression.

STAT 3022. Data Analysis. (4.0 cr.; prereq 3011 or 3021 or SOC 3811; fall, spring, every year)
Practical survey of applied statistical inference/computing covering widely used statistical tools. Multiple regression, variance analysis, experiment design, nonparametric methods, model checking/selection, variable transformation, categorical data analysis, logistic regression.

STAT 4011. Theory of Statistics I. (4.0 cr.; #=STAT 5101; prereq Math 1272; fall, every year)

STAT 4012. Theory of Statistics II. (4.0 cr.; #=STAT 5102; prereq 4011; spring, every year)

STAT 4893W. Senior Project. (3.0 cr.; A-F only; prereq Stat major (BA or BS), Sr, 5302; fall, spring, every year)

STAT 4932. Topics in Statistics. (3.0 cr.; prereq #)
Topics vary according to student needs and available staff.

STAT 5021. Statistical Analysis. (4.0 cr.; #=STAT 3011, ANSC 3011, ESPM 3012); prereq = 3011; College algebra or #; Stat course recommended; fall, spring, every year)
Intensive introduction to statistical methods for graduate students needing statistics as a research technique.

STAT 5031. Statistical Methods for Quality Improvement. (4.0 cr.; prereq [3021 or 3022 or 4012 or 5021 or 5022 or 8102]; Math 1272; spring, offered periodically)

STAT 5041. Bayesian Decision Making. (3.0 cr.; prereq 4101 or 5021 or 5101 or #; )

STAT 5101. Theory of Statistics I. (4.0 cr.; #=STAT 4101); prereq MATH 2263 or MATH 2374; fall, every year)
Logical development of probability, basic issues in statistics. Probability spaces. Random variables, their distributions and expected values. Law of large numbers, central limit theorem, generating functions, multivariate normal distribution.

STAT 5102. Theory of Statistics II. (4.0 cr.; #=STAT 4102); prereq 5101 or Math 5651; spring, every year)

STAT 5201. Sampling Methodology in Finite Populations. (3.0 cr.; prereq 3022 or 4012 or 5021 or 5102 or #; spring, every year)

STAT 5302. Applied Regression Analysis. (4.0 cr.; prereq 3022 or 4012 or 5021 or 5102 or #; fall, spring, summer, every year)
Simple, multiple, and polynomial regression. Estimation, testing, prediction. Use of graphics in regression. Stepwise and other numerical methods. Weighted least squares, nonlinear
models, response surfaces. Experimental research/applications.

STAT 5303. Designing Experiments. (4.0 cr.; prereq 3022 or 4102 or 5021 or 5102 or #; fall, spring, summer, every year)

STAT 5401. Applied Multivariate Methods. (3.0 cr.; prereq 5302 or 8102 or #; fall, offered periodically)

STAT 5421. Analysis of Categorical Data. (3.0 cr.; prereq 5302 or #; fall, spring, every year)

STAT 5511. Time Series Analysis. (3.0 cr.; prereq Theoretical understanding; fall, every year)

STAT 5601. Nonparametric Methods. (3.0 cr.; prereq 3022 or 4102 or 5021 or 5102 or #; fall, spring, every year)
Order statistics. Classical ranked-based procedures (e.g., Wilcoxon, Kruskal-Wallis). Goodness of fit. Topics may include smoothing, bootstrap, and generalized linear models.

STAT 5701. Statistical Computing. (3.0 cr.; A-F or Audit; prereq 4102 or 5021 or 5102 or #; fall, every year)
Statistical programming, function writing, graphics using high-level statistical computing languages. Data management, parallel computing, version control, simulation studies, power calculations. Using optimization to fit statistical models. Monte Carlo methods, reproducible research.

STAT 5933. Tutorial. (1.0-6.0 cr. [max 12.0 cr.; prereq #; fall, spring, summer, every year)
Directed study in areas not covered by regular offerings.

SCB 5051. Stem Cell Biology Practical Training Module. (1.0 cr.; A-F only; prereq Acceptance into stem cell biology master's program; fall, every year)

SCB 5054. Stem Cell Institute Research Seminar and Journal Club. (2.0 cr. [max 6.0 cr.; A-F only; prereq Acceptance into stem cell biology master's program; fall, every year)
Students attend weekly Stem Cell Institute research seminars and journal clubs, write brief summaries, participate in journal club, and present original research paper.

SCB 5900. Master's Plan B Research Paper and Presentation. (2.0 cr.; A-F only; prereq Admission to stem cell biology master's plan B program; fall, spring, summer, every year)
Students write research paper based on primary literature on stem cell biology topic of interest, mentored by faculty member.

Studies in Cinema and Media Culture (SCMC)

SCMC 1201. Introduction to Cinema and Media Culture. (4.0 cr.; [CSCL 1201]; fall, spring, every year)
Critical analysis of films, particularly as they emerge within context of mass culture. Determining discursive specificity of cinema, network of institutions that expose this discourse to other media discourses. Rudiments of film theory. Brief engagement with production.

SCMC 3001W. History of Cinema and Media Culture. (4.0 cr.; [max 6.0 cr.]; fall, spring, every year)
Introduction to cinema in relation to other media, notably photography, radio, television/video and the Internet. Representative films from decisive moments in global development of cinema. Rise/fall of Hollywood studio system, establishment of different national cinemas, cinematic challenges to cultural imperialism, emergence of post-cinematic technologies.

SCMC 3201. Fundamentals of Digital Filmmaking. (4.0 cr.; A-F only; prereq #; fall, every year)
Practice of digital filmmaking. Digital techniques, practical tools required to produce films. Optical/digital devices as artistic tools. Historical/theoretical issues of cinema, its relation to other art forms.

SCMC 3202. Intermediate Digital Filmmaking. (4.0 cr.; A-F only; prereq 3201 or #; spring, every year)
Students complete a film of any length, 24 frames or feature-length. Emphasizes formal analysis of frames, shots, sequences, and relations of unit (frame or shot) to whole.

SCMC 3993. Directed Study. (1.0-3.0 cr. [max 6.0 cr.]; fall, spring, every year)
Guided individual reading or study.

SCMC 4993. Directed Study. (1.0-3.0 cr. [max 6.0 cr.]; fall, spring, every year)
Guided individual reading or study.

SCMC 5001. Critical Debates in the Study of Cinema and Media Culture. (4.0 cr.; fall, spring, every year)
Basic concepts in historical/international debates over production/reception of media culture. Emphasizes cinema. Advanced orientation toward intellectual traditions that inform contemporary scholarship.

SCMC 5002. Advanced Film Analysis. (4.0 cr.; A-F only; prereq [1201 or ARTH 1921W or CSCL 1201 or CSCL 1921 or equiv coursework]; SCMC major; fall, every year)
Application of textual analysis to the reading of a film. Students work collaboratively to discern and interpret all component aural/visual elements of what the film says and how it says it.

SCMC 5993. Directed Study. (1.0-3.0 cr. [max 6.0 cr.]; fall, spring, every year)
Guided individual reading or study.

Study Abroad in Argentina (ARGN)

ARGN 3009. Argentina: Stereotypes and Identity. (3.0 cr.; prereq 1004; fall, spring, summer, every year)
Intercultural perspectives on Argentina. How others perceive Argentines and how Argentines perceive themselves, through literature, humor, art, music, and history.

Supply Chain and Operations (SCO)

SCO 2550. Business Statistics: Data Sources, Presentation, and Analysis. (4.0 cr.; A-F or Audit; prereq [Math 1031 or equiv], at least 30 cr; fall, spring, summer, every year)
Data analysis, basic inferential procedures, statistical sampling/design, regression/time series analysis. How statistical thinking contributes to improved decision making.

SCO 3001. Introduction to Operations Management. (3.0 cr.; A-F or Audit; fall, spring, summer, every year)

SCO 3041. Project Management. (2.0 cr.; A-F or Audit; prereq 3000 or #; fall, every year)
Principles and methods useful for planning and controlling a project, including development of
project plan, resource planning and scheduling, and project monitoring and control. Selected computerized packages are studied, including PERT and CPM, and examples of different types of projects from manufacturing and service industries are used.

SCO 3045. Sourcing and Supply Management. (2.0 cr.; A-F only; prereq 3001; fall, spring, every year) Strategic/operational role of purchasing/supply. Supply management. Supplier-selection criteria such as quantity, quality, cost/price considerations. Buyer-supplier relationships.

SCO 3048. Transportation and Logistics Management. (2.0 cr.; A-F only; prereq 3001; fall, every year) Linkages between logistics/transportation and marketing, operations, and finance. How different industries integrate logistics, warehousing, transportation, and information systems.

SCO 3051. Service Management. (2.0 cr.; A-F only; prereq 3001; fall, every year) Issues unique to managing service processes. Identifying service needs, designing services, and managing services.

SCO 3056. Supply Chain Planning and Control. (4.0 cr.; A-F or Audit; prereq 3001 or #; fall, spring, every year) Decisions/tradeoffs when directing operations of supply chain. Forecasting, capacity/production planning, just-in-time, theory of constraints, supply chain flows, enterprise resource planning, supply chain design.

SCO 3059. Quality Management and Lean Six Sigma. (4.0 cr.; A-F or Audit; prereq 3001 or equiv or #; fall, spring, every year) Process management from Quality Management and Six Sigma perspective. Managerial/technical aspects of improvement strategy, improvement tools/methods, Malcolm Baldrige Award, ISO 9000, Six Sigma.

SCO 3061. Lean Thinking. (2.0 cr.; A-F only; prereq 3001; fall, every year) Approaches to waste, flow, error proofing, and daily management that simultaneously improves quality, cost, and delivery, while building worker engagement/skill. Philosophical foundations. Tools to identify, measure, and eliminate non-value-added activities.

SCO 3072. Managing Technologies in the Supply Chain. (2.0 cr.; A-F only; prereq 3001; spring, every year) Technologies and technological change within/between firms as opportunities for professional leadership. Selecting technologies, nurturing their adoption, and ensuring their exploitation.

SCO 3850. Topics in Operations and Management Science. (2.0-4.0 cr. [max 16.0 cr.]; A-F only; prereq 3001; fall, spring, offered periodically) Discussion/analysis of current topics/developments in operations/management science.

SCO 406W. Supply Chain and Operations Strategy. (4.0 cr.; A-F only; prereq 3001, 3056, 3059, 4 [OMS or SCO] elective cr; fall, spring, every year) Senior capstone. How to achieve/sustain competitive advantage through consistent decisions in manufacturing/service operations. Marketing/business strategy in global context. Vertical integration, capacity, facilities, technology/infrastructure.

**Sustainability Studies (SUST)**

SUST 3003. Sustainable People, Sustainable Planet. (3.0 cr.; [GLOS 3304]; prereq Soph or jr or sr; fall, spring, every year) Introduction to interdisciplinary Sustainability Studies minor. Scientific, cultural, ethical, and economic concepts that affect environmental sustainability and global economic justice. Key texts. Participatory classroom environment.

SUST 3480. Topics in Sustainability. (1.0-4.0 cr. [max 24.0 cr.]; A-F only; fall, spring, every year) Topics in sustainability encompass special courses related to issues such as renewable energy, food and waste systems, sustainable planning, water and climate change.

SUST 4004. Sustainable Communities. (3.0 cr.; A-F only; prereq [3003 or GLOS 3304, Jr or Sr] in sustainability studies minor or #; fall, spring, every year) Students synthesize multiple disciplinary perspectives and integrate insights gained from various approaches/methods. Concepts/scholarship related to sustainability. Applying knowledge/experience to real sustainability problems.

SUST 4096. Sustainability Internship. (3.0-4.0 cr. [max 8.0 cr.]; A-F only; prereq Familiarity with sustainability concepts through academic work or other experiences; fall, spring, every year) Eight to ten hour per week internship experience related to a sustainability theme or approach, such as sustainable foods, green building, renewable energy or environmental justice. Intern in a nonprofit, governmental, educational or business organization, from choices provided or approved by instructor.

**Swahili (SWAH)**

College of Liberal Arts

**Swahili I (SWAH) 1211.** Beginning Swahili I, Semester I. (5.0 cr.; fall, every year) Comprehension, speaking, reading, writing. Meets with 2211.

**Swahili II (SWAH) 2221.** Beginning Swahili II. (5.0 cr.; prereq 1211 or equiv; spring, every year) Continuation of skill development from 1221.

**Swahili III (SWAH) 3225.** Intermediate Swahili I. (5.0 cr.; prereq 1 yr Swahili or equiv; spring, every year) Readings of contemporary Swahili texts. Review of grammar and complex verb forms. Vocabulary, communication skills.

**Swahili IV (SWAH) 3226.** Intermediate Swahili II. (5.0 cr.; prereq 3225 or equiv; spring, every year) Continuation of skill development from 3225.

**Swahili V (SWAH) 4221.** Beginning Swahili I. (2.0 cr.; prereq Grad student; fall, every year) Comprehension, speaking, reading, writing. Meets with 2221.

**Swahili VI (SWAH) 4222.** Beginning Swahili II. (2.0 cr.; prereq Grad student; spring, every year) Comprehension, speaking, reading, writing. Meets with 2222.

**Swahili VII (SWAH) 4225.** Intermediate Swahili I. (2.0 cr.; prereq Grad student; spring, every year) Readings of contemporary Swahili texts. Review of grammar and complex verb forms. Vocabulary, communication skills.

**Swahili VIII (SWAH) 4226.** Intermediate Swahili II. (2.0 cr.; prereq [4225 or equiv], grad student; spring, every year) Continuation of skill development from 4225.

**Swedish (SWED)**

College of Liberal Arts

**Swedish I (SWED) 1001.** Beginning Swedish. (5.0 cr.; [SWED 4001]; fall, spring, summer, every year) Emphasis on working toward novice-intermediate low proficiency in all four language modalities (listening, reading, speaking, writing). Topics include everyday subjects (shopping, directions, family, food, housing, etc.).

**Swedish II (SWED) 1002.** Beginning Swedish. (5.0 cr.; [SWED 4002]; prereq 1001; fall, spring, summer, every year) Continues the presentation of all four language modalities (listening, reading, speaking, writing), with a proficiency emphasis. Topics include free-time activities, careers, and the Swedish culture.

**Swedish III (SWED) 1003.** Intermediate Swedish. (5.0 cr.; [SWED 4003]; prereq 1002; fall, spring, summer, every year) Emphasis on intermediate proficiency in listening, reading, speaking, and writing. Contextualized work on grammar and vocabulary is combined with authentic readings and essay assignments.

**Swedish IV (SWED) 1004.** Intermediate Swedish. (5.0 cr.; [SWED 4004]; prereq 1003; fall, spring, summer, every year) Emphasis on developing intermediate mid-high proficiency in listening, reading, speaking, and writing. Contextualized work on grammar and vocabulary is supported by work with authentic readings and essay assignments.

**Swedish V (SWED) 4001.** Beginning Swedish. (2.0 cr.; [SWED 1001]; prereq 1004 in another language or passing score on LPE or grad student; fall, summer, every year) Meets concurrently with 1001. See 1001 for description.

**Swedish VI (SWED) 4002.** Beginning Swedish. (2.0 cr.; [SWED 1002]; prereq 1004 in another language or passing score on LPE or grad student; spring, summer, every year) Meets concurrently with 1002. See 1002 for description.
SWED 4003. Intermediate Swedish. (2.0 cr.; =[SWED 1003]; prereq 1004 in another language or passing score on LPE or grad student; fall, every year) Meets concurrently with 1003. See 1003 for description.

SWED 4004. Intermediate Swedish. (2.0 cr.; =[SWED 1004]; prereq 1004 in another language or passing score on LPE or grad student; spring, every year) Meets concurrently with 1004. See 1004 for description.

Theatre Arts (TH)
College of Liberal Arts

TH 1101V. Honors Section: Introduction to the Theater. (3.0 cr. [max 4.0 cr.]; A-F only; =[TH 1101W]; prereq Honors student; fall, spring, every year) Introduction to art/craft of theater. Appreciation/critical analysis of plays/performances. Examples of theater's diverse interactions with society considered from various cultural perspectives.

TH 1101W. Introduction to the Theatre. (3.0 cr. [max 4.0 cr.]; =[TH 1101V]; fall, spring, every year) Introduction to art/craft of theater. Appreciation/critical analysis of plays/performances. Examples of theatre's diverse interactions with society considered from various cultural perspectives.

TH 1102. Stage, Screen, Society: Performance in the Media Age. (3.0 cr.; fall, spring, every year) Drama/cultural values implicit in media. Study of primary texts (biography, history, novel, plays), video clips, complete films. How film medium shapes cultural identity.

TH 1301. Acting/Non-Majors. (3.0 cr.; fall, spring, every year) Background/techniques of acting as viewed/practiced in theatre, society, and student's own relationships.

TH 1321. Beginning Acting: Fundamentals of Performance. (3.0 cr.; prereq 1101 or &1101; fall, spring, every year) Vocabulary/techniques for practical performance studies. Use/training of body/voice. Creation of choices and dramatic phrases. Storytelling. Training the will, the instrument, and the imagination.

TH 1322. Creating the Performance. (3.0 cr.; prereq 1321 or &1321 or 1501 or &1501; fall, spring, every year) Responsibilities/techniques of modern stage director as creative/interpretive artist. Creation of directed performance of invented/pre-existing forms, from happenings to traditional psychological/poetic realism.

TH 1361. Singing for Musical Theatre. (3.0 cr.; A-F or Audit; ) Beginning singing, interpretation, part singing, phonetics, audition techniques. Solo/ensemble presentations at final class performance.

TH 1362. Dance for Musical Theatre. (2.0 cr.; A-F or Audit; =[DNCE 1362]; ) Movement based lab. Dance skills in musical theatre performance. Focuses on various styles/disciplines of dance throughout its culturally diverse heritage. Character development necessary to execution of various dance styles.

TH 1381. New Voices. (1.0 cr.; S-N only; prereq [Fr or transfer] student from BFA actor training or BA or BFA dance or BA theater; fall, every year) Instructors lead students in four Saturday workshop intensives. Student forge interdisciplinary collaborations as they journey through their respective programs.

TH 1391. BFA Acting I. (3.0 cr.; A-F or Audit; prereq Accepted into BFA acting program; fall, every year) Acting.

TH 1392. BFA Voice and Speech I. (2.0 cr.; A-F or Audit; prereq Accepted into BFA acting prog; fall, spring, every year) Study/practice in breath centering/expansion; vocal resonance, musicality, placement; ear training; strengthening and making more flexible the muscles of speech.

TH 1393. BFA Movement I. (2.0 cr.; A-F or Audit; prereq BFA-acting major; fall, every year) Focuses on building a foundation for further work in program.

TH 1395. BFA Acting II. (3.0 cr.; A-F or Audit; prereq 1391; fall, spring, offered periodically) Continuing the process of interpreting dramatic material.

TH 1396. BFA Voice and Speech II. (2.0 cr.; A-F or Audit; prereq 1392; fall, spring, offered periodically) Building a foundation for further work in the program. Emphasizes practicing the sounds of good American speech and of the written phonetic alphabet.

TH 1397. BFA Movement II. (2.0 cr.; A-F or Audit; prereq 1393; fall, spring, offered periodically) May include sections such as African dance, yoga, movement for actors, and circus techniques. Focuses on building a foundation for further work in the program.

TH 1401. Introduction to Performance. (3.0 cr.; A-F only; spring, every year) Explore different dimensions of performance as they relate to theatre, dance, everyday life. Develop vocabulary with which to engage performance by viewing live/recorded performances, reading performing texts, collaborating on small group projects.

TH 1501. Introduction to Design and Technology for Live Performance. (3.0 cr.; A-F only; prereq 1101 or &1101; fall, spring, every year) Principles, processes, and possibilities in all areas of stage design and production. Process and relationship between artistic and production staff members. Collaboration, compromise, creation. Student are assigned to a lab in a technical area.

TH 1904. Freshman Seminar. (3.0 cr. [max 6.0 cr.]; A-F or Audit; prereq freshman; fall, spring, offered periodically) Topics specified in Class Schedule.

TH 1905. Freshman Seminar. (3.0 cr. [max 6.0 cr.]; A-F or Audit; prereq Fr; fall, spring, offered periodically) Topics specified in Class Schedule.

TH 1909W. Topics: Freshman Seminar. (3.0 cr.; A-F or Audit; prereq freshman; fall, spring, offered periodically) Topics specified in Class Schedule.

TH 1910W. Topics: Freshman Seminar. (3.0 cr.; A-F or Audit; prereq freshman; fall, spring, offered periodically) Topics specified in Class Schedule.

TH 1950. Topics in Theater. (1.0-3.0 cr. [max 6.0 cr.]; fall, spring, every year) Topics specified in Class Schedule.

TH 2391. BFA Acting III. (3.0 cr.; A-F or Audit; prereq BFA student in theatre arts; fall, spring, offered periodically) Applying concepts of first year of training to an ensemble performance project. Beginning of Shakespeare foundation unit.

TH 2392. BFA Voice and Speech III. (2.0 cr.; A-F or Audit; prereq BFA student in theatre arts; fall, spring, offered periodically) Continuing to build a strong, healthy voice. Mastering written phonetics, sounds of good American speech for stage. Students begin to explore speaking of heightened verse, particularly Shakespearean text.

TH 2393. BFA Movement III. (2.0 cr.; A-F or Audit; prereq BFA student in theatre arts; fall, spring, offered periodically) Deepens/refines foundation laid in BFA Movement II.

TH 2395. BFA Acting IV. (3.0 cr.; A-F or Audit; prereq BFA-Acting sophomore; fall, spring, offered periodically) Application of process towards performance. Emphasizes Shakespeare.

TH 2396. BFA Voice and Speech IV. (2.0 cr.; A-F or Audit; prereq BFA-acting sophomore; fall, spring, offered periodically) Continuing to build a strong, healthy voice. Mastering written phonetics and the sounds of good American speech for the stage. Students begin basic dialect acquisition work for the stage. Emphasizes English/Italian dialects.

TH 2397. BFA Movement IV. (2.0 cr.; A-F or Audit; prereq BFA-acting sophomore; fall, spring, offered periodically) May include sections such as jazz dance, partner dances, and movement for actors.

TH 3100. Theatre Practicum. (1.0 cr. [max 4.0 cr.]; S-N or Audit; prereq 1101; only two enrollments as actor may count toward a major; fall, spring, summer, every year) Participation in University Theatre main stage play as actor, construction/running crew personnel, or theatre management operations personnel.

TH 3115. Introduction to Playwriting. (3.0 cr.; fall, spring, every year)
Study of traditional play structure, characterization, dialogue, dramatic action, and theme. Final project is a one-act play.

TH 3120. Theatre: Theory and Practice. (3.0 cr.; [max 6.0 cr.;] prereq Th major or #; fall, spring, summer, every year)
Introduction to diverse ways of thinking about theatre and its representational practices. Students explore traditional/non-traditional modes of performance through readings, discussions, and hands-on performance projects. Seminar-style course.

TH 3171. History of the Theatre: Ancient Greece Through Neo-Classicism. (3.0 cr.; prereq Th major or #; fall, spring, summer, every year)
History of Western theatre and drama; theatrical practices, staging conventions, and dramatic structure of plays. Ancient to mid-18th century.

TH 3172. History of the Theatre: Age of Enlightenment to Present. (3.0 cr.; prereq Th major or #; fall, spring, summer, every year)
Theatrical practices, staging conventions, dramatic structure of plays.

TH 3314. Text and the Actor. (3.0 cr.; A-F or Audit; prereq 1101, 1321, 1322; fall, spring, every year)
Standard stage speech, international phonetic alphabet transcription, and textual analysis to perform heightened language texts such as Shakespearean/Shavian monologues, Chaucer's Canterbury Tales, and Beowulf. Videos viewed/discussed.

TH 3316. Voice for the Actor. (3.0 cr.; A-F only; prereq 1101, 1321, 1322; fall, spring, every year)

TH 3321. Stanislavski and Techniques for Characterization. (3.0 cr.; prereq 1322; [3314 or & 3314]; audition; fall, spring, every year)

TH 3322. Advanced Techniques for Characterization. (3.0 cr.; prereq 3321; fall, spring, every year)

TH 3330. Physical Approaches to Acting. (3.0 cr.; [max 6.0 cr.;] prereq 1322, [3314 or &3314]; audition; #; fall, spring, every year)
Dynamic physical approach to acting. Expanding expressiveness/creativity. Strengthening connections between physical/vocal expression. Uniting instinct and intellectual analysis. Techniques as advanced by Delsarte, Meyerhold, Grotowski, Kantor, Suzuki, Barba, etc., and structured improvisation, are incorporated in solo/ collaborative performance projects.

TH 3332. Circus Performance. (1.0 cr.; A-F only; spring, every year)

TH 3361. Introductory Musical Theater. (3.0 cr.; A-F or Audit; fall, spring, offered periodically)
History of American musical theater. Videos/discussions, basic music theory, voice, dance, acting, audition techniques. Solo/ensemble presentations for public class performance.

TH 3370. BA Mentoring. (1.0 cr. [max 4.0 cr.;] A-F only; fall, spring, every year)
Prepare BA theatre performance majors/minors with essential skills that will enhance performing careers as actors, directors, playwrights. Attend non-traditional performances by national/international touring companies. Engage in vigorous discussions led by those artists who are at the forefront of creation models. Rigorous skill-building workshops led by artists, scholars, technicians.

TH 3381. Theater Storytelling and Solo Performance. (3.0 cr.; spring, every year)
Live storytelling and solo performance as theatrical art form. How to turn personal experiences into stage stories. Guests perform, discuss their work, and critique student work. Students develop short monologues/performance and conclude with original solo theatre performance/story.

TH 3391. BFA Acting V. (3.0 cr.; A-F or Audit; fall, every year)
Experiencing a foreign theater culture/history. Applying process of interpreting dramatic material to plays of that culture.

TH 3392. BFA Voice and Speech V. (2.0 cr.; A-F or Audit; fall, spring, every year)
Experiencing a foreign theater culture/history. Applying voice training to dramatic material of that culture.

TH 3393. BFA Movement V. (2.0 cr.; A-F or Audit; prereq BFA student in theatre arts; fall, every year)
Experiencing a foreign theatre culture/history, applying training to dramatic material of that culture.

TH 3395. BFA Intensive I. (2.0 cr.; A-F or Audit; prereq BFA-acting jr; spring, every year)
Incorporating disciplines of acting/voice/movement.

TH 3398. BFA Rehearsal & Performance I. (2.0 cr.; A-F or Audit; prereq BFA-acting jr; fall, spring, offered periodically)
Continuing the application of process towards performance.

TH 3399. BFA Rehearsal and Performance II. (2.0 cr.; A-F or Audit; prereq BFA-acting jr; fall, spring, offered periodically)
Continuing the application of process towards performance.

TH 3521. Introduction to Scenic Design for Theater and Performance. (3.0 cr.; prereq 3571; spring, every year)

TH 3531. Introduction to Theatrical Costume Design. (3.0 cr.; prereq TH 3571; spring, every year)
Costume design process, including, researching, script analysis, the costume designer's role throughout the production process, and design problems.

TH 3541. Introduction to Stage Lighting Design. (3.0 cr.; prereq 3571; spring, every year)
Composition, color theory, instrumentation, and control (dimming) as they apply to theater, opera, and dance. Collaborative process of the lighting designer through individual and group projects in a lab setting (i.e., a theater.)

TH 3559. Introduction to Sound Design for the Theatre. (3.0 cr.; prereq 1501; fall, spring, every year)
Basics of audio design for theatre. Script analysis, audio editing, music research, basic system design, paperwork, cue building. Basic components of audio design. Final project will involve applying skills to partially realized design.

TH 3571. Introduction to Stage Technology. (3.0 cr; A-F only; prereq 1501; fall, spring, every year)

TH 3711. Beginning Directing. (3.0 cr.; prereq 1101, 1321, 1322; fall, spring, every year)
Introduction to/application of techniques/theories of stage direction. Script analysis, composition, blocking, rehearsal methods, improvisation, actor coaching, scene production.

TH 3716. Stage Management. (4.0 cr.; A-F only; prereq 1501 or #; fall, spring, every year)
Production process, pre-production to maintaining/closing. Managing rehearsals, communication, conflict resolution. Individual/group projects: promptbook building, blocking notation, Cue placement/execution, scene breakdowns, creating/maintaining checklist, building a form library.

TH 3950. Topics in Theatre. (1.0-4.0 cr. [max 8.0 cr.;] fall, spring, every year)
Topics specified in Class Schedule.

TH 3993. Directed Study. (1.0-6.0 cr. [max 18.0 cr.]; prereq 6 Th cr, #, %, @; fall, spring, summer, every year)
Guided individual reading or study.
TH 4115. Intermediate Playwriting. (3.0 cr.; prereq 3115 or [writing sample, #]; spring, every year)
New methods of play construction.
How characteristic plays from particular contemporary styles create original theatrical effects by using/breaking dramatic conventions.
Writing exercises, workshops of student plays.

TH 4177W. Survey of Dramatic Literature I: Strategic Interpretation. (3.0 cr.; prereq 3171, 3172, [jr or sr] or #; fall, summer, every year)
Basic principles of script analysis as applied to stage practice from traditional/postmodern approaches.
Students read plays, critical perspectives. Discussion, critical writing, performance.

TH 4178W. Survey of Dramatic Literature II: Representation and Its Effects. (3.0 cr.; prereq 3171, 3172, [jr or sr] or #; spring, every year)
In-depth look at how plays actively participate in production of social values and of society itself. Emphasizes consequences of choices theatre artists make.

TH 4321. Career Preparation for the Actor. (3.0 cr.; prereq 3322; fall, every year)
Information/techniques necessary for professional acting career.

TH 4322. Acting for the Camera. (3.0 cr.; prereq 1301 or 3321; fall, spring, every year)
Differences between stage acting and acting for camera. Hands-on experience with film equipment. Scenes/monologues rehearsed/performed for camera. Videotape playback for class critique.

TH 4380. Creative Collaboration. (1.0-3.0 cr. [max 12.0 cr.]; prereq Audition, interview, #; fall, every year)
Ensemble creation of a single theatre performance work. Creative/dramaturgical work. Public showing of work, completed or in-progress. Students work collaboratively with faculty or affiliate guest artists.

TH 4391. BFA Intensive II. (2.0 cr.; A-F or Audit; prereq BFA student in theatre arts; fall, every year)
Applying first three years of training toward performance. Seventh in sequence of eight. Acting, voice, and movement. Integrating the disciplines.

TH 4393. BFA Rehearsal and Performance III. (2.0 cr.; A-F or Audit; prereq BFA student in theatre arts; fall, spring, offered periodically)

TH 4394. BFA Rehearsal and Performance IV. (2.0 cr.; A-F or Audit; prereq BFA student in theatre arts; fall, spring, offered periodically)

TH 4395. BFA Intensive III. (2.0 cr.; A-F or Audit; prereq BFA-acting sr; spring, every year)
Incorporating the disciplines of acting/voice/movement.

TH 4398. BFA Rehearsal and Performance V. (2.0 cr.; A-F or Audit; prereq BFA-acting sr; fall, spring, offered periodically)
Acting, voice and movement. Continuing the application of process toward performance.

TH 4399. BFA Rehearsal and Performance VI. (2.0 cr.; A-F or Audit; prereq BFA-acting sr; fall, spring, offered periodically)
Acting, voice, and movement. Continuing the application of process toward performance.

TH 4532. Makeup for the Actor. (2.0 cr.; fall, spring, every year)
Topics vary. May include functions/aesthetics of stage makeup, application techniques, prosthetics, and facial hair.

TH 4550. Video Technology. (3.0 cr.; fall, spring, every year)
Lighting, camera operation, and recording for video/film production, using the state-of-the-art equipment in Studio B. Hands-on training in tools of video technology. Students create a final group project.

TH 4555. Audio Technology. (3.0 cr.; prereq 1501 or #; fall, offered periodically)

TH 4556. Digital Audio and MIDI for Performance. (3.0 cr.; spring, every year)
Hands-on computer/CPU-generated audio technology. Use of MIDI language protocol for performance in all aspects of the arts.

TH 4711. Intermediate Stage Direction. (3.0 cr.; prereq 1322 or #; fall, spring, every year)

TH 4901. Senior Seminar. (2.0 cr.; S-N or Audit; =DENCE 4901); prereq Sr, [Th or Dnce major]; fall, spring, every year)
Development of senior project, alone or in groups, under guidance of faculty members.

TH 4905H. Honors: Tutorial Seminar in Theatre Arts. (2.0-4.0 cr.; A-F only; prereq 4905H; honors, theatre arts, %; limit [2 cr for [cum laude or magna cum laude], 4 cr for summa cum laude]; fall, spring, every year)
Independent reading/research in preparing honors thesis or selected creative project.

TH 5100. Theatre Practicum. (1.0-4.0 cr. [max 20.0 cr.]; prereq #, %; 4 cr for 3100 for undergrads; fall, spring, every year)
Individual creative projects in production of approved plays as an actor, director, dramaturg, or playwright. (See 5500 for design practicums.)

TH 5117. Performance and Social Change. (3.0 cr.; A-F or Audit; prereq Jr or sr or grad student; )
Reading, writing, research, presentations and workshops explore activist performance projects. Theories of social formation and ideology provide framework to discuss/animate theater's potential for social change.

TH 5179W. Text and Performance. (3.0 cr.; A-F or Audit; prereq [3322, 3171 or 3172] or grad student; fall, every year)
How to read texts toward performance in various dramatic/choral material. Method of unlocking metaphoric energy of texts. Vocabulary/techniques of analysis that transform text from page to stage.

TH 5181W. Blacks in American Theatre. (3.0 cr.; =AFRO 5181W); spring, offered periodically)
Historical survey of significant events in the development of American black theatre traditions. Essays, plays, playwrights, and theatres from early colonial references to the Black Arts Movement.

TH 5182. Contemporary Black Theatre: 1960-Present. (3.0 cr.; =TH 5182W, AFRO 5182W); fall, even years)
Essays, plays, playwrights, and theatres that have contributed to contemporary Black theatre. From the beginning of the Black Arts Movement to the present.

TH 5182W. Contemporary Black Theatre: 1960-Present. (3.0 cr.; =TH 5182W, AFRO 5182W); spring, odd years)
Essays, plays, playwrights, theatres that have contributed to contemporary Black theatre from beginning of Black Arts Movement to present.

TH 5183. Critical Literacy, Storytelling, and Creative Drama. (3.0 cr.; prereq Jr or sr or grad student; summer, every year)
How storytelling and creative drama can be used as tools to help develop K-12 students' critical literacy and to assist them in becoming more fluent readers/writers.

TH 5330. Comedy: Advanced Physical Performance Studio. (3.0 cr.; A-F only; prereq 3331, #; spring, every year)
Mechanics of creating physical comedy.
Focuses on process using clown, Commedia dell'arte, Bouffons, or improvisational comedy.
Exercises on how comedy is born from tragedy and state of conflict within one's self.

TH 5340. Tragedy/Poetry: Advanced Physical Performance Studio. (3.0 cr. [max 6.0 cr.]; A-F only; prereq 4332, 3331, grad student) or #; fall, every year)
Specific tragic/poetic training paradigms in physical theater employed by Stanislavski, Grotowski, Brecht, Lecoq, etc. Psychological, emotional, technical, and physical work.
Tragic action in Greek tragedy, Shakespeare, Melodrama, operatic characterization, Brecht. Original tragic/poetical work.

TH 5355. Puppetry: Techniques and Practice in Contemporary Theater. (3.0 cr.; prereq [3513 or &3513], #) or grad student; fall, spring, every year)
Fundamentals of puppet and object theater/performance are introduced through traditional/contemporary puppetry forms. Focuses on object theater, toy theater, hand puppets, and shadow/Bunraku-style puppets. Readings, in-class screenings of videos/slides. Students
build/create series of short works for in-class performance.

TH 5370. Hand, Mind, and Gesture: An Independent Study in the Creation of Image Driven Performance. (3.0 cr.; prereq 5355, #; spring, every year)
Create single or collaborative performance/event that lives in time/space. Work will draw from personal investigation, amplify personal signature, explore modalities of image driven forms. Propose, develop, construct, rehearse, present finished public performance.

TH 5500. Theatre Design Practicum. (1.0-3.0 cr. [max 20.0 cr.]; prereq 3515, #; %; fall, spring, summer, every year)
Individual projects in production of approved plays as a designer of scenery/properties, costumes, lighting, or sound. (See 5100 for other creative practicums.)

TH 5510. Drawing, Rendering, and Painting for the Theatre Designer I. (3.0 cr.; prereq 3515 or grad or #; fall, spring, offered periodically)
Development of skills necessary for presentation of theatre scene/costume designs. Materials, layout, and techniques in scene painting. Basic drawing/graphic skills.

TH 5520. Scene Design. (3.0 cr. [max 9.0 cr.]; prereq 3515 or grad or #; fall, spring, every year)
Conceiving/communicating design ideas in both two-dimensional sketches and three-dimensional models for theatre and allied venues. Drafting.

TH 5530. Costume Design. (3.0 cr. [max 9.0 cr.]; prereq 3515 or grad or #; fall, spring, every year)
Theory and process of costume design for theatrical productions (e.g., dance, opera, film) through hypothetical productions.

TH 5540. Lighting Design for the Theatre. (3.0 cr. [max 9.0 cr.]; prereq 3515 or grad or #; spring, every year)
Design aesthetics and exploration of design for various stage forms and venues. Development of the lighting plot and paperwork; use of the computer in lighting design.

TH 5545. Stage Lighting Technology. (3.0 cr.; prereq 3515 or grad or #; fall, offered periodically)
The lighting technician's skills and crafts: equipment, techniques, control operation, wiring, and maintenance.

TH 5554. Multimedia Production for Live Performance. (3.0 cr.; prereq 5553 or #; )
Use of multimedia production technologies in actual production. Students apply knowledge/skill in conjunction with an artistic team on a production and are an integral part of the development/realization of that production.

TH 5556. Audio Engineering. (3.0 cr.; prereq 4555, #; spring, offered periodically)
Miking/recording techniques specific to music/dramatic dialogue. Recording different styles of music. Hands-on recording of bands, doing final mixes to demo CD. Field trips to professional studios and club/concert recordings.

TH 5559. Sound Design for Performance. (3.0 cr.; prereq 4555 or #; fall, spring, offered periodically)
Audio technology/psychology, their impact on audience in a performance. Communication, design process, psychoacoustics, script analysis.

TH 5560. Drawing, Rendering, and Painting for the Theatre Designer II. (3.0 cr.; prereq 5510; spring, offered periodically)
Development of skills necessary for presentation of theatre scene/costume designs. Materials, layout, and techniques in scene painting. Rendering and scene painting skills.

TH 5570. Properties/Scenery Technology. (1.0-3.0 cr. [max 15.0 cr.]; prereq 3515 or grad or #; fall, spring, every year)
Management, structures, upholstery, mask-making, furniture construction, stage mechanics, soft properties, faux finishes. Topics specified in Class Schedule.

TH 5580. Costume Technology. (3.0 cr. [max 15.0 cr.]; prereq 3515 or grad or #; fall, spring, every year)
Fabric enhancement techniques, masks, wig-making, millinery, makeup prosthetics, pattern drafting, and draping. Topics specified in Class Schedule.

TH 5590. Theatre Technology Practicum. (1.0-3.0 cr. [max 15.0 cr.]; prereq 3515, #, %; 4 cr max for undergrads; fall, spring, summer, every year)
Individual creative project in technology/craft area of theatre. Practical work in costume, lighting, makeup, props, scenery, sound, or theatre management.

TH 5711. Advanced Stage Direction. (3.0 cr.; prereq [4711, #] or grad student; fall, spring, offered periodically)

TH 5716. Stage Management for the Theatre. (4.0 cr.; prereq [1101, 1321, soph] or grad; fall, every year)
Theories, practicalities, and techniques for rehearsal/performance. Organizing/managing various types of performance venues.

TH 5760. Advanced Stage Management. (2.0-3.0 cr. ; prereq 5716 or & 5716, #; [4 cr max for undergrads]; fall, spring, every year)
Practical experience in stage management for specific productions of the University Theatre with emphasis on rehearsal and performance.

TH 5950. Topics in Theatre. (1.0-4.0 cr. [max 20.0 cr.]; fall, spring, summer, every year)
Topics specified in Class Schedule.

TH 5993. Directed Study. (1.0-5.0 cr. [max 20.0 cr.]; fall, spring, summer, every year)
Guided individual reading or study. Prereq 6 Th cr, instr consent, dept consent, college consent.

Academic Affairs, Senior Vice President

TLDO 3025. Exploring Spanish Culture Through Digital Technology. (3.0 cr. [max 6.0 cr.]; A-F only; summer, every year)
Study abroad course.

Toxicology (TXCL)
College of Veterinary Medicine

TXCL 5000. Directed Research in Toxicology. (1.0-5.0 cr. [max 80.0 cr.]; A-F or Audit; prereq #; fall, spring, every year)
Special project that addresses specific issue in toxicology. Under guidance of faculty member.

TXCL 5011. Principles of Toxicology. (2.0 cr.; A-F or Audit; prereq Grad txcl major or #; )
Introduction to fundamentals of poisoning in individuals and the environment, assessment of potential health hazards, and application of toxicology in various professional careers.

TXCL 5012. Principles of Toxicology. (3.0 cr.; A-F or Audit; prereq At least one semester [biochemistry, calculus, cell biology]; at least one semester of [human or animal] physiology recommended; spring, every year)

TXCL 5013. Chemical Toxicology. (3.0 cr.; A-F or Audit; prereq 5012, #; fall, every year)
Signs, symptoms, and mechanism of toxicity of different classes of chemicals spanning several organ systems, including chemical carcinogenesis.

TXCL 5101. Molecular and Cellular Basis of Nanoparticle Toxicology. (3.0 cr. [max 6.0 cr.]; A-F or Audit; [=Vmed 5101]; prereq Introductory toxicology course; fall, odd years) Introduction to science of nanotoxicology. Nanotechnology in scientific research. Assessment of impact on biological systems.

TXCL 5195. Veterinary Toxicology. (3.0 cr.; A-F or Audit; [=CVM 6195]; prereq Grad student or #; fall, every year)
Toxicology of minerals, pesticides, venoms, and various toxins. Identification of poisonous plants. Recognition, diagnosis, and treatment of animal poisons.

TXCL 5545. Introduction to Regulatory Medicine. (2.0 cr.; A-F or Audit; [=CVM 6545]; prereq Grad student or #; spring, offered periodically)
Explanation of products requiring pre-market approval and those that may be marketed without approval. Post-market surveillance. Adverse reactions, removal of product from market.

Translation and Interpreting (TRIN)
College of Continuing Education

TRIN 900. Special Education for Interpreters. (0.0 cr.; S-N only; spring, every year)
Terminology, processes, concepts, and legalities involved in interpreting in special education settings.
TRIN 990. Interpreting in Special Education Settings. (0.0 cr.; S-N only; fall, every year) Advanced skills to apply special education protocols/concepts to simulated interpreting encounters. Self-assessment, glossary compilation, critical analysis, review of ethical procedures.

TRIN 1201. Health Care Terms and Concepts for Interpreters. (3.0 cr.; A-F or Audit; fall, every year) Technical vocabulary, oral discourse patterns used by health care providers in talking to patients, family members. Language of American health care interview.


TRIN 3001. Introduction to Translation. (3.0 cr.; prereq Bilingual proficiency in [English, second language of instruction]; fall, summer, every year) Theory of and supervised practice in translation. Re-expressing meaning in a second language. Translation primarily of English language texts concerning public health/safety, legal/voting rights, regulations, and procedures.

TRIN 3002. Intermediate Translation. (3.0 cr. [max 6.0 cr.]; prereq 3001; spring, offered periodically) Additional instruction and supervised practice in translation.

TRIN 3005. Principles of Translation. (3.0 cr.; prereq Fluent in English, proficient in a second language, not in CCE certificate prog in interpreting; basic knowledge of English grammar recommended; fall, offered periodically) Key linguistic principles that help us understand how language makes meaning. Applying principles to translation.

TRIN 3101. Introduction to Interpreting. (3.0 cr.; prereq high level of proficiency in spoken English and another language; 3001 recommended; fall, spring, every year) Practical and theoretical introduction to interpreting in health, human service, and legal settings. Emphasis on understanding the unique role of the interpreter, current models and modes of interpreting, ethical issues and professional standards of practice, and developing pre-interpreting skills.

TRIN 3102. Consecutive Interpreting. (3.0 cr.; prereq 3101, high level of proficiency in [spoken English, another language]; spring, every year) Practice/theory at professional level in interpreting in health, human service, legal settings. Emphasizes professional/client dialogues. Consecutive interpreting skills, vocabulary research/storage, intercultural issues. Analyzing interpretive process. Performance assessment through audio/ videotaping. Subject languages (e.g., Spanish, Russian, Somali) specified for each section.

TRIN 3900. Topics in Translation and Interpreting. (3.0 cr. [max 12.0 cr.]; fall, spring, offered periodically) Topics specified in Class Schedule.

TRIN 4201. Interpreting in Health Care Settings. (3.0 cr.; A-F or Audit; prereq 1201, 3102; spring, every year) Practice in interpreting simulated clinical encounters and monologues. Fluency/accuracy in consecutive/simultaneous modes. Sight translation, medical vocabulary in two languages, ethical/situational considerations in health care interpreting. Coursework mainly in bilingual sections (English, another language).


TRIN 5900. Topics in Translation and Interpreting. (1.0-4.0 cr. [max 16.0 cr.]; fall, spring, summer, offered periodically) Topics specified in Class Schedule.

TRIN 5993. Directed Study. (1.0-3.0 cr. [max 6.0 cr.]; fall, spring, summer, every year) Directed study in translation/interpretation.

University College (UC) College of Continuing Education

UC 1005. Global Perspectives on Higher Education. (2.0 cr. [max 4.0 cr.]; prereq International student; fall, spring, every year) Provides international students with the skills to examine, process, and articulate the values, contexts, and goals of the American higher educational system as it compares to their previous experiences.

UC 1485. Creativity: Photography. (4.0 cr.; =PSTL 1485; prereq Own camera [35 mm w/ adjustable controls preferred], UC; $50 lab fee; fall, spring, every year) Conceptual, technical, and historical aspects of photography as art. Hands-on experience with camera control, film development, enlarging, and printing in black-and-white. Individual/group critiques of student portfolios. Lab.

UC 3201. Web Designer Introduction. (4.0 cr.; fall, spring, summer, every year) Web design process: plan, design, launch, and publish. Design principles, business practices, site analysis. Students use industry standard Web design software, including Adobe Photoshop, Macromedia Dreamweaver, and Flash, to build Web site. HTML, CSS. Lectures, exercises, lab.

UC 3202. Web Designer Introduction II. (4.0 cr.; prereq 3201 or #; spring, every year) Designing with Adobe Photoshop vector tools, using batch processing. Macromedia Flash as an animation tool. Developing an environment through ActionScripts. DHTML Layers, HTML frames, form processing. Internet service providers, hosting, search engines, Web site marketing.

UC 3950. Special Topics. (1.0-4.0 cr. [max 12.0 cr.]; fall, spring, summer, every year) Special topics course.

UC 4003. Internship in Substance Abuse Counseling II. (4.0 cr.; S-N or Audit; prereq Adds 4001, Adds 4002, Adds student; #; fall, offered periodically) Students' knowledge, internship site functioning, and counseling skills are advanced through clinical experience/supervision.

UC 4301. Perspectives: Interrelationships of People and Animals in Society Today. (2.0 cr. [max 3.0 cr.]; =VCS 3050; spring, every year) Interrelationships of people and animals from several viewpoints. Social, economic, and health consequences of these relationships, including issues such as pets and people sharing an urban environment, animal rights, and the influence of differences in cultures on animal-human relationships.

UC 5075. Directed Study. (1.0-8.0 cr.; fall, spring, summer, every year) Directed study.

UC 5950. Special Topics. (1.0-8.0 cr. [max 16.0 cr.]; fall, spring, summer, every year) Special topics.

Urban Studies (URBS) College of Liberal Arts

URBS 1001W. Introduction to Urban Studies: The Complexity of Metropolitan Life. (3.0 cr.; A-F or Audit; fall, spring, every year) Interdisciplinary course, ranging across spatial, historical, economic, political, and design perspectives, among many others.

URBS 3001W. Introduction to Urban Studies: The Complexity of Metropolitan Life. (3.0 cr.; A-F or Audit; fall, spring, every year) Interdisciplinary course, ranging across spatial, historical, economic, political, and design perspectives, among many others.

URBS 3201. Urban Studies Colloquium. (1.0 cr. [max 4.0 cr.]; A-F or Audit; prereq %; fall, every year) Urban/ metropolitan issues. Topics vary to reflect current concerns. In-depth reading, intensive group discussion.

URBS 3202. Urban Studies Colloquium. (1.0 cr. [max 4.0 cr.]; A-F or Audit; spring, every year) Urban/metropolitan issues. Topics vary to reflect current concerns. In-depth reading, intensive group discussion.

URBS 3301W. American Cities As Settings for Cultural Diversity. (3.0 cr.; fall, every year) Explores cultural diversity in American cities, considering patterns of and reasons for racial
and class segregation and interaction. Its foci are the problems, conflicts, and successes of cultural diversity from a multidisciplinary perspective.

URBS 3500. Urban Studies Workshop. (3.0 cr.; [max 9.0 cr.]; A-F or Audit; prereq #; fall, spring, every year) Links academic learning to actual urban problems/issues. Focuses on specific topic using local community as laboratory. Field work, contact with local institutions/ agencies.

URBS 3751. Understanding the Urban Environment. (3.0 cr.; A-F or Audit; spring, every year) Examine links between cities and the environment with emphasis on air, soil, water, pollution, parks and green space, undesirable land uses, environmental justice, and the basic question of how to sustain urban development in an increasingly fragile global surrounding.

URBS 3771. Fundamentals of Transit. (3.0 cr.; A-F only; spring, even years) Importance of transit to an urban area. Issues surrounding development/operation of transit. Defining various modes of transit, evaluating why/where each may be used. Making capital improvements to transit system. Finance, travel demand forecasting, environmental assessment, scheduling, evaluation of effectiveness/accessibility.

URBS 3861. Financing Cities. (3.0 cr.; A-F only; fall, odd years) Readings, lecture, discussion, coursework. Services/projects cities provide/finance. Ways in which developers/consumers participate in urban development through policies and financial tools. Challenges cities face in determining budgets.

URBS 3871. A Suburban World. (3.0 cr.; fall, odd years) Suburbs as sites of urgent battles over resources, planning practices, land use, and economic development. How suburban life shapes values, political ideals, and worldviews of its populations.

URBS 3900. Urban Studies Internship Seminar. (2.0 cr. [max 4.0 cr.]; A-F or Audit; prereq Sr, internship placement, %; #; fall, spring, summer, every year) Weekly seminar integrates internship experience with academic program.

URBS 3955W. Senior Paper Seminar. (2.0 cr.; A-F or Audit; prereq %; fall, spring, every year) Methods/resources for research. Substantial writing.

URBS 3993. Urban Studies Directed Study. (1.0-3.0 cr. [max 6.0 cr.]; A-F or Audit; fall, spring, summer, every year) For students with a specific educational objective that cannot be satisfied through regular curriculum (e.g., foreign study) and for honors students to complete an honors opportunity. Prereq UrbS majors, instr consent, dept consent.

URBS 5101. The City and the Metropolis: An Exploration. (3.0 cr.; A-F only; prereq Grad student or [adv UrbS undergrad, #]; spring, even years) The City and the Metropolis as places that result from important acts of human creativity. Interdisciplinary/exploratory perspectives. Building/developing (North American) cities, Construction of "urban culture."

URBS 5861. Financing Cities. (3.0 cr.; A-F only; fall, odd years) Services/projects cities provide/finance. Ways in which developers/consumers participate in urban development through policies and financial tools. Challenges cities face in determining budgets.

Veterinary & Biomedical Sciences (VBS)

College of Veterinary Medicine


VBS 2032. General Microbiology With Laboratory. (5.0 cr.; A-F only; [MICB 3303, MICB 3301, BIOL 2032]; prereq One semester each of college chemistry, biology; fall, spring, every year) Bacterial metabolism, growth/genetics, biology of viruses/fungi. Control of microorganisms. Host-microbe interactions, microorganisms/disease, applied microbiology.

VBS 2100. Companion Animal Anatomy. (3.0 cr.; A-F only; prereq General Biology (e.g., BIOL 1009) is recommended; spring, every year) Develop anatomical knowledge through study/dissection. Compare/contrast animal adaptations.

Veterinary Clinical Sciences (VCS)

College of Veterinary Medicine


VCS 4992. Directed Readings in Veterinary Clinical Sciences. (1.0-6.0 cr. [max 12.0 cr.]; A-F only; prereq [One-page proposal, bibliography of works to be read] submitted to faculty; fall, spring, summer, every year) Students read seminal works in veterinary medicine and literature pertaining to their area of interest. Final project evaluated by faculty member.

VCS 4993. Directed Study in Veterinary Clinical Sciences. (1.0-6.0 cr. [max 12.0 cr.]; A-F only; prereq One-page proposal submitted to faculty member; fall, spring, summer, every year) Students expand their knowledge of a specific area. Final project evaluated by faculty member.

VCS 4994. Directed Research in Veterinary Clinical Sciences. (1.0-6.0 cr. [max 12.0 cr.]; A-F only; prereq One-page proposal submitted to faculty member; fall, spring, summer, every year) Students perform research in lab setting.

Veterinary Medicine, Graduate (VMED)

College of Veterinary Medicine

VMED 5080. Problems in Veterinary Epidemiology and Public Health. (1.0-3.0 cr.; A-F or Audit; fall, spring, every year) Individual study on problem of interest to epidemiology or public health student.

VMED 5082. Diagnostic Epidemiology of Infectious Diseases. (2.0 cr.; A-F only; prereq Statistics course or #; spring, every year) Theoretical principles, practical applications of diagnostic testing in populations. Examples related to infectious diseases in veterinary/human health. Basis of test performance, limitations, interpretations.

VMED 5090. Seminar: Veterinary Epidemiology. (1.0 cr. [max 3.0 cr.]; S-N or Audit; prereq Veterinary Medicine grad student; fall, spring, every year) Each student leads at least one seminar. Reviews of current research, literature reviews, and technique development. Students and participating faculty participate in presentation, discussion, and administration of the seminars.

VMED 5101. Molecular and Cellular Basis of Nanoparticle Toxicity. (3.0 cr. [max 6.0 cr.]; A-F or Audit; [TACL 5101]; fall, every year) Use of nanotechnology in scientific research. Impact of nanomaterials on biological systems.

VMED 5165. Surveillance of Foodborne Diseases and Food Safety Hazards. (2.0 cr.; [professional school or grad student] or #; spring, every year)

VMED 5180. Ecology of Infectious Disease. (3.0 cr.; [CMB 5180, PUBH 6380]; fall, every year)
How host, agent, environmental interactions influence transmission of infectious agents. Environmental dissemination, eradication/ control, evolution of virulence. Use of analytical/molecular tools.

VMED 5181. Spatial Analysis in Infectious Disease Epidemiology. (4.0 cr.; Student Option No Audit; [CMB 5181]; prereq Intro to epidemiology, statistics, #; spring, every year)

VMED 5190. Seminar and Presentation Development. (2.0 cr.; S-N only; prereq Grad student; fall, every year)
Skills needed to research, organize, develop, and deliver an oral scientific presentation or to assist in finding, compiling, and organizing information for presentations, theses, or papers suitable for publication.

VMED 5193. Dairy Decision Making in a Financial Context for Veterinarians. (3.0 cr.; A-F only; fall, every year)
Concepts/tools of economic analysis needed to support decision making on dairy farms, particularly as those decisions relate to health, disease impact, nutrition, general farm management. Prereq Earned DVM, instr consent.

VMED 5196. Dairy Production Medicine. (4.0 cr.; A-F only; prereq DVM degree, #; fall, every year)
Intense eight week course designed to develop advanced knowledge/skills in dairy production medicine. Mixture of lectures, wetlabs, farm investigations, presentations. Held at Dairy Education Center at New Sweden Dairy.

VMED 5210. Advanced Large Animal Physiology I. (1.0-3.0 cr. [max 6.0 cr.]; fall, every year)
Review of large animal physiology at level needed for specialty board certification or beginning research. Students present topics in physiology and supplement reading with clinical case material or journal articles.

VMED 5211. Advanced Large Animal Physiology II. (1.0-3.0 cr.; A-F or Audit; prereq #; 5210 recommended; spring, every year)
Large animal physiology for specialty board certification or beginning research. Students present topics in physiology and supplement reading with clinical case material or journal articles.

VMED 5232. Comparative Clinical Veterinary Dermatologic Pathology. (1.0 cr. [max 2.0 cr.]; S-N only; prereq DVM degree or foreign equiv; fall, spring, every year)
Microscopic pathology of basic dermatologic reactions and of variable disease states.

VMED 5240. Advanced Small Animal Pathobiology I. (1.0 cr.; A-F only; fall, every years)
Biology, physiology, pathophysiology, and medicine of disciplines relevant to companion animals. Pathogenesis/treatment of diseases. Developing hypotheses that can be translated into clinical research. Prereq CVM grad student, [DVM or foreign equiv] degree.

VMED 5241. Advanced Small Animal Pathobiology II. (1.0 cr.; A-F only; spring, odd years)
Overview of biology, physiology, pathophysiology, and medicine of disciplines. Underlying pathogenesis/treatment of diseases of companion animals. Developing hypotheses that could be translated into clinical research. Prereq CVM grad student, [DVM or foreign equiv] degree.

VMED 5242. Advanced Small Animal Pathobiology III. (1.0 cr.; A-F only; fall, odd years)
Overview of biology, physiology, pathophysiology, and medicine. Underlying pathogenesis/treatment of diseases of companion animals. Developing hypotheses that could be translated into clinical research. Prereq CVM grad student, [DVM or foreign equiv] degree.

VMED 5243. Advanced Small Animal Pathobiology IV. (1.0 cr.; A-F only; spring, even years)
Overview of biology, physiology, pathophysiology, and medicine. Underlying pathogenesis/treatment of diseases of companion animals. Developing hypotheses that could be translated into clinical research. Prereq CVM grad student, [DVM or foreign equiv] degree.

VMED 5250. Basic Microbiology. (3.0 cr.; S-N only; prereq Intro course in microbiology; fall, every year)
Bacterial/viral infections of veterinary/zoonotic importance. Includes laboratory identification of microorganisms. Underlying pathogenesis/treatment of diseases important to animal and public health.

VMED 5295. Problems in Large Animal Clinical Medicine. (3.0 cr.; A-F only; prereq Grad student in CMB or [VMED, [DVM degree or foreign equivalent]; fall, every year)
Hospital cases using standardized format, audiovisual aids. Review literature pertaining to case. One or two cases presented by enrolled participants per month.

VMED 5310. Topics in Veterinary Clinical Pathology. (1.0 cr. [max 2.0 cr.]; S-N only; prereq Grad student in CVM; fall, spring, every year)
Modified rounds format. Cases from VMC used to explore cytology with associated chemistry/ hematology data. Attendees/clinicians can request lab topics for discussion. Past topics have included lab measurement of chemical analytes, test sensitivity or specificity (e.g., ethylene glycol test, FELV test), lab testing for infectious agents.

VMED 5319. Veterinary Gross Pathology. (1.0 cr. [max 3.0 cr.]; S-N only; fall, spring, every year)
Diagnosing gross lesions of tissues. Evaluating images from wide variety of animals submitted to lab. Mock exams. Students prepare two in-depth reviews on topics covered during in course. Prereq Grad student in CMB or [VMED, [DVM degree or foreign equivalent], college consent]

VMED 5510. Scientific Writing and Speaking. (2.0 cr.; A-F only; prereq Grad student in health sciences; fall, odd years)

VMED 5520. Molecular Epidemiology of Infectious Disease. (3.0 cr.; A-F only; prereq Basic course in microbiology; spring, every year)

VMED 5540. Microbial Risk Assessment of Foods. (3.0 cr.; Student Option No Audit; prereq Intro course in microbiology, [basics algebra, calculus, probability theory, probability distributions] or #; spring, every year)
Risk analysis process as part of science-based decision-making. Conduct microbial risk assessment by different steps of hazard
identification, hazard characterization, exposure assessment/risk characterization. Qualitative/quantitative tools.

VMED 5496. Training in Swine Production and Management. (4.0 cr.; S-N only; prereq VMED grad student or #: fall, spring, every year)
Production module introduces techniques/protocols for swine production system operation. Research module covers applied research trials for viral/bacterial pathogens in pigs.

VMED 5594. Research in Veterinary Medicine. (0.5-4.0 cr.; max 8.0 cr.; prereq Jr, #: fall, spring, summer, every year)
Independent study as determined by instructor. Usual activity includes conducting research in instructor’s lab, though research in field may also be included.

VMED 5596. Swine Diseases and Diagnostics. (2.0-3.0 cr.; max 2.0 cr.; fall, spring, every year)
Review of recent advances in swine diseases; farm visits for on-farm disease diagnostics and control programs.

VMED 5621. Principles of Veterinary Anesthesiology. (2.0 cr.; A-F only; prereq VMed grad student, [DVM degree or foreign equiv], instr consent; spring, every year)
In-depth training in principles of veterinary anesthesiology. Lectures, anesthesia labs, presentations by students.

VMED 5670. Bovine Surgery Practicum. (2.0 cr.; S-N only; prereq [VMed grad student, [DVM degree or foreign degree]] or #: fall, spring, every year)
Intensive training in ruminant surgery. Evaluation of food animal surgery principles, hands-on laboratory components.

VMED 5910. Grant Writing: What Makes a Winning Proposal?. (2.0 cr.; A-F only; prereq VMed grad student, [DVM degree or foreign degree] or #: spring, every year)
Components of a strong proposal. Grant submission process. What reviewers look for. How to locate grant announcements that match research interests.

VMED 5920. Food Defense: Prepare, Respond, Recover. (3.0 cr.; A-F only; prereq Grad or professional student or #: fall, every year)
Basic principles of preparedness/emergency response. Instructor may substitute topics if timelier topic arises.

VMED 5921. Seminar in Food Protection and Defense. (1.0 cr.; fall, spring, every year)
Complexities of our food systems. Natural/intentional threats to food security within various industry sectors. Which agencies are responsible for regulating food chains, monitoring food safety, responding to contamination events.

VMED 5991. Animal Health and Food System Policy and U.S. State government. (1.0 cr. [max 2.0 cr.]; S-N only; fall, spring, every year)

VMED 5992. Animal Health and Food System Policy and U.S. National Government. (0.0-1.0 cr.; S-N only; prereq DVM or equiv degree or current DVM student or #: spring, every year)
Evidence-based policy development. Relevant global animal health and food system issue. Role of scientific evidence in developing/implementing policy. Policy-making process as it pertains to trade, animal health, and food system at national level, as well as role of scientific evidence.

VMED 5993. Animal Health and Food System Policy and Intergovernmental Organizations. (1.0 cr.; S-N only; prereq DVM or equiv degree or current DVM student or #: spring, every year)
Evidence-based policy development. Relevant global animal health and food system issue. Role of scientific evidence in developing/implementing policy. Policy-making process as it pertains to trade, animal health, and food system across intergovernmental organizations. Role of scientific evidence in intergovernmental organization's policy development.

VMED 5994. Advanced Clinical Epidemiology. (1.0 cr.; A-F only; fall, every year)
An in-depth focus on infectious disease epidemiology, with opportunities to apply epidemiologic principles to control infectious diseases in animal populations.

VMED 5995. Engaging Intergovernmental Organizations. (1.0 cr.; S-N only; fall, spring, every year)
Relevant policy issues/roles of intergovernmental organizations. Discussions/debate about current issue, interact with key officials, perform group task assignments, develop/deliver presentation to relevant leaders.

VMED 5996. Professional Communications: Policy Issue Briefs. (1.0 cr. [max 2.0 cr.]; S-N or Audit; prereq Students must have a professional or graduate degree related to human, animal, or ecosystem health or be pursuing a graduate degree (MS/PhD) or professional masters (MPH/MPA) or #: fall, every year)

VMED 5998. Leadership to Address Global Grand Challenges. (1.5 cr.; Student Option No Audit; prereq Grad or professional student; spring, every year)

VMED 5999. Professional Communications: Agendas, Minutes, Briefing Memos, Decision Memos. (1.0 cr.; S-N only; prereq Professional or graduate degree related to human, animal, or ecosystem health or be pursuing a graduate degree (MS/PhD) or professional masters (MPH/MPA) or #: fall, every year)
Improve professional communications to increase effectiveness of meetings, conference calls. Enhance influence of emails, minutes, issue briefs/decision memos. Compose/critique meeting agendas, minutes, notes, summaries, e-mails, trip reports. Produce issue briefs/decision memos.

VPM 1550. Introduction to the horse including care, handling, and recognizing behaviors. (1.0 cr.; fall, spring, summer, every year)
Horse breeds, colors, behaviors. Basic care/handling. Online course, but includes three labs working with live horses.

VPM 1560. Introduction to Horseback Riding and Horse Health. (2.0 cr.; fall, spring, summer, every year)
Basic motor skills/commands necessary to ride horse. Focus on interaction of human body with horse’s body to create movement. Basic horse care skills, grooming, taking temperature, using hoof tester, etc.

VPM 1905. Freshman Seminar. (2.0-3.0 cr.; A-F only; fall, spring, every year)
Freshman seminar.

VPM 1906W. Garbage, Government and the Globe. (3.0 cr.; A-F only; fall, every year)
Freshman Seminar

VPM 3101. Animal Toxicology and the Environment. (3.0 cr.; A-F only; spring, every year)
Different aspects of Animal Toxicology/its relationship to environment.

VPM 3700. Equine Reproduction and Breeding Management. (2.0 cr.; A-F only; prereq AnSc 3305 recommended; spring, every year)
Vienna Executive MBA (VMBA)
Curtis L. Carlson School of Management

VMBA 5700. Managerial Accounting. (4.0 cr.; A-F or Audit; spring, every year)

VMBA 5701. Data Analysis and Decision Making. (4.0 cr.; A-F or Audit; spring, summer, every year)
Exploratory data analysis, basic inferential procedures, statistical process control, regression analysis, decision models.

VMBA 5702. Financial Management. (4.0 cr.; A-F or Audit; spring, summer, every year)
Theory/practice of finance from an analytical approach. Students apply concepts of risk, return, valuation to decisions that a corporate financial officer or person engaged in small business must make about sources/uses of funds during changing financial markets.

VMBA 5703. Marketing Management. (4.0 cr.; A-F or Audit; spring, summer, every year)
Developing/implementing most appropriate combination of variables to carry out a firm’s strategy in its target markets. Analytic perspectives, concepts, decision tools of marketing for product offering decisions, distribution channel decisions, pricing decisions, communication program decisions.

VMBA 5704. Managing People and Organizations. (4.0 cr.; A-F or Audit; spring, every year)
Theories/frameworks for analyzing behavior of individuals, groups, organization itself. Emphasizes making decisions, developing action plans. Concepts/principles associated with function of human resource management (e.g., personnel selection, reward/compensation, collective bargaining).

VMBA 5705. Operations Management. (4.0 cr.; A-F or Audit; fall, every year)
Operations management function in different types of organizations. Emphasizes productive, innovative, competitive operations. Concepts/principles related to management of quality/innovation within service/manufacturing organizations.

VMBA 5706. Business, Government, and Macroeconomics. (4.0 cr.; A-F or Audit; fall, every year)
Roles of government/business in society. Alternative systems of economics, political values. Social, political, economic, cultural conflicts affecting business sector.

VMBA 5707. Economics in Transition. (4.0 cr.; A-F or Audit; fall, every year)
Technological, political, and ethical forces that are shaping the competitive environment. Theoretical considerations. Business responses to specific issues. Projects/cases for companies in East Central Europe.

VMBA 5709. Info Tech Mgmt. (4.0 cr.; A-F or Audit; spring, every year)
Various information technologies, their applications. Competitive advantages associated with information technology, organizational/managerial implications.

VMBA 5710. Advanced Financial Management for Global Markets. (4.0 cr.; A-F or Audit; spring, every year)
Advanced financial concepts for corporate financial decisions at executive level. Investment, firm financing, global markets.

VMBA 5711. Managing Globalization (Guangzhou). (4.0 cr.; A-F or Audit; spring, summer, every year)

VMBA 5712. Strategies for a Global Company: an Integrative Perspective. (6.0 cr.; max 36.0 cr.; A-F or Audit; spring, every year)
Multi-disciplinary perspectives from strategic marketing, corporate strategy, operations management. Involvement of faculty/corporate executives. Site visits to global companies, student projects. Capstone course.

VMBA 5713. Negotiations and Conflict Management. (4.0 cr.; A-F only; spring, every year)
Typical challenges faced when negotiating. Strategies for managing challenges and improving skills as a negotiator and conflict manager.

VMBA 5714. Financial Accounting. (4.0 cr.; A-F or Audit; spring, every year)

Warsaw Executive MBA (WMBA)
Curtis L. Carlson School of Management

WMBA 5650. Management Challenges and Organizational Behavior. (3.0 cr.; A-F or Audit; fall, spring, every year)

WMBA 5651. Human Resources Management. (3.0 cr.; A-F or Audit; )
Human resources issues from managerial perspective. External environment in which firm operates, characteristics of its workforce. The firm’s developed culture. Strategy of the organization, technology of production, organization of work. Framework for managing human resources strategically.

WMBA 5653. Managerial Economics. (3.0 cr.; A-F or Audit; )
Tools, economics principles that provide overview of competition/cooperation in different environments. Emphasizes practical implications of principles.

WMBA 5654. Business Law. (3.0 cr.; A-F or Audit; )

WMBA 5655. Data Analysis and Reasoning. (3.0 cr.; A-F or Audit; )
Exploratory data analysis, inferential procedures, regression analysis, and time series analysis in a business setting. Overview of graphical/numerical methods for summarizing data. Use of inferential statistics. Focuses on sampling distribution of a statistic.

WMBA 5656. Financial Accounting. (3.0 cr.; A-F or Audit; fall, spring, every year)
Introduction to accounting system used by firms to measure/report their economic performance and financial position to external constituents, such as stockholders, creditors, and potential investors. Basic accounting model, its strengths/shortcomings.

WMBA 5657. Managerial Accounting. (3.0 cr.; A-F or Audit; )

WMBA 5658. Financial Management. (4.5 cr.; A-F or Audit; )

WMBA 5659. Strategic Marketing Management. (4.5 cr. [max 435.0 cr.]; A-F or Audit; )
Marketing concepts/analysis, strategy/planning in different market conditions.
Lectures, readings, case discussions, computer simulation.

**WMBA 5660. Operations and Logistics Management.** (4.5 cr.; A-F or Audit; ) Operations/business logistics as field of managerial responsibility. Linkages between logistics, operations, and other managerial disciplines, such as marketing and finance.

**WMBA 5661. Managing in an International Environment.** (4.5 cr.; A-F or Audit; fall, offered periodically) Policies to balance constraints produced by globalization and regional economic integration, in order to reduce transaction costs for business/public.

**WMBA 5662. Macroeconomic Business Environment.** (3.0 cr.; A-F or Audit; spring, every year) Students apply methods of decision-making, and of business/public policy analysis, in various real situations drawn from experience of developed market economies.

**WMBA 5663. Business Ethics.** (1.5 cr.; A-F or Audit; ) Ethical dimension of business decision-making in a market economy. Does behaving ethically mean more than behaving legally? Do managers have responsibilities to parties other than stockholders? How can managers balance potentially conflicting obligations? Is there a logical relationship between ethical behavior and profitability? Ethical dilemmas in various business settings.

**WMBA 5664. Strategic Management.** (4.5 cr.; A-F or Audit; fall, spring, every year) Integrated top-executive point of view on successful managing of diverse businesses in a challenging game with competitors. Analytical skills, creative synthesis of diverse factors, individual/team work, informatin search, problems formulation. Decision making under conditions of time pressure, uncertainty, ambiguity, and risk.

**WMBA 5665. Management Information Systems.** (3.0 cr.; A-F or Audit; fall, spring, every year) Information technology/systems. Data flow diagrams, data modeling, electronic commerce, HTML, Web design, ERP systems, database management systems, business process re-engineering.

**WMBA 5666. Effective Decisions.** (1.5 cr.; A-F or Audit; fall, spring, every year) Identifying barriers to effective decision making in business. Different forms of decision making. Methods of overcoming barriers and managing practical difficulties.

**WMBA 5670. Field Project.** (12.0 cr.; A-F or Audit; ) Students define problem; gather, analyze, and evaluate data; develop managerial recommendations; and prepare/present a report.

**WMBA 5673. Strategic Brand Management.** (1.5 cr.; A-F only; spring, every year) Warsaw Executive MBA: Strategic Brand Management

**WMBA 5696. Developing a New High-Growth Business.** (1.5 cr. [max 3.0 cr.]; A-F only; fall, spring, summer, every year) Entrepreneurship as a business phenomenon, whether as a corporate or independent venture or as an alliance. How to apply knowledge to new-business development process.

**WMBA 5700. Developing Management Skills.** (1.5 cr.; A-F only; spring, every year) How writing works in varying contexts/genres, how it presents complex arguments. Students read/analyze increasingly challenging texts. Concepts of audience, purpose, and context. Library research, guided revision.

**WRIT 1905. Topics: Freshman Seminar.** (3.0 cr.; A-F only; prereq Fr; fall, every year) Topics vary.

**WRIT 1908W. Topics: Freshman Seminar.** (3.0 cr.; prereq Fr; fall, every year) Topics specified in Class Schedule.

**WRIT 1910W. Topics: Freshman Seminar.** (3.0 cr.; prereq Fr; fall, every year) Topics vary.

**WRIT 3001. Introduction to Technical Writing and Communication.** (3.0 cr.; A-F only; prereq Technical Writing & Communication Major or #: fall, every year) Research origins/history. Technical communication. Audience, purpose, ethics, global communication, collaboration, usability, digital writing technologies. Journal articles, student/professional organizations, guest presentations, interviews, digital portfolio. Oral presentations, research.

**WRIT 3029W. Business and Professional Writing.** (3.0 cr.; [ENGL 3029W]; fall, spring, every year) Practice writing for various professional purposes/audiences, using appropriate styles, tones, and organizational elements. Potential genres include proposals, reports, web content, email, executive summaries, job search portfolios. Attention to workplace collaboration and broader issues of professional literacy.

**WRIT 3101W. Writing Arguments.** (3.0 cr.; A-F or Audit; prereq Soph or jr or sr; fall, spring, every year) Classical appeals of ethos, logos, and pathos. Different styles/levels of complexity. Logical arguments, logical fallacies, credibility issues. Ways to integrate evidence. Uses of grammar/punctuation.

**WRIT 3102W. Public Writing.** (3.0 cr.; A-F only; prereq Soph or jr or sr; fall, spring, every year) Practice and study of public writing beyond the academy or professions. Examine public documents and apply critical/rhetorical analysis regarding audience, purpose, message, power, and context. Students conduct research/write documents for public audiences on contemporary issues of interest.

**WRIT 3152W. Writing on Issues of Science and Technology.** (4.0 cr.; A-F or Audit; fall, spring, every year) Read books/articles, discuss, and write about major issues in science/technology. Possible topics: DNA and human genome. Animal/human interaction. Global warming; Alternative energies; Animal/human cloning and stem-cell research. Vaccines from Smallpox to AIDS. Why civilizations collapse.

**WRIT 3221W. Communication Modes and Methods.** (4.0 cr.; A-F only; prereq Soph or jr or sr; fall, spring, every year)
Theories/practices of interpersonal, small group, organizational, and scientific and technical communication. Lecture, discussion, simulations, small group work.

WRIT 3244W. Critical Literacies: How Words Change the World. (3.0 cr.; A-F or Audit; prereq Soph or jr or sr; spring, every year) Language as creating rather than simply describing "reality." Reading and writing as arenas of active human struggle over social group power. Techniques for analyzing, interpreting, and participating in the conversation of critical literacies.

WRIT 3257. Technical and Professional Presentations. (3.0 cr.; Student Option No Audit; prereq COMM 1101 or #; fall, spring, every year) Oral presentation skills for technical or professional topics. Visual communication, audience analysis, organizing presentation, presenting complex material. Emphasizes use of computers.

WRIT 3270. Special Topics. (1.0-3.0 cr.; fall, spring, offered periodically) See Class Schedule.

WRIT 3291. Technical Communication Certificate Capstone Project. (1.0 cr.; A-F only; prereq #; fall, spring, summer, every year) The capstone project is taken in conjunction with a concurrent WRIT course for the Technical Communication Certificate. The project extends an assignment in the selected WRIT course to further explore an aspect of technical communication. Students develop their project in consultation with the instructor of the selected course. Project formats include a paper, report, podcast, video, scientific poster, or electronic presentation.

WRIT 3315. Writing on Issues of Land and the Environment. (3.0 cr.; A-F or Audit; prereq Soph or jr or sr; spring, every year) Land in America as idea and as actual space. History of cultural values and the meanings land holds for us. Contrasting views of land, especially those of certain Native American peoples. Rise of the conservation movement and the urbanization of U.S. space.

WRIT 3361. Literature of Social Movements in the United States: 1950 to Present. (3.0 cr.; A-F or Audit; prereq Soph or jr or sr or #; spring, every year) Literature (fictional, nonfictional) of social movements in United States in last half of 20th century. Artistic truth in relation to historical truth. Roles/obligations of citizens to protest/change social structures.

WRIT 3371W. Technology, Self, and Society. (3.0 cr.; A-F only; spring, every year) Cultural history of American technology. Social values that technology represents in shifts from handicraft to mass production/consumption, in modern transportation, communication, bioengineering. Ethical issues in power, work, identity, our relation to nature.

WRIT 3381W. Writing and Modern Cultural Movements. (3.0 cr.; A-F or Audit; fall, every year) How written texts contribute to movements in art and culture. How such texts are written with particular audiences, purposes, styles, and forms. Readings, lectures, discussions, analysis of texts.

WRIT 3405W. Humanistic Healthcare and Communication. (3.0 cr.; spring, every year) Relationships in art between communication, humanism in healthcare, empathy.

WRIT 3441. Editing, Critique, and Style. (3.0 cr.; A-F only; prereq Soph or jr or sr; fall, spring, every year) Editing for style, correctness, and content. Grammar/punctuation, Copyediting/proofreading. Working with a writer to develop, organize, write, and polish a document. Editing technical/scientific information. Paper/electronic assignments.

WRIT 3533. Roles of the Reader. (3.0 cr.; A-F or Audit; prereq Jr or sr or #; spring, every year) Broad perspective on reading. Reading as a cognitive process, as strategic activity, as aesthetic experience, as central social practice. Historical, technological, social, and cultural conditions and contexts. Reciprocity between reading and writing.

WRIT 3562W. Technical and Professional Writing. (4.0 cr.; A-F only; prereq Jr or sr or #; [1301 or 1401 or equiv]; fall, spring, summer, every year) Written/oral communication in professional settings, gathering research, analyzing audience, assessing/practicing multiple genres. Draft, test, revise present findings in oral presentation.

WRIT 3567W. Rhetoric, Technology, and the Internet. (3.0 cr.; A-F only; prereq Soph or jr or sr or #; fall, spring, every year) How persuasive communication is tailored to the Internet; how Internet technologies enable/limit persuasion; how to adapt rhetorical theory to 21st century digital writing; ethical issues, including free speech, copyright, fair use, privacy; rhetorics of social networks.

WRIT 3577W. Rhetoric, Technology, and the Internet. (3.0 cr.; A-F only; prereq Soph or jr or sr or #; fall, spring, every year) How persuasive communication is tailored to the Internet; how Internet technologies enable/limit persuasion; how to adapt rhetorical theory to 21st century digital writing; ethical issues, including free speech, copyright, fair use, privacy; rhetorics of social networks.

WRIT 3671. Visual Rhetoric and Document Design. (3.0 cr.; A-F only; prereq Jr or sr; fall, every year) Rhetorical principles applied to visual displays of information/data in print/online documents. Analyze/create examples of visual communication/design for selected documents combined with various writing strategies.

WRIT 3672W. Project Design and Development. (3.0 cr.; A-F or Audit; prereq Jr or sr; spring, every year) Students study, plan, research, design, and develop technical communication print documents, including documentation, brochures, and newsletters. Workplace project processes. Develop production-quality documents.

WRIT 3701W. Rhetorical Theory for Writing Studies. (4.0 cr.; A-F only; prereq S&TC Major, Soph or jr or sr or #; spring, every year) Principles/history of rhetorical theory/criticism. Classical theories. Aristotle's Rhetoric applied to examples of contemporary communication. Relationship of classical theory to scientific discourse, technical communication.

WRIT 3751W. Seminar: Theory and Practice of Writing Consultancy. (4.0 cr.; prereq Currently working in a University writing center, instr consent; fall, every year) How writers learn to write, how writing is taught in the academy, and how rhetorical conventions vary across disciplines.

WRIT 3793. Directed Study. (1.0-4.0 cr.; max 8.0 cr.; [max #, %, @; fall, spring, summer, every year) Supervised research/thesis on topics not covered in regularly scheduled offerings. Intended primarily for upper division undergraduate students.

WRIT 4196. Internship in Technical Writing and Communication. (3.0 cr.; A-F only; prereq 3562W, 24 cr in Technical Writing & Communication major; fall, spring, summer, every year) Internships sites may include University, industry, or government agencies. Internship proposal, progress report, internship journal (optional), final report with letter from internship supervisor.

WRIT 4431W. Science, Technology, and the Law. (3.0 cr.; A-F only; prereq Jr or sr or grad student or #; spring, every year) How issues in science/technology affect 21st century practice of law. Ownership, access, ethics, information, technology used to frame topics. Intellectual property, privacy, health law, research practice.

WRIT 4501. Usability and Human Factors in Technical Communication. (3.0 cr.; A-F only; prereq S&TC major, Jr or sr or grad student[] or #; spring, every year) Principles/concepts of human factors/usability testing. Developing objectives, criteria, and measures. Conducting tests in lab, field, and virtual environments. Using software programs to analyze qualitative/quantitative data.

WRIT 4562. International Professional Communication. (3.0 cr.; prereq 3562W or equiv; fall, every year) Communicating with multicultural audience/working as member of international team. Exposure with peers/instructors from various parts of world.

WRIT 4573W. Writing Proposals and Grant Management. (3.0 cr.; A-F or Audit; prereq [3562W or 3029W or equiv], Jr or sr STC major or grad student[] or #; fall, spring, offered periodically) Research funding sources. Interpreting RFP or program announcement. Letters of intent. Grant preparation, following guidelines of RFP or program announcement. Proposals for nonprofits or research/business.

WRIT 4662W. Writing With Digital Technologies. (4.0 cr.; A-F only; prereq Jr or sr or grad student or #; spring, every year) WRIT 4662W is an advanced level Writing Studies course that explores various digital writing technologies and provides multiple
opportunities to assess writing situations and make appropriate decisions about digital form and production. Students will learn the basic building blocks of writing in Internet environments (text, sound, images, video) as well as the vocabularies, functionalities, and organizing structures of Web 2.0 environments, how these impact understanding and use of information, and how to produce these environments (i.e., multimedia internet documents) for interactivity and use. This course includes design projects and practice with apps, markup language, content management systems, video, and social media.

WRIT 4664W. Science Writing for Popular Audiences. (3.0 cr.; A-F or Audit; prereq 3562 or 4; spring, every year) How science is translated for popular audiences. Rhetorical theory to critique popularized articles. Developing heuristic for writing articles. Controversial issues in moving from science as science to science as popular.

WRIT 4980. Senior Seminar in Writing Studies. (3.0 cr.; A-F only; prereq Major in [scientific/technical communication or writing studies], upper div; fall, spring, every year) Research questions/topics in writing studies. Combines theory, history, and writing practice. Theme/problem in writing studies. Semester paper. Topics listed in Class Schedule.

WRIT 4995. Senior Project. (1.0 cr.; A-F only; prereq Sr, Scientific and Technical Communication major; #; fall, spring, summer, every year) Senior project addressing topic in writing studies related to WRIT course. Must be done in conjunction with concurrent 3xxx or 4xxx level course in Writing Studies that student is taking. Instructor permission required for registration.

WRIT 5001. Introduction to Graduate Studies in Scientific and Technical Communication. (3.0 cr.; A-F only; prereq Grad student or #; fall, every year) History of technical communication. Different audiences, purposes, genres, and emerging trends. International/intercultural issues. Students participate within a community of technical communication professionals.

WRIT 5051. Graduate Research Writing Practice for Non-native Speakers of English. (3.0 cr.; prereq Grad student; fall, spring, summer, every year) Graduate-level writing techniques/formats for summaries, critiques, research, and abstracts. Persuasion, documentation, structure, grammar, vocabulary, field-specific requirements. Writing through several drafts, using mentor in specific field of study. Revising/editing to meet graduate standards. Discussions.

WRIT 5052. Graduate Research Presentations and Conference Writing for Non-Native Speakers of English. (3.0 cr.; prereq [Grad student, non-native speaker of English] or #; fall, spring, every year) Practice in writing/presenting graduate-level research for conferences or professional seminars. Delivery of professional academic presentations to U.S. audiences. Conference abstract, poster, and paper presentation. Communication in research process. Students select topics from their own research/studies. Format, style, transitions, topic narrowing, non-verbal presentation skills.

WRIT 5112. Information Design: Theory and Practice. (3.0 cr.; A-F or Audit; prereq Grad student or #; spring, offered periodically) Political, economic, social, and technical aspects of media selection and message design. Media analyses, scripts, budgets, treatments, project-design plans, interactive screens. Online design project.

WRIT 5196. Internship in Scientific and Technical Communication. (3.0-6.0 cr.; S-N or Audit; prereq STC grad or #; fall, spring, summer, every year) Internship sites may include the University, industry, or government agencies. An internship proposal, progress report, internship journal (optional), and final report with a letter from the internship supervisor are required.

WRIT 5270. Special Topics. (3.0 cr. [max 9.0 cr.;], prereq Grad student or #; fall, spring, offered periodically) Topics specified in Class Schedule.

WRIT 5291. Independent Study, Reading, and Research. (1.0-3.0 cr.; prereq #, %, fall, spring, summer, every year) Supervised reading/research on advanced projects not covered in regularly scheduled offerings.


WRIT 5531. Introduction to Writing Theory and Pedagogy. (3.0 cr.; A-F or Audit; prereq Grad student; fall, every year) Pedagogical philosophy/methodology in composition, primarily first-year writing. Theories underlying teaching/tutoring with technology.

WRIT 5532. Writing Pedagogy Practicum. (1.0 cr. [max 3.0 cr.;], S-N only; prereq Grad student; spring, every year) Discussion/activities that support development of sound pedagogical practices. Practical details of classroom. Professionalization, theory/research.

WRIT 5561. Editing and Style for Technical Communicators. (3.0 cr.; A-F only; prereq [Grad student, knowledge of grammar/ punctuation rules] or #; spring, summer, every year) Proofreading, copy-editing, comprehensive editing. Students primarily use electronic editing methods. Editor's responsibilities, relationship to writers, roles within an organization, style guides, ethical choices. Editing in global setting. Editing/style for visual design and online documents.

WRIT 5570. Minnesota Writing Project Directed Studies. (1.0-3.0 cr. [max 9.0 cr.;] A-F or Audit; summer, every year) Guided individual research into current theories/practices of writing and writing pedagogy.

WRIT 5671. Visual Rhetoric. (3.0 cr.; A-F only; prereq Jr or sr grad student; spring, every year) Range/development of visuals, especially those in science/technology. Vocabulary for commenting on, criticizing, and creating visuals.

WRIT 5775. The Rhetorical Tradition: Classical Period. (3.0 cr.; A-F only; fall, every year) Rhetoric in the Classical world and recurring themes that constitute "the rhetorical tradition." Epistemological/ethical status and sociopolitical importance of ancient rhetorical training and discourse. Works by Isocrates, Plato, Aristotle, Cicero, Quintillian, and others. Prepares students for preliminary examinations/seminars in rhetoric.

WRIT 5776. The Rhetorical Tradition: Modern Era. (3.0 cr.; A-F or Audit; spring, offered periodically) Core works in modern/contemporary rhetorical theory. Twentieth-century revivals of and challenges to the Aristotelian rhetorical tradition. Units devoted to Enlightenment rhetoric; the New Rhetorics of I. A. Richards, Kenneth Burke, and Chaim Perelman; feminist rhetorical theory, historiography, and critique; deconstruction/post-structuralism. Prepares students for preliminary examinations/seminars in rhetoric.

YOST 1001. Seeing Youth, Thinking Youth: Media, Popular Media, and Scholarship. (3.0 cr.; fall, spring, every year) Use of life-experience, news and popular media to explore everyday realities of being a young person, as it varies by age social class, race/ethnicity, geography, time period, sexual orientation, and capacity.

YOST 2101. Urban Youth and Youth Issues. (4.0 cr.; prereq 1001 or #; fall, spring, every year) What it is like to be a young person in a city, in the United States and worldwide.

YOST 2241. Experiential Learning. (4.0 cr.; [YOST 5241]; prereq [1001, 2001] or #; fall, spring, every year) History/theory of experiential learning, its application in youthwork. Observation, reflection, program design, and evaluation skills grounded in experiential learning theory. 15 hours of field observation required.
YOST 3001. Introduction to History & Philosophy of Youthwork. (4.0 cr.; prereq 2xxx or #; fall, spring, every year) Foundations of youthwork. Where contemporary American youthwork stands, particularly in comparison with international perspectives on youth/youthwork.

YOST 3031. International Youthwork. (3.0 cr.; A-F only; =YOST 5031; prereq 2xxx or #; fall, spring, summer, offered periodically) Lives of young people living outside the United States and of immigrants/refugees now resident in this country. Working with and on behalf of such groups. Socio-political analysis of globalization, its impact on young people, youthwork, and youth policy worldwide.

YOST 3032. Adolescent and Youth Development for Youthworkers. (4.0 cr.; =YOST 5032; prereq 1001 or 2001 or 2002W or 2101, [any Psych or CPSy course]; fall, spring, every year) Application of theory/research about children/adolescents. How findings can be used. How theories facilitate understanding of behavior.

YOST 3101. Youthwork: Orientations and Approaches. (4.0 cr.; prereq One gen psy course, one gen soc course; spring, every year) Historical/contemporary approaches to youthwork, diverse settings in which it is done, importance of worker's life experience in crafting ethical, effective practice. At least 15 hours of field experience.

YOST 3234. Youth Agencies, Organizations, and Youth Service Systems. (3.0 cr.; =YOST 5234; prereq [Two soc/anth courses, work experience in youth [agency or org]] or #; spring, every year) Communities/governmental responses to young people as potential problems through agencies, programs, and other organizational forms. Purpose, structure, and activities of such forms. How the forms are/are not integrated into youth service systems.

YOST 3235. Community Building, Civic Engagement, and Civic Youthwork. (4.0 cr.; =YOST 5235; prereq [2001, one basic course in Pol, one basic course in Soc] or #; spring, every year) Reciprocity between youth development and community development brought about by young people's civic engagement. Individual, social, and political change by/for young people and their community.

YOST 3240. Special Topics in Youth Studies. (2.0-8.0 cr. [max 10.0 cr.]; =YOST 5240; prereq [Two social sci courses, exp working with youth] or #; fall, spring, summer, every year) In-depth investigation of one area of youth studies. Teaching procedure/approach determined by specific topic and student needs. Topic announced in advance.

YOST 3291. Independent Study in Youth Studies. (1.0-9.0 cr. [max 18.0 cr.]; prereq #; fall, spring, summer, every year) Independent reading or research under faculty supervision.

YOST 4160H. Honors Capstone Project. (2.0 cr. [max 4.0 cr.]; A-F only; prereq YoSt honors or #; fall, spring, every year) Individualizes the honors experience by connecting aspects of major program with special academic interests.

YOST 4196. Youthwork Internship. (4.0 cr.; prereq Declaration of youth studies major; #; fall, spring, every year) Supervised field learning in school/community-based organizations/agencies. Emphasizes youthwork practice.

YOST 4301. Communicating With Adolescents About Sexuality. (3.0 cr.; prereq 1001 or 2002W or #; summer, every year) How to communicate sensitively/effectively with adolescents and their concerned persons about sexuality in everyday life. Focuses on healthy sexual development (physical, emotional, ethical) and sexual diversities. Adolescent sexual issues: gender, body image, disease, sexual violence, intimacy, sex in cyberspace.

YOST 4314. Theater Activities in Youthwork and Education. (2.0 cr.; =YOST 5314; prereq 1001 or 2101; spring, every year) Empowering methods of personal/creative development using experiential learning and theater activities to enhance creativity/imagination. Approaches to working with youth in school and youth agency settings. Experiential learning, improvisational theater theory/practice.

YOST 4315. Youthwork in Schools. (4.0 cr.; =YOST 5315; prereq Introductory course in education or #; fall, spring, every year) Craft of youthwork as a framework to understand life-worlds of young people and a practice to enhance healthy development. How young people often divide their lives into artificial/harmful divide: “school” and “not school.”

YOST 4316. Media and Youth: Learning, Teaching, and Doing. (2.0 cr.; =YOST 5316; prereq 1001 or 2101 or #; spring, every year) How to use various media sources with young people to enhance their development and civic engagement.

YOST 4317. Youthwork in Contested Spaces. (3.0 cr.; prereq 1001 or 2101 or #; 3101 recommended; spring, every year) Consequences of marginalized youth and everyday lives/futures of youth. Violence in conflict/post-conflict societies. Role of youthwork under these circumstances.

YOST 4319. Understanding Youth Subcultures. (3.0 cr.; =YOST 5319; prereq [1001, one basic course in [ANTH or SOC]] or #; summer, every year) Young people's participation in and understanding of subcultures, lifestyles, and event cultures. Place of these in young people's identity, friendship, and life chances.

YOST 4321. Work with Youth: Individual. (2.0 cr.; =YOST 5321; prereq 1001 or 2101 or #; fall, every year) Assumptions underlying individual work with youth. Issues/concerns of adolescents and of persons who work with them in one-to-one interactions.

YOST 4322. Work with Youth: Families. (2.0 cr.; =YOST 5322; prereq 1001 or 2002W or #; fall, every year) Theories/techniques of working with youth and their families. Emphasizes practical methods of structural change, effective communication, decision-making and problem-solving systems, winning the family's cooperation. Role of professional in influencing healthy family development.

YOST 4323. Work with Youth: Groups. (2.0 cr.; A-F only; =YOST 5323; prereq [[1001 or 2002W, 4321] or #; fall, every year) Social group work, adolescent group needs/associations. Group process. Working with diverse groups of youth in community, in group living situations, and in group therapy.

YOST 4325. Improving Everyday Youthwork: Practical Program Evaluation. (3.0 cr.; prereq [[1001 or 2101], 3234] or #; fall, every year) Purpose, methods, and uses of program evaluation. How young people can develop/enhance programs and secure funding. Evaluation as political/moral imperative.

YOST 4401W. Young People's Spirituality and Youthwork: An Introduction. (4.0 cr.; =YOST 5401; prereq 1001 or 2002W or #; spring, every year) Adolescent spirituality, its relation to working with young people. Faith/spirituality as necessary for healthy youth development. Knowledge, attitudes, and skills to recognize spirituality in cultural, social, economic, and political worlds.

YOST 4402. Youth Policy: Enhancing Healthy Development in Everyday Life. (4.0 cr.; =YOST 5402; prereq [1001, 2002W] or #; spring, every year) Youth policy as formulated in response to youth issues, problems, and community/public concerns. Policy as political response to youth panics, as indirect youthwork, and as a community's moral compact with its young people. Perspectives explored are specific to student interests.

YOST 4403. Indirect Youthwork: Working on Behalf of Young People. (4.0 cr.; prereq [[1001 or 2101], 3234] or #; spring, every year) Program development/management, policy, and social/community action, all directed at enhancing status of young people. Examining/advocating for particular sociopolitical, economic, and cultural definitions/understandings of young people.

YOST 4411. Youth Research and Youth Program Evaluation. (4.0 cr.; prereq Basic research methods course or #; spring, every year) Field research practicum. Basic social science approaches to the study of youth. Evaluating youth programs. Students complete a simple youth research/evaluation study.

YOST 5031. International Youthwork. (3.0 cr.; =YOST 3031; prereq 2xxx or #; fall, every year)
Lives of young people living outside the United States and of immigrants/refugees now resident in this country. Working with and on behalf of such groups. Socio-political analysis of globalization. Its impact on young people, youthwork, and youth policy worldwide.

**YOST 5032. Adolescent and Youth Development for Workworkers.** (4.0 cr.; [YOST 3032]; prereq [1101 or 2001 or 2002W or 2101], [any Psych or CPSy course]; fall, spring, every year)

Application of theory/research about children/adolescents. How findings/theories facilitate understanding of behavior.

**YOST 5234. Youth Agencies, Organizations, and Youth Service System.** (3.0 cr.; [YOST 3234]; prereq [Two soc/anth courses, work experience in [youth agency or org]] or #; spring, every year)

Communities/governmental responses to young people as potential problems through agencies/programs and other organizational forms. Purpose, structure, activities of such forms. How forms are/are not integrated into youth service systems.

**YOST 5235. Community Building, Civic Engagement, and Civic Youthwork.** (4.0 cr.; [YOST 3235]; prereq [2001, one basic course in Pol, one basic course in Soc] or #; spring, every year)

Reciprocity between youth development and community development brought about by young people's civic engagement. Individual, social, and political change by/for young people and their community.

**YOST 5240. Special Topics in Youth Studies.** (2.0 cr. [max 10.0 cr.]; [YOST 3240]; prereq Two social sci courses, exper working with youth or #; fall, spring, summer, every year)

In-depth investigation of one area of youth studies. Teaching procedure and approach determined by specific topic and student needs. Topic announced in advance.

**YOST 5291. Independent Study in Youth Studies.** (1.0-8.0 cr. [max 16.0 cr.]; fall, spring, summer, every year)

Independent reading and/or research under faculty supervision.

**YOST 5301. Communicating With Adolescents About Sexuality.** (3.0 cr.; prereq [Upper div AdPy course, exper working with youth] or #; summer, every year)

How to communicate sensitively/effectively with adolescents and their concerned persons about sexuality in everyday life. Healthy sexual development (physical, emotional, ethical), sexual diversities. Gender/body image, disease, sexual violence, intimacy, sex in cyberspace.

**YOST 5314. Theatre Activities in Youthwork and Education.** (2.0 cr.; [YOST 4314]; prereq 1001 or 2101; spring, every year)


**YOST 5315. Youthwork in Schools.** (4.0 cr.; [YOST 4315]; prereq Introductory course in education or #; fall, spring, every year)

Craft of youthwork as a framework to understand life-worlds of young people and a practice to enhance healthy development. How young people often make artificially/harmfully divide their lives into "school" and "not school."

**YOST 5316. Media & Youth: Learning, Teaching, and Doing.** (2.0 cr.; [YOST 4316]; prereq 1001 or 2101 or #; spring, every year)

Youth are targets, producers, and consumers of a variety of media. This course is about understanding and learning to use a variety of these sources with young people to enhance their development and civic engagement.

**YOST 5319. Understanding Youth Subcultures.** (3.0 cr.; [YOST 4319]; prereq 2001 or one course each in [Anth, Soc] or #; summer, every year)

Young people’s participation in and understanding of subcultures, life-styles, and event cultures. Place of these in young people’s identity, friendship, and life chances.

**YOST 5321. Work With Youth: Individual.** (2.0 cr.; [YOST 4321]; prereq 1001 or 2002W or #; fall, spring, summer, every year)

Basic assumptions underlying individual work with youth. Special issues/concerns of adolescents and of persons who work with them, especially those who work with youth in one-to-one interactions.

**YOST 5322. Work With Youth: Families.** (2.0 cr.; [YOST 4322]; prereq 1001 or 2002W or #; fall, spring, summer, every year)

Theories/techniques of working with youth and their families. Practical methods of structural change. Developing effective communication. Decision-making/problem-solving systems. Winning the family’s cooperation. Role of professional in influencing healthy family development.

**YOST 5323. Work with Youth--Groups.** (2.0 cr.; [YOST 4323]; prereq 1001 or 2002W or #; fall, summer, every year)

Social group work. Adolescent group needs/associations. Group process. Working with diverse groups of youth in community, in group living situations, and in group therapy.

**YOST 5401. Young People’s Spirituality and Youthwork: an Introduction.** (4.0 cr.; A-F or Audit; [YOST 4401W]; prereq [2001, one course each in [Anth, Soc, CPSy] or #; spring, every year])

Adolescent spirituality, its relation to working with young people. Faith/spirituality as actual/necessary aspects of healthy youth development. Research, active community-based programs. Knowledge, attitudes, and skills to meet adolescent needs/wants.

**YOST 5402. Youth Policy: Enhancing Healthy Development in Everyday Life.** (4.0 cr.; [YOST 4402]; prereq [2001, one course each in [FSoS, PolSci, Soc]] or #; spring, every year)

Youth policy as formulated in response to youth issues, problems, and community/public concerns. Policy as political response to youth panics, as indirect youthwork, and as a community’s moral compact with its young people. Perspectives are explored specific to student interests.

**YOST 5952. EveryDay Lives of Youth.** (3.0 cr.; A-F or Audit; fall, every year)

Youth as idealized-reality in scholarship, public discourse, and professional practice. Building practice of work with or on behalf of youth.

**YOST 5954. Experiential Learning: Pedagogy for Community and Classroom.** (3.0 cr.; fall, spring, every year)

Relationship between experience and learning in community and school settings. Emphasizes intentional application of experiential learning theory/practice to educational program development.

**YOST 5956. Organizational Approaches to Youth Development.** (3.0 cr.; A-F or Audit; fall, every year)

Historical contexts, theoretical frameworks, organizational practices, and public policies that shape nonformal educational experiences of youth in community-based or school-linked settings.

**YOST 5958. Community: Context for Youth Development Leadership.** (3.0 cr.; A-F or Audit; spring, every year)

Issues/policies in family, school, and community that drive the professional practice of community-based youth work. Practical projects explore what it means to be local, to build social capital for youth, and to involve youth in community change.

**YOST 5960. Seminar in Youth Development Leadership.** (1.0-4.0 cr.; S-N or Audit; prereq YDL student or #; fall, spring, summer, every year)

Group study of topics/issues. Course proposal, educational program development. Students participate in co-created learning experience with a group of peers. Four-course sequence.

**YOST 5962. Leadership Field Experience: Youth Development.** (4.0 cr.; S-N only; prereq YDL student; fall, spring, summer, every year)

Demonstration of leadership in practice. Project on youth, experiential pedagogy, and community/program settings. Focuses on public policy, advocacy, evaluation, pedagogical issues, program design, curriculum development, or applied research.

**YOST 5972. Education in the Community.** (3.0 cr.; fall, every year)

Models of community/education, their intersections. Twentieth century practice of education in the community in the U.S. Examples from other cultures/times.

**YOST 5974. The Democratic Learning Community.** (3.0 cr.; spring, offered periodically)

Historical/theoretical development of how leading thinkers have conceptualized education centered in the community. Colonial, Native American, transcendentalist, progressive, experiential, critical, and feminist perspectives.