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Course Descriptions

Course Numbers, Symbols, and Abbreviations

The courses in this catalog are not offered every semester. To find out whether a course is offered during a particular semester, consult the Class Schedule.

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.

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.

Department 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, WoSt for Women’s Studies). When no department 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 Symbols

The following symbols are used throughout the course prerequisites of most University catalogs to denote common and recurring items of information.
! ......................... Work for this course will extend past the end of the term. A grade of K will be assigned to indicate that the course is still in progress.
† ......................... All courses preceding this symbol must be completed before credit will be granted for any semester of the sequence.
§ ......................... 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.

Course Listing Sample

The courses in this catalog are current as of March 28, 2002.
Check the University Catalogs Web site at <www.catalogs.umn.edu> for the most current course information.
Course Descriptions

Course Descriptions

Accounting (Acct)

Department of Accounting

Curtis L. Carlson School of Management


Acct 3001, Introduction to Management Accounting. (3 cr; A-F only. Prereq—2050, 50 cr) 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 3199, Internship in Public Accounting. (2 cr; S-N only. Prereq—Acct 3201, #) Full-time work for a public accounting firm plus a written report on the work experience.

Acct 3201, Intermediate Management Accounting. (3 cr; A-F only. Prereq—3001, acct or finance major) Activity-based costing techniques in specific industries including service firms. Other topics could include costing for Just-in-Time manufacturing, tracking customer profitability, and costing quality.

Acct 3299, Internship in Management Accounting. (2 cr; S-N only. Prereq—Acct 3201, #) Full-time work in industry in the areas of accounting, cost accounting, or internal auditing in an industrial or governmental organization plus a written report analyzing the work experience.

Acct 5100, Corporate Financial Reporting. (4 cr; A-F only. Prereq—3001, non-accounting major) Overview of asset/liability valuation and income measurement. Focus on how economic events are reported in the financial statements. Examines accounting theory and the accounting standard-setting process.

Acct 5101, Intermediate Accounting I. (4 cr; A-F only. Prereq—Grade of at least B- in 2050, [mgmt major or mgmt grad student]) Valuation, measurement, and reporting issues related to selected assets/liabilities of a firm. Theory underlying accounting issues. Applying accounting principles.

Acct 5102, Intermediate Accounting II. (4 cr; A-F only. Prereq—5101; mgmt or grad mgmt student) Basic valuation problems encountered in financial reporting. Focuses on valuation of liabilities. Accounts receivable, inventories, and deferred taxes. Introduces consolidated financial statements.

Acct 5125, Auditing Principles and Procedures. (4 cr; A-F only. Prereq—[3101/5101 or 5100/6100], [accounting major or grad mgmt student]) Auditing fundamental accounting information systems. Independent audits and internal auditing. Ethics. Legal responsibilities.

Acct 5126, Internal Auditing. (2 cr; A-F only. Prereq—[3101/5101 or 5100/6100], 3001) Financial and operational auditing. Standards. Managing the function.

Acct 5135, Fundamentals of Federal Income Tax. (4 cr; A-F only. Prereq—2050 or 8030 or 8130, [mgmt or grad mgmt student]) Introduction to the U.S. federal system of taxation. Concepts of gross income, deductions, and credits. Analysis of the structure of the Internal Revenue Code and its provisions with respect to specific areas of the law. Examination of the interrelationships between legislative, judicial and administrative authorities. Introduces the various methods, tools and techniques to conduct tax research.


Acct 5160, Financial Statement Analysis. (2 cr; A-F only. Prereq—[5100/6100 or 3101/5101], [accounting or finance major]) Interpretation/analysis of financial statements. Introduces basic techniques of financial statement analysis and applies them in different settings (e.g., investment/credit decisions).

Acct 5180, Consolidations and Advanced Reporting. (2 cr; A-F only. Prereq—5102, mgmt or grad mgmt student) Theory underlying the preparation of consolidated financial statements, as well as the mechanical computations needed to prepare the statements themselves.

Acct 5200, Tax Accounting Methods and Periods. (4 cr; A-F only. Prereq—MBT student; 5135) 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.

Acct 5220, Tax Research, Communication, and Practice. (4 cr; A-F only. Prereq—MBT student; 5135) In-depth treatment of tax research methodology including tax questions, locating potential authority, assessing potential authority and communicating research results. Substantive material on dealing with the IRS including sources of IRS policy; processing returns, auditing returns; rulings and determination letters; closing agreements; assessments and collections.

Acct 5230, Corporate Taxation I. (2 cr; A-F only. Prereq—MBT student; 5135) Federal income taxation of corporations and shareholders. Establishment of its capital structure; determination of its tax liability; dividends and other nonliquidating distributions; stock redemptions, and liquidations.

Acct 5236, Introduction to Taxation of Business. (2 cr; A-F only. Prereq—5135, acct major) Introduction to the income tax laws governing the taxation of corporations, partnerships, limited liability companies, limited liability partnerships, and S corporations. Students will also increase their knowledge and skills related to tax research by writing research memorandums.

Acct 5271, Accounting Information Systems. (2 cr. Prereq—3101/5101 or 5100/6100) Applications of electronic data processing systems in accounting, including modeling, financial planning, auditing, and data security. Analysis/design of accounting information systems.

Acct 5281, Special Topics in Financial Reporting. (2 cr; A-F only. Prereq—5102, mgmt or grad mgmt student) Covers areas of financial reporting frequently covered on the CPA exam, including partnerships, foreign operations, and accounting for government and nonprofit organizations.

Acct 5310, International Accounting. (2 cr; A-F only. Prereq—2050, mgmt student) Review of macroeconomic concepts of international economics, including trade, international markets for capital, and the role of accounting. Survey of different accounting policies and approaches among nations. Reading and understanding financial statements produced in countries other than the United States.

Acct 5320, Current Topics in Accounting. (2 cr; A-F only. Prereq—5102, acct major) Topics vary.

Acct 5325, Advanced Tax Principles. (2 cr; A-F only. Prereq—5135, MBT student) In-depth coverage of issues affecting all tax entities, focusing on topics pertaining to individuals and partnerships: at-risk provisions, passive activity loss rules, Alternative Minimum Tax/AMT credit for individuals, tax benefit rule and claim of right doctrine, like-kind exchanges of personal property, net operating losses, hobby losses, and business/rental use of residences.

Acct 5330, Taxation of Corporations II. (2 cr; A-F only. Prereq—5230, MBT student) Corporate reorganizations related to multiple corporations and consolidated returns.

Acct 5333, Tax Aspects of Consolidated Returns. (2 cr; A-F only. Prereq—5230, MBT student) Covers aspects of filing consolidated federal income tax returns. Includes determining affiliated groups; election and filing requirements; intercompany transactions, limitations on certain loss and credit carryforwards; allocations of federal income tax liability; E&P and investment basis adjustments; loss allocations; and loss accounts.

Acct 5335, Taxation of the Small Business Corporation. (2 cr; A-F only. Prereq—5230, MBT student) 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-gain tax.

Acct 5340, Taxation of Partners and Partnerships. (2 cr; A-F only. Prereq—5135, MBT student) Reviews tax consequences associated with formation, operation, and dissolution of a partnership.

Acct 5350, Taxation of Estates and Gifts. (2 cr; A-F only. Prereq—5135, MBT student) Taxation of transfers under federal estate and gift tax laws. Includes property owned by the decedent; retained life estates; transfers taking effect at death; revocable transfers; joint interest; powers of appointment; valuation problems; expenses, debts and taxes; charitable bequests, marital deduction, taxable inter vivos gifts, splitting and credits.

Acct 5351, Estate Planning. (2 cr; A-F only. Prereq—5135, MBT student) Addresses various topics related to planning the transfer of property during lifetime and at death.

Acct 5353, Income Taxation of Fiduciaries. (2 cr; A-F only. Prereq—5135, MBT student) Simple, complex, and revocable trusts; estates; accumulation distributions, income in respect of decedents; trust accounting income and principal; distributable net income; terminations; and excess distributions.

Acct 5356, Taxation of Compensation Arrangements. (2 cr; A-F only. Prereq—5135, MBT student) Federal income taxation of corporate deferred compensation and fringe benefits with emphasis on pension plans, profit sharing plans, stock option plans, individual retirement accounts, annuities and insurance, related compensation benefits, and reporting requirements.

Acct 5360, State and Local Taxation. (2 cr; A-F only. Prereq—5135, MBT student) Examines state levying of individual income, corporate income, property, sales, and excise taxes. Tax problems of businesses with multistate operations.

Acct 5370, Taxation of Property Transactions. (2 cr; A-F only. Prereq—5135, MBT student) 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.

Acct 5380, Tax Aspects of International Business I. (2 cr; A-F only. Prereq—5230, MBT student) Multinational business operations and transactions involving foreign income. Tax consequences of transactions with foreign organizations and by related foreign companies.

Acct 5381, Tax Aspects of International Business II. (2 cr; A-F only. Prereq—5380, MBT student) Foreign tax credit and Subpart F planning opportunities, international structuring (including joint ventures and use of the new entity classification regulations), transfer pricing, and foreign currency. Recent legislative, regulatory, and judicial
developments in the international tax area, and the challenges and opportunities presented by these developments.


**Adult Education**

**AdEd 5001. Survey: Human Resource Development and Adult Education.** (3 cr) Overview of fields of human resource development and adult education. Includes societal context, system characteristics of professionals, definitions, philosophies, goals, sponsoring agencies, professional roles, participants, and resources. Emphasis on the unique characteristics and ways the fields overlap and enhance one another.

**AdEd 5101. Strategies for Teaching Adults.** (3 cr; A-F only) 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.

**AdEd 5102. Perspectives of Adult Learning and Development.** (3 cr) 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.

**AdEd 5103. Designing the Adult Education Program.** (3 cr; A-F only) Designing and implementing educational programs for adults. Application of concepts, theories, and models in different learning situations.

**AdEd 5196. Field Experience in Adult Education.** (3-6 cr [max 6 cr]; S-N only) Supervised fieldwork and practice. Presentations and evaluations of adult education practices.

**AdEd 5201. Introduction to Adult Literacy.** (3 cr) Definitions of literacy: workplace, community and family. Issues: poverty, welfare, ethnicity, cultural diversity, social class, language and learning, immigrants. Review of literacy programs, funding, and professionalization. Reaching and recruiting undereducated adults. The role of the family and schools; community, state and local government.

New social action approaches required for licensure.

**AdEd 5202. Assessment of Adult Literacy.** (3 cr) Assessment of adult literacy problems as they affect work, family and community. Setting educational goals; formal versus informal assessment; case studies; educational planning.

**AdEd 5203. Methods of Teaching Adult Literacy.** (3 cr) Approaches to teaching reading, writing, and mathematics to adults. Technology as a teaching tool. Teaching students with disabilities. Cultural and gender differences. English as a second language. Evaluation of commercial materials and software.

**Aerospace Engineering and Mechanics (AEM)**

**Department of Aerospace Engineering and Mechanics**

**EADM 2301. Mechanics of Flight.** (3 cr; A-F only. Prereq–[Math 2374 or equiv], [Math 1301 or IT]) Standard atmospheric properties, basic aerodynamics, generation of lift/drag. Airfoils and finite wings. Elements of aircraft performance, atmospheric flight mechanics, wind tunnel experiments. Experimental determination of lift/drag. Introduction to MatLab.

**EADM 2302. Mechanics of Flight.** (3 cr; A-F only. Prereq–[Math 2374 or equiv], [Math 1301 or IT]) Standard atmospheric properties, basic aerodynamics, generation of lift/drag. Airfoils and finite wings. Elements of aircraft performance, atmospheric flight mechanics, wind tunnel experiments. Experimental determination of lift/drag. Introduction to MatLab.


AEM 4332W. Aerospace Vehicle Design II. (4 cr. Prereq–[4331 or 2], [Eng/GC 1011 or equiv]) Students work in project groups to design/build/test model of vehicle designed in 4331. Design, proposals, schedules/milestones/critical-path, CAD/CAM, drawings/specifications, control systems, weight/balance envelopes, test matrix, structural analysis/testing, wind tunnel/vehicle testing, flight testing, certification. Professional ethics. Design log, status reports, written report, oral presentation.

AEM 4351. Aerodynamic Decelerator Systems. (3 cr. Prereq–2012, 2301, [IT upper div or grad student]) Review of basic aerodynamics, unique features of decelerators, downforce, apparent mass effects, trajectory analysis, engineering properties of textile materials, design projects.


AEM 4441. Structural Dynamics. (3 cr. Prereq–IT upper div or grad, 4301, 3031) Frequency and time domain analysis of multi-degree of freedom mechanical systems; natural frequencies and normal modes of vibration; free and forced vibrations of strings, rods, shafts beams; Introduction to finite elements in structural dynamics. Design project.

AEM 4495. Problems in Dynamics and Control. (1-3 cr. [max 6 cr.], Prereq–A) Topics of current interest. Individual projects with consent of faculty sponsor.


AEM 4511. Mechanics of Composite Materials. (3 cr. Prereq–3031, [IT upper div or grad student]) Analysis, design, and applications of laminated and chopped fiber reinforced composites. Micro-macro-mechanical analysis of cohesive constants, failure, and environmental degradation. Design project.

AEM 4581. Mechanics of Solids. (3 cr. Prereq–3031, [Math 2373 or equiv], [Math 2374 or equiv], [IT upper div or grad student]) Continuum mechanics in one dimension: kinematics; mass, momentum/energy, constitutive theory. Wave propagation, heat conduction. Strings. Euler-Bernoulli theory. 3-D deformations/stretch. Topics from fracture mechanics, structural stability, vibrations, thin films, layered media, smart materials, phase transformations, 3-D elastic wave propagation. Elasticity, viscoelasticity, plasticity.

AEM 4595. Problems in Mechanics and Materials. (1-3 cr. [max 6 cr.], Prereq–A) Topics of current interest. Individual projects with consent of faculty sponsor.

AEM 4601. Instrumentation Laboratory. (3 cr. Prereq–CSCI 1113, EE 3005, EE 3006, [upper div IT or grad student]) Introduction to lab instrumentation. Computerized data acquisition. Statistical analysis of data. Time series data, spectral analysis. Transducers for measurement of solid, fluid, and dynamical quantities. Design of experiments.

AEM 4602W. Aeromechanics Laboratory. (4 cr. Prereq–IT upper div or grad student), 4201, 4501, 4601, [Eng/GC 1011 or equiv]) Experimental methods/design in fluid/solid mechanics. Wind tunnel/channel experiments with flow visualization, pressure, velocity, force measurements. Measurement of stresses, strain, displacements in solids/structures, including stress concentrations, aerodynamic materials behavior, structural dynamics. Computerized data acquisition/analysis, error analysis, data reduction. Experiment design. Lab. Reports. Writing intensive.

AEM 4651. Aeroelasticity. (3 cr. Prereq–IT upper div or grad, 4301, 4202) Static aeroelastic phenomena, torsional divergence of a lifting surface, control surface surface/rotor, unsteady aerodynamics; problems of gust response, buffeting. Design project.

AEM 4796. Professional Experience. (1-3 cr. [max 3 cr]; A-F only. Prereq–IT upper div, AEM major, A) Work experience with substantive engineering component. Written report. Number of credits awarded based on extent of experience.


AEM 4822W. Aerospace Engineering and Mechanics Honors Thesis II. (3 cr. Prereq–upper div AEM honors student, A) Individual projects under the direction of AEM faculty member.


AEM 5501. Continuum Mechanics. (3 cr. Prereq–IT upper div or grad, 3031, Math 2243 or equiv or #) 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 cr. A-F only. Prereq–4501 or equiv, Math 2263 or equiv or #) Introduction to the theory of elasticity, with emphasis on linear elasticity. Linear and nonlinear strain measures, boundary-value problem for linear elasticity, linear problems in linear elasticity. Three dimensional problems in linear elasticity. Topics from nonlinearity elasticity, micromechanics, contact problems, fracture mechanics.

Aerospace Studies (Air)

Department of Aerospace Studies (Air/ROTC)
Office of the Executive Vice President and Provost

Air 1000. Leadership Laboratory. (1 cr. [max 1 cr]; S-N only) 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 cr; A-F only) 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 cr; A-F only) 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 cr; A-F only) Air Force heritage and leaders, Quality Air Force, and introduction to ethics and values, introduction to leadership, group leadership problems, and continuing application of communicative skills.

Air 1205. Quality Air Force, Group Leadership Problems, and Presentation Techniques. (1 cr; A-F only) Leadership and followerhood, 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 cr; A-F only) Study of leadership, communication, fundamentals, and communication skills required of an Air Force junior officer. Case studies.

Air 3302. Air Force Officerhood, Quality, and Communication. (3 cr; A-F only. Prereq–3301 recommended) Focus on completing Quality Air Force training, learning 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 cr; A-F only) 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 cr; A-F only) National security process, regional studies, advanced leadership ethics, and Air Force doctrine. Military law, current issues affecting military professionalism, and preparation for active duty as a second lieutenant in the U.S. Air Force.

For definitions of course numbers, symbols, and abbreviations, see page 296.
Afro 1011. Introduction to African American Studies. (3 cr)
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. (3 cr)
Diverse themes and disciplines in African Studies from prehistory to post-colonial period. Introduction to methodologies of inquiry.

Afro 1221. Beginning Swahili. (4 cr)
Introduction to basic skills: comprehension, speaking, reading and writing.

Afro 1222. Beginning Swahili. (4 cr. Prereq–1221 or equiv)
Continuation of skill development from 1221.

Afro 1902. Freshman Seminar. (3 cr [max 6 cr]; A-F only.
Prereq–Fr with no more than 36 cr)
Topics specified in Class Schedule.

Afro 2002. West African History: Early Times to 1800. (3 cr)
West Africa from late prehistoric times to establishment of states. Relations with North African, Mediterranean, Asian, and American worlds. Examines non-centralized patriarchal authority.

Afro 3001. West African History: Early Times to 1800. (3 cr)
West African history from late-18th century to present. Themes include study of continuities with the past and profound changes including new 19th century state formation, European colonialism, and post-colonial issues.

Afro 3061. The Black Family. (3 cr)
A sociological view of African American family life in the United States.

Afro 3072. Racism: Social and Psychological Consequences for Black Americans. (3 cr)
Racism and its effects on African Americans; definitions, determinants, and dynamics. Examined in an experiential context to reflect individual and institutional racism.

Afro 3108. Black Music: A History of Jazz. (3 cr)
The development of jazz in America and in the world, with special emphasis given to the role of jazz in the African American experience.

Afro 3141. Africa. (3 cr)
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 cr.
§Hist 3434)
Introductory survey of the history of South Africa from early humans to the arrival of the first Dutch settlers at 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 cr.
§Hist 3435)
The history of South Africa from the Union to the present. Focus on such issues as African and Afrikaner nationalism, structures of apartheid, forced population removals, divestment and sanctions, and the post-apartheid era.

Afro 3225. Third Semester Swahili. (4 cr. Prereq–1 yr Swahili or equiv)
Readings of contemporary Swahili texts. Review of grammar and complex verb forms, building vocabulary and communication skills.

Afro 3226. Fourth Semester Swahili. (4 cr.
Prereq–3225 or equiv)
Advanced Swahili readings, speaking, and writing practice.

Afro 3251W. Sociological Perspectives on Race, Class, and Gender. (3 cr; A-F only)
Race, class, and gender as aspects of social identity and as features of social organization. Experiences of women of color in American society. Family life, work, violence, sexuality/reproduction, possibilities for social change.

Afro 3301. The Music of Black Americans. (3 cr)
Musical contributions of African American artists and innovators from 1619 to the present. Musical genres explored include spirituals, blues, ragtime, gospel, art music, and jazz.

Afro 3334. Black Women: Interdisciplinary Perspectives. (4 cr)
Interdisciplinary study of the experience of African American women, including economic, political, and social factors, psycho-sexual development, and family roles.

Afro 3405. The African American Child. (3 cr)
Research carried out by African American psychologists and behavioral/social scientists, and by experts on African American childhood development.

Afro 3431. History of Africa to 1800. (4 cr)
Socioeconomic, political, and cultural development in precolonial Africa from ancient Egypt through the era of the trans-Atlantic slave trade.

Afro 3432. History of Africa: 1800 to Present. (4 cr)
Socioeconomic, political, and cultural development in Africa from the abolition of the trans-Atlantic slave trade through the postcolonial era.

Afro 3543. Psychology and the Black American Experience. (3 cr)
Historical and contemporary perspectives of the relationship between the area of psychology and African Americans in research and practice.

Afro 3578. Arts of Africa. (3 cr. §ArtH 3578)
Survey of the diverse arts of Africa, from ancient times to present. Visual arts of several civilizations. Relation of visual arts to larger cultural issues (religion, cosmology, gender, identity, political power).

Afro 3591. Introduction to African American Literature. (3 cr)
Afro-American autobiography, fiction, essay, poetry, drama, and folklore from the late-18th century to the present.

Afro 3591W. Introduction to African American Literature. (3 cr)
Afro-American autobiography, fiction, essay, poetry, drama, and folklore from the late-18th century to the present.

Afro 3592. Introduction to Black Women Writers in the United States. (3 cr)
The literary works of African American women writers explored in novels, short stories, essays, poetry, autobiographies, and drama from the 18th and 19th centuries.

Afro 3598. Arts of the African Diaspora. (3 cr. §ArtH 3598)

Afro 3601. Introduction to African Literature. (3 cr)
Oral and written literature of the 19th and 20th centuries. Emphasis on literature written in English and French. All readings in English.

Afro 3625. Black Women Writers in the Diaspora. (3 cr)
Works of black women writers from Europe, Africa, South America, and the Caribbean. Novels, drama, films, and essays.

Afro 3654. African Cinema. (3 cr)
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 3741. Racial Minorities and the Mass Media. (3 cr; A-F only.
Prereq–Jour majors must have course approved on program plan; pre-jour should not enroll)
Past and present depictions of minority individuals and groups in movies, literature, radio/TV, etc., as seen against anthropological, psychological, and sociological knowledge and experience. Emphasis on personal and political effects of media depictions.

Afro 3864. African American History: Slavery through Reconstruction. (3 cr)
Importance of dynamics of class, gender, region, and political ideology. Changing nature of race/racism.

§Hist 3865)
Internal migrations, industrialization/unionization, the Great Depression, world wars, large scale movements for social/political change.

Afro 3910. Topics in Afro-American and African Studies. (3 cr [max 9 cr]
Topics specified in Class Schedule.

Afro 3991. Senior Thesis Preparation in Afro-American and African Studies. (1.5 cr; A-F only.
Prereq–Completed component requirement)

Afro 3992. Senior Thesis/Project. (1.5 cr.
Prereq–3991)
Research and writing of a draft and final senior thesis in Afro-American and African Studies.

Afro 3993. Directed Study. (1-3 cr.
Prereq–#, A, Q)
Guided individual research and study.

Afro 4001. Seminar: History of Women in South Africa. (3 cr)
The changing role and status of women in South Africa from precolonial era to the present, and relationships to political, social, and economic development.

Afro 4013. Cities in Africa: African, Islamic, European Traditions. (3 cr)
History of African cities, their common and unique features, Case study of Swahili cities. Roots and issues of 20th century urban growth.

Afro 4231. The Color of Public Policy: African Americans, American Indians, and Chicanos in the United States. (3 cr)
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 4302H. Honors: Women's Autobiographical Narratives. (3 cr.
Prereq–5 cr or grad or #)
Focus is on literary autobiography, journals, travel narratives, essays, slave narratives, testimonial, and ethnographies to consider the content and the methodological, axiological, and aesthetic issues of the construction and production of women's experience.

Afro 4432. Colloquium: Before the Field: Internships, Community Service, and Study Abroad. (3 cr)
Theoretical and practical preparation for internships, community work, and study abroad.

Afro 4622. Caribbean Writers and Identity. (3 cr)
Examination of literary and historical issues explored by Caribbean writers in English, French, and Spanish-speaking Caribbean through autobiographies, short stories, novels, and films.

Afro 4632. Black Francophone Writers in Translation. (3 cr)
Exploration of ideas, particularly negritude and issues of creolization, central to male and female writers in French from Africa and the Caribbean. Novels, essays, short stories, and plays.
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Title</th>
<th>Credits</th>
<th>Prerequisites</th>
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</thead>
<tbody>
<tr>
<td>AFEE 2096</td>
<td>Professional Practicum in Agricultural Education: Early Experience</td>
<td>(1 cr; A-F only)</td>
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<tr>
<td>AFEE 3096</td>
<td>Experiential Learning: Production and Business.</td>
<td>(1-8 cr; max 12 cr)</td>
<td>Prereq–AgEd major, #</td>
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<tr>
<td>AFEE 3112</td>
<td>Technical Drawing and Production Technologies.</td>
<td>(3 cr; A-F only)</td>
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<tr>
<td>AFEE 5072</td>
<td>Proseminar: Social and Psychological Consequences for Black Americans.</td>
<td>(3 cr)</td>
<td></td>
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<tr>
<td>AFEE 5143</td>
<td>Geography of West Africa.</td>
<td>(3 cr)</td>
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<tr>
<td>AFEE 5181</td>
<td>Blacks in American Theater.</td>
<td>(3 cr)</td>
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<tr>
<td>AFEE 5182</td>
<td>Contemporary Black Theater: 1960 to Present.</td>
<td>(3 cr)</td>
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<tr>
<td>AFEE 5191</td>
<td>Seminar: The African American Experience in South Africa.</td>
<td>(3 cr)</td>
<td>#</td>
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<tr>
<td>AFEE 5301</td>
<td>The African Novel.</td>
<td>(3 cr)</td>
<td>Prereq–Grad or #</td>
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<tr>
<td>AFEE 5352</td>
<td>Black Families in Comparative Perspective.</td>
<td>(3 cr)</td>
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<tr>
<td>AFEE 5401</td>
<td>Field Studies in Afro-American and African Studies.</td>
<td>(1-6 cr; Prereq—Major or minor, #)</td>
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<tr>
<td>AFEE 5405</td>
<td>The African American Child.</td>
<td>(3 cr)</td>
<td>§3405</td>
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<tr>
<td>AFEE 5551</td>
<td>Methods: Use of Oral Traditions as Resources for History.</td>
<td>(3 cr)</td>
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<tr>
<td>AFEE 5593</td>
<td>The Afro-American Novel.</td>
<td>(3 cr)</td>
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<tr>
<td>AFEE 5597</td>
<td>Seminar: Harlem Renaissance.</td>
<td>(3 cr)</td>
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<tr>
<td>AFEE 5598</td>
<td>Black Arts Renaissance, 1960s and 1970s.</td>
<td>(3 cr)</td>
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<tr>
<td>AFEE 5655</td>
<td>African American Cinema.</td>
<td>(3 cr)</td>
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<tr>
<td>AFEE 5701</td>
<td>Proseminar: Classic Works in Afro-American Studies.</td>
<td>(3 cr)</td>
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<tr>
<td>AFEE 5702</td>
<td>Proseminar: Major Figures in Afro-American Studies.</td>
<td>(3 cr)</td>
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<tr>
<td>AFEE 5704</td>
<td>Minorities and the Mass Media.</td>
<td>(3 cr)</td>
<td>A-F only; Prereq—Jour major or minor, Jour 3004, A</td>
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<tr>
<td>AFEE 5766</td>
<td>Proseminar: African-American History.</td>
<td>(3-4 cr; Prereq—#)</td>
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<tr>
<td>AFEE 5865</td>
<td>Proseminar: African-American History.</td>
<td>(3-4 cr; Prereq—#)</td>
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<tr>
<td>AFEE 5876</td>
<td>Proseminar: Approaches to African Development.</td>
<td>(3 cr)</td>
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<tr>
<td>AFEE 5910</td>
<td>Topics in Afro-American and African Studies.</td>
<td>(3 cr; max 9 cr)</td>
<td>Topics specified in Class Schedule</td>
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<tr>
<td>AFEE 5993</td>
<td>Directed Study.</td>
<td>(1-3 cr; Prereq—#)</td>
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<tr>
<td>AFEE 5111W</td>
<td>Agricultural Education: Methods of Teaching.</td>
<td>(4 cr)</td>
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<tr>
<td>AFEE 5112</td>
<td>Agricultural Education Program Organization and Curriculum for Youth.</td>
<td>(3 cr)</td>
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<tr>
<td>AFEE 5113</td>
<td>Adult Agricultural Education Program Development and Technology.</td>
<td>(3 cr; A-F only)</td>
<td>Organization and implementation of education programs for farmers, farm managers, and agribusiness personnel using community and environmental resources, agricultural and instructional technology, and management information systems to attain family and business goals</td>
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<tr>
<td>AFEE 5114</td>
<td>Agricultural Education Teaching Seminar.</td>
<td>(1 cr)</td>
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<tr>
<td>AFEE 5116</td>
<td>Coordination of SAE Programs: Work-based Learning.</td>
<td>(2 cr; A-F only; Prereq—Agricultural education major or #)</td>
<td>Principles/techniques for coordinating work-based learning; Supervised agricultural experience in agricultural education. Historical/philosophical roots of experiential learning, integration with classroom instruction, legal aspects, record keeping, coordination techniques, current agreement laws.</td>
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</tbody>
</table>
Agricultural Engineering Technology (AgET)

Department of Biosystems and Agricultural Engineering

College of Agricultural, Food and Environmental Sciences

AgET 3213. Engineering Principles and Applications. (3 cr; A-F only)
Introduction to engineering principles and applications; focus on conceptual and design aspects.

AgET 5095. Special Problems in Biosystems and Agricultural Engineering. (1-5 cr; A-F only)
Independent study of selected topics relevant to biosystems and agricultural engineering.

Agri 1000H. Honors Colloquium. (2 cr; A-F only; Prereq—Admission to COAFES honors program or #)
Topics vary by semester.

Agri 1901W. Freshman Seminar. (1-3 cr; A-F only; Prereq—Fr with no more than 36 cr)
Interdisciplinary seminar. Topics specified in Class Schedule.

Agri 3000. Seminar in International Agriculture. (1-4 cr [max 8 cr]; A-F only; P rereq—#)
Oral presentations, discussion of students’ research papers. Literature review of selected topics.

Agricultural Industries and Marketing (AIM)

College of Agricultural, Food and Environmental Sciences

AIM 4011. Student Project/Field Investigation. (3 cr)
Application of marketing knowledge that involves building a complete marketing plan for an agricultural product or device. Team projects are used.

Agriculture (Agri)

College of Agricultural, Food and Environmental Sciences

Agri 1000H. Honors Colloquium. (2 cr; A-F only; Prereq—Admission to COAFES honors program or #)
Topics vary by semester.

Agri 1901W. Freshman Seminar. (1-3 cr; A-F only; Prereq—Fr with no more than 36 cr)
Interdisciplinary seminar. Topics specified in Class Schedule.

Agri 3000. Seminar in International Agriculture. (1-4 cr [max 8 cr]; A-F only; Prereq—#)
Oral presentations, discussion of students’ research papers. Literature review of selected topics.

Agri 3001. Pests and Crop Protection. (3 cr; A-F only; Prereq—Bio 1009 or equiv)
Introduction to biology/identification of insects, weeds, and diseases that affect agricultural crops.

Agri 3100H. Honors Experience. (2-3 cr; A-F only; Prereq—Admission to COAFES honors program or #)
Developed by student and COAFES faculty mentor. May include foreign study-travel, research, position or policy paper, or any experience demonstrating advanced study/service/understanding.

Agri 3500. Global Seminar. (3 cr [max 9 cr]; A-F only; Prereq—#)
Interface of agriculture with various natural resource, environmental, economic, food safety, public policy, ethical issues transcending national borders.

Agronomy and Plant Genetics (Agro)

Department of Agronomy and Plant Genetics

College of Agricultural, Food and Environmental Sciences

Agro 1093. Directed Studies. (1-4 cr [max 12 cr]; A-F only; Prereq—#)
 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 cr)
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 2101. Science of Food, Land, People, and the Environment. (4 cr; A-F only) Science base of food, land, people, and environmental systems and their interface with social, economic, and political systems. Active learning, project-based course.


Agro 3203W. Environment, Global Food Production, and the Citizen. (3 cr. §AnSc 3202. Prereq.–Biol 1009 or equiv) Ecological and ethical concerns of food production systems in global agriculture—past, present, future. Examines underlying ethical positions about how agroecosystems should be configured. Decision cases, discussions, videos, other media.

Agro 4005. Applied Crop Physiology and Development. (4 cr; max 8 cr) Prereq.–Chem 1011 or Biol 1009 or [biol or plant science] 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 maturaiton and dry down for harvest. Emphasizes inquiry, field problems, and group activity. Lecture, laboratory.

Agro 4093. Directed Studies for Advanced Students. (1-4 cr; max 12 cr) Prereq.–15 cr in agronomy, #) 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. (1-3 cr; max 6 cr; S-N only. Prereq.–COAFES undergrad, #, complete internship contract available in COAFES Career Services) Supervised professional experience in agribusiness firms or government agencies; evaluative reports and consultations with faculty advisers and employers.

Agro 4101. Agricultural Decision Making and Experimentation. (3 cr. Prereq.–Jr or sr) Principles of field plot techniques and design applied to field demonstrations/experiments. Inductive/ deductive reasoning, analysis of data, tests of significance. Treatment comparisons, decision making. Computer use for data processing and statistical analysis.

Agro 4103. World Food Problems. (3 cr. §ApEc 4103, §CAPS 4103, §FCSc 4103. Prereq.–[Jr or sr or grad]) Multidisciplinary look at problems of and possible solutions for food production, storage, and utilization in developing countries. Presentations and discussions introduce conflicting views on population, use of technology, and ethical and cultural values held in various parts of the world.

Agro 4201. Agro-ecosystems and Crop Production. (3 cr. Prereq.–10 cr of biol and/or plant science) Basic concepts in agroecosystems; organization, development, and function of field crop communities in contrast to natural ecosystems. Means of improving designed and managed systems for the benefit of human kind while minimizing impact on the ecosystem.

Agro 4401. Plant Genetics and Breeding. (4 cr; §Hort 4401. Prereq.–[Biol 1009 or equiv], grad student with program committee approval) Principles of plant genetics and environmental variation. Applications of genetics to crop evolution and breeding of self-pollinated, cross-pollinated, and hexaploid propagated crops. Lab experiments in hybridization, variation, and selection.


Agro 4603. Field Crop Scouting and Problem Diagnosis. (3 cr. Prereq.–3005, Soil 3416, [2501, Ent 3001, PIPa 2002] or Agro 3001; [jr or sr; 16-20 cr in major.) Insects, diseases, weeds. Nutrient status. Environmental stresses due to wind, hail, frost, soil conditions, and chemical injury. Calibration of equipment associated with crop protection. Pesticide use, safety procedures. Crop growth staging and growing degree day as components of decision-making and precision agriculture. Intensive summer training sessions at selected Minnesota agricultural research and outreach centers.

Agro 4605. Management Strategies for Crop Production. (4 cr. Prereq.–Jr or sr student with program committee approval) Crop management situations/nodes in various climate zones, soil types, from seed selection to crop storage. Focuses on cropping systems involving corn, soybeans, small grains, and forages. Emphasizes long term productivity, profitability, and sustainability. Lecture, discussion, problem sets, laboratory.

Agro 4660. Senior Capstone: Leadership, Decision Making, and Problem Solving. (2 cr. Prereq.–4096 or SCaG 4009 or §) Professional leadership and decision making from ethical, technical, societal, and personal reflection perspectives. Linked to undergraduate internship and other experiential learning opportunities. Problems, decision-centered cases, interviews.

Agro 4888. Issues in Sustainable Agriculture. (2 cr. Prereq.–[1103, Soil 1125] or 2125 or equiv) Agroecology, sustainable practices, production economics, environmental quality, holistic resource management, healthy food/water, rural communities. Meet sustainable-agriculture advocates, including farmers, faculty, and representatives from non-profit sustainable-agriculture organizations.

Agro 5021. Introduction to Plant Breeding. (3 cr. Prereq.–[GCBP 3022 or equiv], background in plant science) For majors not specializing in plant breeding. How genetics is applied to plant improvement. Emphasizes sustainable-production scenarios.

Agro 5311. Research Methods in Crop Improvement and Production. (1 cr; S-N only) Prereq.–Applied Plant Sciences grade 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 cr; A-F only. §Ent 5321. Prereq.–any course in [Agro or AnSc or Ent or Hort or PIPa or Soil or Ent] or §) Ecological approach to problems in agricultural systems. Formal methodologies of systems inquiry are developed/applied.

Agro 5999. Special Topics/Workshop in Agronomy. (1-4 cr. Prereq.–Jr or sr) Workshops on a variety of topics in Agro offered at locations other than the Twin Cities campus. Presenters/faculty may include guest lecturers/ experts. Topics specified in Class Schedule.

Akkadian (Akka)

Department of Classical and Near Eastern Studies

College of Liberal Arts


Akka 5300. Readings in Akkadian. (3 cr (max 18 cr) Prereq.–5011, 5022) Survey of Akkadian literature, including literary, legal, historiographical, and sacred texts. Topics specified in Class Schedule.

American Indian Studies (Amln)

Department of American Indian Studies

College of Liberal Arts

Amln 1001. Indigenous Peoples: an American Perspective. (3 cr) 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.


Amln 1101. Beginning Ojibwe I. (5 cr) Acquisition of speaking skills, fundamentals of grammar, writing systems.

Amln 1102. Beginning Ojibwe II. (5 cr; Prereq.–1101) Acquisition of speaking skills, fundamentals of grammar, and writing systems.

Amln 1121. Beginning Dakota I. (5 cr) Development of the four skills of language acquisition: listening, speaking, reading, and writing. Oral drills and in-class participation focused on questions and answers.

Amln 1122. Beginning Dakota II. (5 cr; Prereq.–1121) Further development of language acquisition skills with oral drills and in-class participation focused on questions and answers.

Amln 1908W. Freshman Seminar. (3 cr [max 6 cr]; A-F only) Topics specified in Class Schedule.

Amln 3103. Intermediate Ojibwe I. (5 cr. Prereq.–1101, 1102) Improving speaking skills; grammatical structures; storytelling, oral history, and translation projects.

Amln 3104. Intermediate Ojibwe II. (5 cr. Prereq.–1101, 1102, 3103) Improving speaking skills; grammatical structure; storytelling, oral history, and translation projects.

For definitions of course numbers, symbols, and abbreviations, see page 296.
Amin 3123. Intermediate Dakota I. (5 cr. Prereq–1122) Development of listening, speaking, reading, and writing skills with oral drills and in class participation focused on questions and answers.

Amin 3124. Intermediate Dakota II. (5 cr. Prereq–1121, 1122, 3123) Further development of the listening, speaking, reading, and writing skills with oral drills and in class participation focused on questions and answers.

Amin 3201W. American Indian Literature. (3 cr) Comparative studies of oral traditions, modern literature from various tribal cultures.

Amin 3301. American Indian Philosophies. (4 cr) World views of the indigenous peoples of the Americas. Topics include native medicines and healing practices, ceremonies and ritual, governance, ecology, humor, tribal histories, and status of contemporary native people.

Amin 3302. American Indians and Photography. (3 cr) 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 3401. American Indian Art. (4 cr) Visual arts depicting rituals, traditions, values, and worldviews of various American Indian populations. Creative processes of art from pre-contact times through contemporary art. Emphasis placed on style, technique, materials and imagery, and symbolism.

Amin 3409. American Indian Women: Ethnographic and Ethnohistorical Perspectives. (3 cr) Comparative survey of ethnographic/ethnohistorical writings by/about American Indian women.


Amin 3701. Ojibwe Culture and History. (3 cr) 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 cr) An overview of Dakota culture, language, history, literature, contemporary issues, and the arts.

Amin 3713. American Indian Communities of the Great Lakes. (3 cr) American Indian communities of the Great Lakes over time, with particular attention to Ojibwe, Dakota, and HoChuk experiences. How the richness of the world created by Great Lakes tribes was damaged, depressed, and altered but not destroyed by the arrival of EuroAmerican nations.

Amin 3870. Topics in American Indian History. (3 cr) Topics may include social history, oral history, history of particular regions, political systems, education, and policy. Designed for undergraduates.

Amin 3871. American Indian History: Precontact to 1830. (4 cr) 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. (4 cr) 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 cr) Educational processes in American Indian cultures; history of school programs established for tribes by missionaries and the U.S. and Canadian governments; the importance of boarding schools in shaping the lives, families, communities, and educational expectations of Indian people in the late-19th and early-20th centuries.

Amin 4201. Topics in American Indian Literature. (3 cr) Topics organized around issues of theme or genre or region or tribe or gender.

Amin 4231. The Color of Public Policy: African Americans, American Indians, and Chicanos in the U.S. (3 cr) 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 cr; Prereq–1001) 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 cr; Prereq–1001) 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 4515. Contemporary American Indian Movements. (3 cr; Prereq–1001) American Indian organizations and social movements of the 20th century. Explorations of political activism on and off reservations; treaty disputes; economic development strategies; the revival of traditional beliefs.

Amin 4525. Federal Indian Policy. (3 cr) Formulation, implementation, evolution, comparison of Indian policy from pre-colonial times to self-governance in the 21st century. 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 policy.

Amin 4990. Topics in American Indian Studies. (1-4 cr [max 8 cr]) Topics specified in Class Schedule.

Amin 4991. Independent Study. (1-12 cr [max 18 cr]. Prereq–A, L) Prereq–A, L Individually arranged research with faculty to meet student needs and interests.

Amin 4996. Field Study. (1-12 cr [max 18 cr]. Prereq–A, L) Opportunities for experiential learning in a variety of American Indian community settings. Consult department faculty at least one term before enrolling.

Amin 5890. Problems in American Indian History. (3 cr; Prereq–A) 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. (2-4 cr [max 4 cr]. A-F only) Intensive examination of a particular topic (e.g., American Indian education, American Indians of the Great Lakes, American Indians of the Southwest, American Indians and the Federal government).

American Sign Language (ASL) Department of Educational Psychology College of Education and Human Development

ASL 1701. American Sign Language I. (4 cr) Introduction to learning and understanding American Sign Language (ASL); cultural values and behaviors of the deaf community in the United States. Includes receptive and expressive reading activities; sign vocabulary; grammatical structure; receptive and expressive fingerspelling; and deaf culture.

ASL 1702. American Sign Language II. (4 cr. Prereq–1701 or #) Increased communication skill in American Sign Language (ASL); cultural values and behavioral rules of the deaf community in the U.S.; receptive and expressive activities; sign vocabulary; grammatical structure; receptive and expressive fingerspelling and aspects of deaf culture.

ASL 3703. American Sign Language III. (4 cr. Prereq–1702 or #) Expanded instruction of American Sign Language (ASL). Receptive and expressive activities; sign vocabulary; grammatical structure; receptive and expressive fingerspelling; narrative skills; cultural behaviors; and aspects of deaf culture. Abstract and conversational approach.

ASL 3704. American Sign Language IV. (4 cr. Prereq–3703 or #) Increases the emphasis on more abstract and challenging conversational and narrative range. Includes receptive and expressive reading activities; sign vocabulary; grammatical structure; receptive and expressive fingerspelling; various aspects of deaf culture and behavioral rules.

ASL 3705. Cultural Perspectives of Deafness. (2 cr) 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 5642. Classroom Communication Through ASL. (1-2 cr [max 5 cr]; S-N only. Prereq–Fluency in ASL, #) American Sign Language (ASL) form/function, vocabulary production, grammar and features needed by professionals working with children, storytelling strategies, technical sign language for classroom teachers. Content progresses in repeated segments.

American Studies (AmSt) Department of American Studies College of Liberal Arts


AmSt 1001H. Honors: American Popular Arts and Public Life, 1900-1940. (4 cr. §1001W. Prereq–Honors) Interdisciplinary study of American society from precontact to industrialization. American literature, art, music, and popular culture in historical context.

AmSt 1002. American Popular Arts and Public Life, 1940 to present. (4 cr) Interdisciplinary study of American society from industrialization through the present. Examination of American literature, art, music, and popular culture in historical context.
Course Descriptions

AmSt 1112. American Cultures II, Transition. (3 cr; A-F only)

AmSt 1113. American Cultures III, Transition. (3 cr; A-F only)

AmSt 1201. Learning Public Ethics Through Arts and the University. (3 cr; A-F only)
Residential College course on study of public ethical decision-making. Case studies of University institutions, literature, and arts, looking at University/public interaction and arts representations to learn working ethics works in people’s participation in public life.

AmSt 1907W. Freshman Seminar. (3 cr [max 6 cr]; A-F only)
Topics specified in Class Schedule.

AmSt 1908W. Freshman Seminar. (3 cr; A-F only. Prereq–Fr or no more than 36 cr)
Topics specified in Class Schedule.

AmSt 1909W. Topics: Freshman Seminar. (3 cr; A-F only)
Topics specified in Class Schedule.

AmSt 3001. Introduction to Asian American Studies. (3 cr)
History, cultural productions, and contemporary concerns of Americans of Chinese, Japanese, Korean, South Asian, Filipino, and Southeast Asian ancestry. Asian American communities looked at from various scholarly perspectives.

AmSt 3111. American Cultures and the Arts. (3 cr)
Relationships between American cultures and artistic productions. Study of the works and lives of selected artists. How American societies and cultures shape, and are shaped by, artistic forms and expressions.

AmSt 3113W. America’s Diverse Cultures. (3 cr)
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 cr)
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 3252W. American Popular Culture and Politics: 1900 to 1945. (4 cr)
Historical analysis of how popular arts represent issues of gender, race, consumerism, and citizenship. How popular artists define the boundaries of citizenship and public life: inclusions and exclusions in politics and national identity. How popular arts reinforce or alter political ideologies.

AmSt 3253W. American Popular Culture and Politics: 1945 to the Present. (4 cr)
Historical analysis of how popular arts represent issues of gender, race, consumerism, and citizenship. How popular artists define the boundaries of citizenship and public life: inclusions and exclusions in politics and national identity. How popular arts reinforce or alter political ideologies.

AmSt 3299W. Junior Proseminar. (3 cr; A-F only)
Exploration of classic and contemporary works and problems; methods and problems in the field; the development of American Studies and the idealization of an American past; the challenges of multiculturalism and contemporary themes in the field.

AmSt 3301W. Senior Proseminar in American Studies. (3 cr. Prereq–AmSt 353 or 354)
Each semester covers a problem related to a representative theme, figure, or period. Students research and write senior theses.

AmSt 3302W. Senior Proseminar in American Studies. (3 cr. Prereq–AmSt 353 or 354)
Each semester covers a problem related to a representative theme, figure, or period. Students research and write senior theses.

AmSt 3390. Topics in American Studies. (3 cr. Prereq–Jr or sr)
Topics specified in Class Schedule.

AmSt 3993. Directed Studies. (1-9 cr [max 9 cr]; Prereq–4)
Guided individual reading or study.

AmSt 4101. Gender, Sexuality, and Politics in America. (3 cr; A-F only)
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 5101. Religion and American Culture. (3 cr; A-F only)
Role of religion in shaping contemporary American cultural pluralism. Institutions and processes, intellectual frameworks, aesthetic and symbol systems that form religious communities and contribute to religious conflicts in U.S. society and culture.

AmSt 5202. Thought and Practice of American Religions. (4 cr; Prereq–4)
Holidays, festivals, religious arts, organizations, spirituality, ethics, and systems of thought of “civil religion,” “women’s religion,” indigenous American religions, American religious movements, Judaism, Islam, Buddhism, and other world faiths, and their interactions in the United States and worldwide.

AmSt 5920. Topics in American Studies. (3-4 cr [max 9 cr]; Prereq–5)
Topics specified in Class Schedule.

Ancient Near Eastern (ANE)

College of Liberal Arts

ANE 1001. The Bible: Narrative Texts. (3 cr; Prereq–Knowledge of Hebrew is not required)

ANE 1002. The Bible: Prophecy. (3 cr; Prereq–Knowledge of Hebrew is not required)

ANE 1003. The Bible: Wisdom, Poetry, and Apocalyptic. (3 cr; Prereq–Knowledge of Hebrew is not required)

ANE 3503. History and Development of Israelite Religion I. (3 cr. Prereq–No knowledge of Hebrew required)
Survey of the evolution of Israelite religion. Cultic practices, law and religion, prophecy, religion and historiography. Relationship to surrounding religious systems.

ANE 3504. History and Development of Israelite Religion II. (3 cr)
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, and Roman.

ANE 3951. Major Project. (4 cr; Prereq–ANE major, 3 xxx ANE courses or #)
Research project pertaining to the study of the ancient world, using documents or other primary sources along with secondary sources. Students select project in consultation with a faculty member.

ANE 4051. Ancient Near East and Egypt: Neolithic to 1500 BCE. (3 cr; A-F only. §Hist 5041. Prereq–Prior 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.

ANE 4052. Ancient Near East and Egypt: 1500 to 323 BCE. (3 cr; A-F only §Hist 4052. Prereq–Prior 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.

ANE 5501. Ancient Israel: The Origins of Israel in Biblical Traditions. (3 cr. Prereq–Knowledge of Hebrew is not required)
The foundation of the Hebrew people; traditions of the patriarchal period, development of Israelite religious and legal institutions; Ancient Near Eastern context of Israel’s origins.

ANSc 4001. Swine Nutrition. (3 cr. Prereq–2401, 3511 recommended) A comprehensive review of major considerations in providing optimum, cost-effective nutrition to swine in all stages of production.

ANSc 4403. Ruminant Nutrition. (4 cr. Prereq–2401) Nutrient requirements of ruminants, physiology of digestion in ruminants, nutrient content of feedstuffs, primary forages; energy utilization, protein and nonprotein nitrogen utilization; nutritional disorders; formulation of adequate rations.


ANSc 4501. Principles of Farm Animal Environment. (3 cr. Prereq–2301, 2401, 3305, 4401; 4501 recommended) Focus on understanding the inter-relationships of business, marketing, and biological performance of pigs in various types of production systems.

ANSc 4602. Sheep Production Systems Management. (4 cr. Prereq–2401, 3221 recommended) Sheep management using feeding, breeding, selection, health, and physiological management aids for breeding flock and market lamb production. Taught jointly with Crookston campus and the West Central Experiment Station, Morris.

ANSc 4603. Beef Production Systems Management. (4 cr. Prereq–4403 recommended) Status and characteristics of the beef industry; apply principles of animal breeding, nutrition, physiology, and economics to management of beef cattle, breeding herds and cattle feeding operations. Ration formulation, management, and marketing of feedlot cattle.
AnSc 4604. Dairy Production Systems Management. (4 cr; Prereq—2401; 3221, 3305, 4403 recommended) Practical applications of principles of animal breeding, nutrition, physiology, reproduction, housing, and economics in a problem solving context. Active learning with decision-case discussion, farm visits, and field diagnostic techniques laboratories.

AnSc 4605. Poultry Production Systems Management. (4 cr; Prereq—2401; 4403 recommended) Physiology, genetics, diseases, nutrition of poultry and relation to current management practices for production of eggs, broilers, and turkeys. Technical and practical phases of production and marketing in relation to their underlying principles. Visits to commercial production units.

AnSc 4609. Analysis of Livestock Production Systems. (2 cr) Systems approach to decision making and problem solving in production enterprises. Planning, long range goal setting, production analysis, risk analysis, and cost-benefit analysis are examined in the total system including quality of life issues.

AnSc 4611. Advanced Pork Production Systems Management. (2 cr; Prereq—4609; 4601) Analysis of pork production systems using case studies and visits to modern pork production operations.

AnSc 4613. Advanced Beef Production Systems Management. (2 cr; Prereq—4609; 4603) Analysis of beef production systems using case studies and visits to beef-cow-calf operations and feedlots.

AnSc 4614. Advanced Dairy Production Systems Management. (2 cr; Prereq—4609, 4604) Analysis of dairy production systems using case studies and visits to actual dairies.

AnSc 5099. Special Workshop in Animal Science. (1-6 cr [max 12 cr]; A-F only. Prereq—#) Topics vary. See Class Schedule or department. Topics may use guest lecturers/experts.


Anth 1001. Human Evolution. (4 cr) From ancestors of chimpanzees and humans to origins of modern humans. Principles of evolutionary theory, behavioral biology, 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 cr. Prereq—Stat 3021 or equiv, [BioI-4003 or equiv]) 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 and our ancestors.


Anth 1003W. Understanding Cultures. (4 cr) Introduction to social and cultural anthropology. Comparative study of societies/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 1111. Human Origins. (3 cr; A-F only) World prehistory as investigated by anthropologists. Methods/concepts used to study prehistoric human biological/cultural development.

Anth 1902–1905. Freshman Seminar. (3 cr; A-F only) Topics specified in Class Schedule.

Anth 1907W–1910W. Freshman Seminar. (3 cr [max 6 cr]; A-F only) Topics specified in Class Schedule.

Anth 3001. Introduction to Archaeology. (4 cr) The fundamentals of fieldwork, laboratory analysis, and interpretation in archaeology. How field and laboratory research are designed and implemented, and how results are interpreted.

Anth 3003. Cultural Anthropology. (3 cr; Prereq—1003 or #) Areas of study may include field research and the politics of ethnographic knowledge; Marxist and feminist theories of culture; culture, language and discourse; psychological anthropology; culture and transnational processes.

Anth 3005. Language and Sociocultural Analysis. (4 cr; Prereq—[1003, anthropology major] or #) Studying sociocultural forms by analyzing linguistic data obtained in fieldwork setting. Students work with fluent speaker of non-English language to explore an unfamiliar culture in manner of an ethnographer working with a key informant.

Anth 3007. Laboratory Techniques in Archaeology. (3 cr; Prereq—1001, 3001) Focuses on plant remains, material culture, faunal remains, and human osteology. Emphasis on lab experience.

Anth 3009. Rise of Civilization. (3 cr) Concept of civilization, from early hunter gatherer groups through settled agricultural villages to rise of towns/cities. Compares processes of change in eight regions of the world.

Anth 3010. Native North Americans in Regional Perspective. (3 cr; Prereq—[1003, anthropology major] or #) An in-depth cultural and historical survey of native peoples who inhabit a particular region of North American (e.g., the greater southwest, prairie/woodland transition zone, Great Lakes area, Northwest coast, etc.).

Anth 3013. American Indian Languages and Cultures. (3 cr) Survey of cultural developments among native peoples of North America from historic times to present.

Anth 3017. Peoples and Cultures of Middle America. (3 cr) Indian and Mestizo (Hispanic) cultures of Mexico and Guatemala and parts of Belize, Honduras, and Nicaragua. Describes both pre-Hispanic and Hispanic influence with attention to area-wide patterns and local traditions.

Anth 3020. Topics in the Anthropology of Africa. (3-6 cr [max 6 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; Islamization; colonization; liberation movements and nationalism; culture change.

Anth 3023. Culture and Society of India. (3 cr) 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 cr; Prereq—1003 or 3003 or #) 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 cr) Early development of non-Mediterranean European society from Old Stone Age through Iron Age to the Roman Period, based on archaeological evidence. Principle transformations of European culture with introduction of agriculture, development of metallurgy, and emergence of towns and cities.

Anth 3028. Historical Archaeology of North America. (3 cr; A-F only) Emphasizes research approaches. Documentary research, oral history, probe 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 3029. Archaeology of Native Americans. (3 cr. Prereq—1001) Pre-European contact and contact period archaeology of American Indians north of Mexico.

Anth 3031. Alternating States: Culture and Politics in Eastern Europe. (3 cr) Post-socialist transitions in Central and Eastern Europe from an anthropological perspective. Explores daily life under socialism and the collapse of socialist rule in relation to social life such as gender, identity, nationalism, and ethnicity.

Anth 3035. Anthropologies of Death. (3 cr; A-F only. Prereq—1003 or #) Anthropological perspectives on death. Diverse understandings of afterlife, cultural variations in death ritual, secularization of death in modern state, management of death in medicine, cultural shifts/conflicts in what constitutes good or natural death.


Anth 3043. Art, Aesthetics and Anthropology. (3 cr) 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 3045. Religion and Culture. (3 cr. Prereq—1003 or #) Course examines religious beliefs and world views cross-culturally; religious dimensions of human life through theories of the origins, functions, and forms (e.g. myth, ritual, and symbolism) of religion in society.
Anth 3047W. Gender in Cross-Cultural Perspectives. (3 cr)
Relationship of biology and culture; cultural construction of gender and sexuality; variations in economic organization; women's involvement in ritual and religion; impact of colonialism on gender; rise of the state and gender issues.

Anth 3310. Topics in Biological and Physical Anthropology. (Prereq–Anth 1003 or Anth 4003) (max 6 cr)
Topics may include faunal analysis, the human skeleton and osteology, primate and human evolution, and forensic anthropology. Topics vary according to student and faculty interest.

Anth 3913. Senior Project Planning. (1 cr. Prereq–Jr or sr or grad major; F)
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 cr [max 6 cr])
Topics specified in Class Schedule.

Anth 4001. Advanced Method and Theory in Archaeology. (3 cr. Prereq–1001 or 3001) (max 9 cr)
Survey and in-depth discussion of past and contemporary archaeological, theoretical, and methodological issues and approaches. Projects incorporating theories and methods. Examination of problems and integrating method and theory.

Anth 4003W. Contemporary Perspectives in Cultural Anthropology. (3 cr; A-F only. Prereq–[1003, jr] or #)
Concept of culture, practice of fieldwork as they relate to various social institutions. Anthropological perspectives on race, ethnicity, gender.

Anth 4011. Senior Seminar. (3 cr; A-F only. Prereq–Sr major, anthh) Research seminar. Topics/methodologies differ according to student, staff, and students. Students complete substantial research paper.

Anth 4013. Senior Project. (3 cr. Prereq–Sr major, anthh) Independent research project fulfilling the senior option; directed by a faculty member.

Anth 4019. Symbolic Anthropology. (3 cr. Prereq–1003 or grad or #)
Examines pragmatic and structural aspects of social symbolism cross-culturally with special attention to power, exchange, social boundaries, gender, and rituals of transition and reversal.

Anth 4021. Psychological Anthropology. (3 cr. Prereq–1003 or grad or #)
Self, emotion, cognition, and child development in cross-cultural perspective. Examines cultural and social influences on personality, and psychological foundations of society and culture.

Anth 4023W. Culture Theory. (3 cr; A-F only. Prereq–Jr or sr or grad or #)
In-depth examination of key developments in the culture concept, from Darwin to present-day postmodern approaches. Examines the view that cultures have an inherent order that cannot be explained psychologically or biologically, and reactions to this view.

Anth 4052. Studies in Ethnographic Classics. (3 cr. A-F only. Prereq–1003)
Five types of explanations employed in ethnographic research: diffusionism and the theory of survivals; the functionalist response; the British structuralists; French structuralism; and the interpretive turn. Examines problems in ethnographic practice, analysis, or writing by focusing on several classic monographic examples and associated theoretical writing.

Anth 4031. Applied Anthropology. (3 cr. Prereq–1003 or 4003 or grad or #)
Introduces the practical application of theories and methods from social and cultural anthropology. Examines issues of policy, planning, implementation, and ethics as they relate to applied anthropology.

Anth 4035. Ethnographic Research Methods. (3 cr. Prereq–1003 or grad)
Introduces the history of and current issues in ethnographic research. Research projects, includes participant observation, interviewing, research design, note taking, life history, and other ethnographic methods.

Anth 4043. Archaeology of Northern Europe. (3 cr. Prereq–Anth 4003 or grad or #)
Archaeological background of British Isles, and northern parts of continental Europe, from late-Bronze Age through Viking Period. Themes include art and symbolism; growth of towns; societal interactions; religion and ritual; introduction of Christianity; and development of long-distance trade.

Anth 4045. Gender and Power in South Asia. (3 cr. Prereq–Anth 1003 or #)
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 4047. Anthropology of American Culture. (3 cr. Prereq–1003 or #)
Anthropological approaches to contemporary American society and culture; tensions between market and family; unity and diversity; individualism and community.

Anth 4049. Religion and Culture. (3 cr. Prereq–1003 or #)
Course examines religious beliefs and world views cross-culturally; religious dimensions of human life through theories of the origins, functions, and forms (e.g. myth, ritual, and symbolism) of religion in society.

Anth 4051. Kinship, Gender and Diversity. (3 cr. Prereq–1003)
Cross-cultural variation in meanings, expectations, and practices related to marriage, family, sexuality and parenthood. Applies knowledge of cultural diversity to other issues in U.S. societies, e.g. changing marriage and family forms, incest, reproductive rights, reproductive technology.

Anth 4053. Economic Anthropology. (3 cr. Prereq–1003 or #)
Systems of production and distribution, especially nonindustrial societies. Comparison, history, and critique of major theories in the field; development of a cross-cultural, anthropological approach to material life that subsumes both market and nonmarket processes, and explores the relation to theory.

Anth 4057. Politics and Law. (3 cr. Prereq–1003 or grad)
Problems of inequality, order and authority in nonstate as well as state-based societies. Historical and cross-cultural survey of the concepts through which these problems have been understood. Comparative political and legal systems, featuring case studies from Africa, Australia, New Guinea, Indonesia, and the United States.

Anth 4061. Culture and Childhood. (3 cr. Prereq–1003 or grad or #)
The contexts, expectations, and tasks/activities of childhood based on case studies from diverse cultures. Application and evaluation of Western theories of child development in relation to non-Western societies. Consideration of conditions of childhood from a global perspective.

Anth 4065. Cultural Change and Development. (3 cr. Prereq–1003 or 4003 or #)
Changes of change; modernization, dependency, and world systems theories. Interdisciplinary analysis of case studies from Africa, Japan, Mexico, and Native North America. Impacts of global processes on local cultures.

Anth 4067. Anthropology of Social Movements. (3 cr. Prereq–1003 or 4003 or grad or #)
Cross-cultural study of the characteristics, functions and processes of movements of social, political, religious and ecological change. Examination of method and theory in the study of such movements. Ethnographic examples in the United States, Europe, Latin America and Africa.

Anth 4069. Environmental Archaeology. (3 cr. Prereq–1001, 3001 or grad)
Use of remains from archaeological sites and off-site records of ancient landscapes, vegetation, and climate to reconstruct how humans interacted with their environments. Interdisciplinary approaches toward reconstructing past human environments; long-term local and global environmental change.

Anth 4071. Race and Culture. (3 cr. A-F only. Prereq–1003 or 3003 or #)
Evaluation of main trends in the study of racism; psychological, sociological, symbolic, and “critical” approaches which treat racism as a sociodiscursive phenomenon. Examines racist discourse as a practice which defines an “other” and subjugates that other to strategies of exclusion.

Anth 4075. Cultural Histories of Healing. (3 cr; A-F only. Prereq–Jr or sr or grad student or #)
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 “ethnomedicines,” traffic of healing practices in a transnationalist world.

Anth 4980. Topics in Sociocultural Anthropology. (3-6 cr. [max 6 cr]. Prereq–1003 or #)
Special topics in all specializations of social and cultural anthropology. Topics specified in Class Schedule.

Anth 4990. Topics in Archaeology: Seminar. (3-6 cr. [max 6 cr]. Prereq–1001 or 3001 or #)
Discussion/review/analysis of specific current theoretical and/or methodological issues in archaeology. Topics specified in Class Schedule.

Anth 4991. Independent Study. (1-6 cr. max 6 cr. Prereq–#)
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. (1-6 cr. max 6 cr. Prereq–#)
Allows students to pursue special interests in anthropology through reading materials under the guidance of a faculty member.

Anth 4993. Directed Study. (1-6 cr. max 6 cr. Prereq–#)
Allows students to pursue special interests in anthropology under the guidance of a faculty member.

Anth 4994W. Directed Research. (1-6 cr. max 6 cr. Prereq–#)
Qualifies students can conduct a well-defined research project under the guidance of a faculty member.

Anth 5025W. Cultural Semantics. (3 cr)
Understanding cultures and cognitive classification systems through lexical semantics.

Anth 5027W. Origins of European Civilization. (3 cr. §3027)
Early development of European society, from Old Stone Age to Roman period. Principle transformations of European culture with introduction of agriculture, development of metallurgy and trade, and emergence of towns and cities.

Anth 5029. Philosophical Anthropology. (3 cr; A-F only. Prereq–Sr or grad or #)
Advanced survey of traditional problems associated with broad-ranging views on human nature and culture. Specific arguments of relativists, behaviorists, phenomenologists, and others in relation to social life. Structuralist and post-structuralist approaches.

Anth 5033. Feminist Anthropology. (3 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 ethnohistory within the discipline as a whole; current debates concerning the reading and writing of ethnography.
Anth 5041. Ecological Anthropology. (3 cr.) Prereq—Grad or #) 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 5045. Urban Anthropology. (3 cr. Prereq—4003 or grad or #) Anthropological approaches to urban life in Western and non-Western settings. Topics include social networks and voluntary organizations; class, ethnicity, gender and power; migration and immigration; urban labor and economics; and urban problems.

Anth 5128. Anthropology of Learning. (3 cr) Cross-cultural perspectives in examining educational patterns, and explicit cultural assumptions underlying them; methods and approaches to cross-cultural studies in education.

Anth 5244. Skeletal Materials for Archaeologists. (4 cr; A-F only. Prereq—1001 or 3001 or #) 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 5980. Topics in Anthropology. (3 cr) Topics specified in Class Schedule.

Anth 5990. Topics in Archaeology. (3 cr; A-F only. Prereq—#) Topics specified in Class Schedule.

Applied Business (ABus)

College of Continuing Education

ABus 4011. Historical Perspectives and Contemporary Business Challenges. (3 cr; A-F only. Prereq—At least 45 cr) Global competitiveness, product and service quality, information revolution, and changing customer/workforce demographics. Approaches to meeting contemporary challenges studied against historical backdrop of evolving management practices. Emphasizes developing systematic ways of analyzing complex problems.


ABus 4022. Managing Organizational Relationships. (3 cr; A-F only. Prereq—At least 45 cr) Political dimensions of organization life. Diagnosing how power is exercised in modern organizations. Cooperative relationships, frameworks for analyzing motives for observed behavior. Skills for managing upward, lateral, and downward relationships. Recognizing potential ethical dilemmas.

ABus 4023. Communicating for Results. (3 cr; A-F only. Prereq—At least 45 cr) Aspects of communication essential for being persuasive/influential. Organizing/presenting ideas effectively, strategies for audience analysis, choosing communication methods, making appropriate use of influence methods, handling dissent. Processes for intercultural communication.

ABus 4024. Effective Oral Communication and Business Presentations. (3 cr; A-F only. Prereq—At least 45 cr) Building/developing business presentation skills and oral communications effectiveness. Videotaping/critiques of actual presentations based on audience analysis, technique selection, and handling receptive/hostile audiences.

ABus 4025. Negotiating for Agreement. (1 cr; A-F only. Prereq—At least 45 cr) Practical negotiating tools, hands-on practice to engage in win-win negotiations.

ABus 4031. Accessing and Using Information Effectively. (3 cr; A-F only. Prereq—Computer literacy, at least 45 cr) Role of information in business operations. Information systems, data management. Accessing external information using information search services, CD-ROMs and periodicals. Accessing internal information using desktop database system, electronic mail, or computer conferencing. Typology of information applied in case studies and exercises.

ABus 4032. Quantitative Skills for Decision Making. (3 cr; A-F only. Prereq—College algebra, college statistics, at least 45 cr) Exploratory data analysis, visual display of data, basic mathematical/statistical techniques for analysis. Decision theory, decision modeling.

ABus 4041. Leadership in a Global and Diverse Workplace. (3 cr; A-F only. Prereq—At least 45 cr) Developing a global/ethical perspective to navigate changes driven by expanding global markets, need to compete with global competitors, and need to interact across cultures within/outside the organization.


ABus 4043. Project Management in Practice. (3 cr; A-F only. Prereq—4102, at least 45 cr) Tools/techniques to support project leader in scheduling, coordinating, and allocating resources. Field project with nonprofit community organization, smaller business, or student’s employing organization.

ABus 4044. Tools for International Trade. (1 cr; A-F only. Prereq—At least 45 cr) International forces/trends. Identifying ways in which businesses can work within context of international change. Tools used in specific transactions, ways to diagnose in what circumstances they are most appropriately applied.


ABus 4103. Marketing and Sales. (3 cr; A-F only. Prereq—At least 45 cr) Legal, behavioral, ethical, competitive, economic, and technological factors as they affect product pricing, promotion, and marketing. Personal selling function as integral part of distribution system. Sales force organization, selection, training, motivation, compensation, forecasting, budgeting, control.


ABus 4501. Entrepreneurship. (3 cr; A-F only. Prereq—4101, 4103, at least 45 cr) Self-employment as alternative to employment. Phases of entrepreneurship, including identifying an opportunity, start-up, managing/harvesting a small business. Emphasizes all aspects of business plan.

ABus 4503. Technological Change, Work Organization, and Management Practices. (3 cr; A-F only. Prereq—At least 45 cr) Evolution of work organization in the United States. Factors responsible for changes. Effect of changes on labor-management relations. Revolutions in technology, scientific management, collective bargaining, self-directed work teams, and lean production methods.

ABus 4505. Values and Ethics at Work. (1 cr; A-F only. Prereq—At least 45 cr) Ways in which we look at work/life issues. Religious, legal, social, cultural, and personal viewpoints. Topics may include pay equity/benefits, discrimination, product liability, corporate political contributions, loyalty, family/work conflicts, community responsibility, and role of business in society. Case examples.


ABus 4509. New Product Development. (1 cr; A-F only. Prereq—At least 45 cr) 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 4515. Changing the American Workplace: Choice or Destiny?. (3 cr; A-F only. Prereq—At least 45 cr) Evolution of work organization. Revolutions in technology, scientific management, collective bargaining, self-directed work teams, and lean production methods. Limited to 25.

ABus 4901. Special Topics in Applied Business. (3 cr; A-F only. Prereq—At least 45 cr) Management issues in a changing workplace. Topics vary.

ABus 4970. Directed Study. (1-3 cr; A-F only. Prereq—BAS student in applied business, #) Specially arranged projects, trips, or fieldwork.

ABus 4999. Practicum. (3 cr; A-F only. Prereq—BAS student in applied business, at least 33 applied-business cr.; A) Project in student’s employing organization or in organization providing an internship. Integrates projects from previous coursework or develops plan for new venture or expands existing business. Limited class meetings.
Environmental Sciences

Agriculture.

Equilibrium models for affects of trading blocks on foreign trade, development, and growth. General business, and property taxes.

Public sector and market economics. Public goods, and the Economy.

Analysis. Structure, pricing policy, risk analysis, investment allocation decisions, linear programming, market problems. Introduction to regression analysis, Applied Microeconomics: Managerial Effects of government regulations, market failure.


Economics of health care markets. Problems faced by consumers and health care services. Builds on microeconomic principles of supply/demand for health care, health insurance, and role of government. Theoretical/empirical models, applications.

Principles of Farm Management. (3 cr. Prereq–3002, [3501 or Fina 3001], Mgmt 3001) Market structure; demand and supply structure; regulated and institutions that influence the behavior of firms in agricultural marketing systems; performance in food assembly, manufacturing, and distribution industries.

Agricultural and Economic Growth in Developing Countries. (3 cr. Prereq–1101, 1102, Econ 1101, 1102 or #) 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.

AgrAbility, and whole farm planning and control; investment management; marketing plan and control; enterprise management; financial analysis, budgeting, strategic production, corporate and cooperative

Stakeholders in decisions. Successful development; consequences of development; influence of government policies and organizations; and models and tools needed for successful development; consequences of development activities and ways to involve stakeholders in decisions.

Principles of Farm Management. (3 cr. Prereq–3002, [3501 or Fina 3001], Mgmt 3001) Market structure; demand and supply structure; regulated and institutions that influence the behavior of firms in agricultural marketing systems; performance in food assembly, manufacturing, and distribution industries.

Economics of health care markets. Problems faced by consumers and health care services. Builds on microeconomic principles of supply/demand for health care, health insurance, and role of government. Theoretical/empirical models, applications.

Principles of Farm Management. (3 cr. Prereq–3002, [3501 or Fina 3001], Mgmt 3001) Market structure; demand and supply structure; regulated and institutions that influence the behavior of firms in agricultural marketing systems; performance in food assembly, manufacturing, and distribution industries.

Agricultural and Economic Growth in Developing Countries. (3 cr. Prereq–1101, 1102, Econ 1101, 1102 or #) 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.

AgrAbility, and whole farm planning and control; investment management; marketing plan and control; enterprise management; financial analysis, budgeting, strategic production, corporate and cooperative

Stakeholders in decisions. Successful development; consequences of development; influence of government policies and organizations; and models and tools needed for successful development; consequences of development activities and ways to involve stakeholders in decisions.

Principles of Farm Management. (3 cr. Prereq–3002, [3501 or Fina 3001], Mgmt 3001) Market structure; demand and supply structure; regulated and institutions that influence the behavior of firms in agricultural marketing systems; performance in food assembly, manufacturing, and distribution industries.
Course Descriptions

Arabic (Arab)

Department of African American and African Studies

College of Liberal Arts

Arab 1101. Beginning Arabic. (5 cr)

Oral practice, reading, comprehension, basic grammar. For students with no previous training in Arabic.

Arab 1102. Beginning Arabic. (5 cr)

Prereq—Arab 1101 or equiv or #)

Arab 1201. Colloquial Arabic. (5 cr)

Prereq—Arab 1101 or equiv or #)

Arab 1202. Colloquial Arabic. (5 cr)

Prereq—Arab 1101 or equiv or #)

Arabic (Arab)

Department of African American and African Studies

College of Liberal Arts

Arab 1101. Beginning Arabic. (5 cr)

Oral practice, reading, comprehension, basic grammar. For students with no previous training in Arabic.

Arab 1102. Beginning Arabic. (5 cr)

Prereq—Arab 1101 or equiv or #)

Arab 1201. Colloquial Arabic. (5 cr)

Prereq—Arab 1101 or equiv or #)

Arab 1202. Colloquial Arabic. (5 cr)

Prereq—Arab 1101 or equiv or #)

For definitions of course numbers, symbols, and abbreviations, see page 296.
Arab 5036. Islam: Religion and Culture. (3 cr. §Afro 3036) Religion of Islam, faith, practices, sectarian splintering, expansion outside original home to status of world religion, institutions, status in world societies - Asia, Europe, Americas.

Arab 5101. Advanced Arabic I. (3 cr. Prereq-3101 or equiv or #) Advanced readings in classical and modern Arabic. Compositions based on texts.

Arab 5102. Advanced Arabic II. (4 cr. Prereq-5101 or #) Readings of Arabic texts. Writing compositions based on texts. Continuation of 5101.

Arab 5491. Classical Islamic Civilization. (3 cr. §Afro 3036) Islamic legacy in the classical age (800-1400), including medical/natural sciences, mathematics, philosophy, literature, and their transmission to Europe.


Arab 5503. Arabic Drama in Translation. (3 cr) Emergence and development of drama as a European-inspired genre in Arabic literature. Emphasizes major trends and playwrights. All readings in English.

Arab 5505. Survey of the Middle East. (3 cr §3505, §HINT 3505, §MELC 3505) Peoples, lands, and cultures of the Middle East. Historical survey from earliest civilizations to the present.


Arab 5542. Medieval Islam. (3 cr §5542) Islamic dynasties, Mamluks and Mongols, and Crusaders and Assassins. Abbasid Caliphate’s disintegration and rise of Seljuk Turks.

Arab 5543. Arabs Under Mamluks and Ottomans: 1300-1612. (3 cr §5354) Struggle against Crusaders and Mongols. Disintegration and reemergence under Muhammad Ali of Egypt; dynastic struggles in Syria; rise of Young Turks; Arab revolt.

Arab 5544. Arab World: 1920 to the Present. (3 cr §5354) Struggle in the Arab world for independence and its course since independence. Emphasis on development, political stability and unity; political structures; the Arab-Israeli conflict.


Arab 5900. Topics in Arabic Literature and Culture. (3 cr [max 9 cr]; Prereq-5102 or #) Readings and discussion of selected works in Arabic. Topics specified in Class Schedule.

Arab 5992. Directed Readings. (1-3 cr. Prereq-#) Individual research and readings for advanced students.

Armaic (Arm) Department of Classical and Near Eastern Studies College of Liberal Arts

Arm 5011. Biblical Aramaic and Old Aramaic Inscriptions. (3 cr. Prereq-1 yr Hebrew or Aramaic or #) Biblical Aramaic—grammar, fluency in reading Biblical Aramaic and Old Aramaic inscriptions.

Arm 5012. Syriac. (3 cr. Prereq-1 yr Hebrew or Aramaic or #) Emphasis on fundamentals of grammar and reading Syriac texts fluently.

Architecture (Arch) Department of Architecture College of Architecture and Landscape Architecture

Arch 1301. Introduction to Drawing in Architecture and Landscape Architecture. (3 cr; A-F only) Development of basic skills involved in perceiving and representing the material environment. Study of sketching and drawing conventions of visual phenomena and forms.

Arch 1401. The Designed Environment. (3 cr; A-F only) 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 these issues.

Arch 1412H. Honors: The Designed Environment. (3 cr; A-F only. Prereq—[Fr or soph], honors; meets HON req) How seminal issues (e.g., relationships of space, place, ideal/real, public/private) have been reflected in, explored through architecture, landscape architecture, urban design.

Arch 3301. Drawing for Design in Architecture. (3 cr; A-F only. Prereq—[[1301 or LA 1301], [pre-Arch or Arch or BED] or #]) Introduction to conceptual function of drawing in architecture. History of drawing in architecture, critical review of drawing conventions/systems, exploration of drawing processes.

Arch 3401V. Honors: Environmental Design and the Sociocultural Context. (3 cr. Prereq—1401 or LA 1401 or #) The designed environment as a cultural medium and product of a sociocultural process and expression of values, ideas, and behavioral patterns. Study of design and construction as a complex political process.

Arch 3401W. Environmental Design and the Sociocultural Context. (3 cr. Prereq—1401 or LA 1401 or #) The designed environment as a cultural medium and product of a sociocultural process and expression of values, ideas, and behavioral patterns. Study of design and construction as a complex political process.

Arch 3411. Architectural History to 1750. (3 cr) History of architecture and city planning from antiquity to 1750, as illustrated by major monuments from western and non-western cultures.

Arch 3412. Architectural History Since 1750. (3 cr) History of structure, cities, sites, and theories of architecture and urbanism since 1750.

Arch 3490H. Honors Theory Seminar. (3 cr; A-F only. Prereq—[CLA BA or CALA BS] honors or #) Topics selected by faculty, from their area of scholarship, in contemporary issues from literature of architecture. Specific buildings or building types, or areas of architectural thought, history, representation, design, technology. See Class Schedule.

Arch 3611. Design in the Digital Age. (3 cr; A-F only) 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 3993. Directed Study. (1-4 cr. Prereq-# only) Guided individual reading or study.


Arch 4572. Structural Frames and Building Design/ Construction. (3 cr; A-F only) Basic contemporary structural systems in masonry, steel, and wood framing systems. Forms/ performance of systems.

Arch 5241. Principles of Design Programming. (3 cr; A-F only. Prereq—For undergrads 5122, BA Arch major; for grad 5255, Arch major or #) Concepts and techniques of architectural programming, including space and activity analysis, site selection, precedent study, code review, appropriate technology integration, hypothesis formulation and evaluation. Emphasis on conceptual development, research, and analytic drawing.

Arch 5250. Advanced Topics in Design. (1-6 cr [max 6 cr]; A-F only, Prereq—Arch or #) Advanced topics in design.

Arch 5281. Undergraduate Architecture Studio I. (6 cr; A-F only, Prereq—[3411 or 3412], Arch major or #) Architectural questions in settlement patterns, architectural elements in their formal organization. Mapping techniques, orthographic projections, analytic drawing, models.

Arch 5282. Undergraduate Architecture Studio II. (6 cr; A-F only, Prereq—5281, Arch major or #) Exploration of human response to the natural forces of gravity, light, and air and their influence on the organization of material form to create places of human habitation.

Arch 5283. Undergraduate Architecture Studio III. (6 cr; A-F only, Prereq—5282, Arch major or #) Exploration of selected design issue or topic, its influence on organization of material form to create places of human habitation.

Arch 5284. Undergraduate Architecture Studio IV. (4 cr; A-F only, Prereq—[5283, 5282, Arch major or #]) Design studio.

Arch 5291. Accelerated Undergraduate Architecture Studio I, II. (6 cr; A-F only, Prereq—#) Selected architectural problems developed by faculty to deepen/enrich ideas introduced in required architectural studio sequence.

Arch 5292. Accelerated Undergraduate Architecture Studio II, III. (6 cr; A-F only, Prereq—[5291, accelerated status] or #) Architectural problems. Emphasizes development of structures as integral part of design, site planning, design process.

Arch 5313. Visual Communication Techniques in Architecture. (3 cr; A-F only. Prereq—For undergrads 3301, BA Arch or BED major; for grads M Arch major or #) Exploration of delineation, presentation, and design techniques, using various visual media and methods of investigation.

Arch 5321. Architecture in Watercolor. (3 cr; A-F only. Prereq—[3301, Arch or BED] or M Arch grad student or #) Watercolor as a tool in the design process. Survey of foundation principles, techniques, medium, tools, and materials. Exploration of color relationships, mixing, composition, and applications to design.

Arch 5350. Topics in Architectural Representation. (1-3 cr [max 9 cr]; A-F only, Prereq—[5321, Arch major or M Arch major] or #) Selected topics in architectural representation.
Arch 5351. AutoCAD I. (3 cr. Prereq—For undergrads 5261, arch major; for grads MArch major or #) Introduction to 3-D studio for architectural modeling, rendering, and animation. Video recording and editing.

Arch 5381. Introduction to Computer Aided Architectural Design. (3 cr; A-F only. Prereq—Arch or BED major or #) Architecture as a cultural medium. Relationships among architecture, people, and culture; research findings and design technologies. Architectural taxonomy. Physiological and symbolic messages; reception theory in architecture; cultural critique and change; implications for architectural practice.

Arch 5382. Computer Aided Architectural Design. (3 cr; A-F only. Prereq—5381, undergrad, [BA Arch major or BED major] or MArch major or graduate LA major or #) Advanced study in architectural history. Readings, research, and seminar reports.

Arch 5423. Gothic Architecture. (3 cr; A-F only. Prereq—For undergrads 3411, arch major; for grads MArch major or #) History of development of architecture and urban design in Western Europe from 1150 to 1400.

Arch 5424. Renaissance Architecture. (3 cr; A-F only. Prereq—For undergrads 3411, arch major; for grads MArch major or #) History of architecture and urban design in Italy from 1400 to 1600. Emphasis on major figures (Brunelleschi, Alberti, Bramante, Palladio) and the evolution of major cities (Rome, Florence, Venice).

Arch 5425. Baroque Architecture. (3 cr; A-F only. Prereq—For undergrads 3411, arch major; for grads MArch major or #) History of architecture and urban design in Italy from 1600 to 1750. Emphasis on major figures (Bernini, Borromini, Cortona, Guarini) and the evolution of major cities (Rome, Turin).

Arch 5426. Architecture and Nature: 1500-1750. (3 cr. Prereq—For undergrads 3411, 3412, arch major; for grads MArch major or #) History of the interaction of architecture and nature in Italy, England, and France in the 16th and 17th centuries. Major monuments, their relationship to theories of architecture and gardening, urban and rural life.

Arch 5431W. Eighteenth-Century Architecture and the Enlightenment. (3 cr; A-F only. Prereq—[3411, 3412, undergrad arch major] or MArch grad student or #) Architecture, urban planning, and garden design in Europe from 1700 to 1850.

Arch 5432. Modern Architecture. (3 cr; A-F only. Prereq—For undergrads 3412, arch major; for grads MArch major or #) Architecture and urban design in Europe and the United States from the early 19th century to World War II.

Arch 5434. Contemporary Architecture. (3 cr; A-F only. Prereq—For undergrads 3412, arch major; for grads MArch major or #) Developments, theories, movements, and trends in architecture and urban design from World War II to the present.

Arch 5439. History of Architectural Theory. (3 cr; A-F only. Prereq—Arch or WoSt major or MArch major or #) Selected topics in architectural theory and criticism.

Arch 5548. Architecture and Culture. (3 cr; A-F only. Prereq—3412, arch major or grad student or #) Architecture and gendered and non-gendered places and practices, and their relations to cultural norms and change.

Arch 5461. North American Indian Architecture. (3 cr. Prereq—For undergrads 3412, arch or Amhn major; for grads MArch major or #) Historic and contemporary principles and theories of North American Indian architecture. Study of the culture, technology, environment, art and craft of North American Indians in their settlements and architecture.

Arch 5501. Architecture and Ecology. (4 cr. A-F only. Prereq—5281, LA 3501, arch major or #) 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 a variety of scales: site/community, building scale, component scale. Fundamental theories, concepts, principles, strategies, and design tools addressed at each scale.

Arch 5511. Construction Materials in Architecture. (3 cr; A-F only. Prereq—MArch major or #) Study and analysis of building materials, assemblies, and construction operations shaping building designs. Examination of material properties for design and detailing of building systems, elements, and components, and their implications in design applications. Modeling and hands-on building experiences.

Arch 5550. Topics in Technology. (1-3 cr [max 6 cr. Prereq—#) Selected topics in architecture technology, including construction, environmental management, energy performance, lighting, or materials.

Arch 5561. Building Production Processes. (3 cr. Prereq—5282, 5501, arch major or BED major or MArch major or #) Introduction to design-build processes including document production, contract execution, and building project management. Case study and hands-on experiences examine construction industry organization, scheduling, consultant relations, legal and code constraints, contractual stipulations, budget and project resource allocations.


Arch 5611. Design in the Digital Age. (3 cr; A-F only. Prereq—Grad student or upper level undergrad) 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 5650. Topics in Architectural Practice. (1-4 cr. Prereq—5621, arch major or 5621, MArch major or #) Topics in architectural practice, methods of design production, marketing, operation, and relationships among clients, architecture, and society.

Arch 5670. Topics in Historic Preservation. (1-3 cr. Prereq—Arch or MArch major or #) Selected topics in the theory, philosophy, research, and methods of architectural historic preservation.

Arch 5671. Historic Preservation. (3 cr. Prereq—3412 or #) Philosophy, theory, and origins of historic preservation. Historic architecture and research, descriptive analysis, and documentation of historic buildings. Government’s role in historic preservation, preservation standards and guidelines, preservation and building codes, neighborhood preservation, preservation advocacy, and future directions for historic preservation. Research on architectural and historical aspects of historic sites using primary and secondary resources and on controversial aspects of preservation.


Arch 5673. Historic Building Research and Documentation. (3 cr. Prereq—3412, 5672 or #) Philosophy, theory, and methods of historic building research, descriptive analysis of buildings, building documentation, historical archaeology, and architectural taxonomy.

Arch 5711. Design Principles of the Urban Landscape. (3 cr; A-F only. Prereq—Arch or BED major or MArch or LA grad major or #) Art and design of creating city, neighborhood, and development plans. Public policies, planning tools and process, and physical models used by design professionals and private and civic institutions to shape the physical environment.

Arch 5724. Meanings of Place. (3 cr; A-F only. Prereq—Arch or BED or Geog major or MArch or LA grad major or #) Analysis of meanings and messages of surroundings, and examination of links between sense of place and feelings of well-being. Exploration of what present-day environments can reveal about the past. Survey of Twin Cities’ central district and selected neighborhoods, and other settings inside and outside Minnesota.

Arch 5993. Directed Study. (1-4 cr; A-F only. Prereq—#) Guided individual reading or study.
Art (ArtS)

Department of Art
College of Liberal Arts

Art 1001W. Introduction to Visual Arts. (4 cr)
Concepts of visual art-making in contemporary and historical contexts. The media, environment, and concerns of the practicing artist. Creative process, visual expression, criteria. Aesthetic foundation for beginning studio courses. Required of all art majors.

Art 1101. Drawing. (4 cr)
Introduction to fundamental principles and processes of drawing; exploration of various drawing media. Work from still life, nature, the life model, and imagination.

Art 1102. Painting. (4 cr. Prereq–1101 or #)
Introduction to painting with attention to understanding and applying the fundamental principles of spatial organization and color interaction.

Art 1301. Sculpture. (4 cr)
An introduction to sculptural practice examining materials, methods, concepts, and history with emphasis on the correlation between concepts and materials. Work in clay, plaster, metal, and wood.

Art 1501. Printmaking. (4 cr)
Introduction to techniques of printmaking: woodcut, etching, lithography, and screen printing. Historical approaches and use through contemporary materials and concepts. Emphasis on the interrelationship of process, materials, and ideas.

Art 1505. Papermaking. (4 cr)
Introduction to approaches, forms, and aesthetic possibilities of paper as an expressive medium. Studio work in both Eastern and Western traditions and sculptural applications.

Art 1601. Electronic Art. (4 cr)
Introduction to the use of computer technologies as a source for creative art making. Emphasis on producing digital fine art in the context of computer-based ideas such as interactivity, virtuality, agency, and community.

Art 1701. Photography. (4 cr)
Presents conceptual, technical, and historical aspects of photography within the fine arts context. Emphasis on the creative process through hands-on experience in use of camera, film development, enlarging, and printing.

Art 1801. Ceramics. (4 cr)
Fundamentals of wheel-thrown and hand-built ceramics as forms of creative expression. Introduction to clay, glazes, and firing techniques.

Art 1902. Freshman Seminar. (3 cr [max 6 cr]; A-F only)
Topics specified in Class Schedule.

Art 1905. Freshman Seminar. (3 cr [max 6 cr]; A-F only)
Topics specified in Class Schedule.

Art 1910W. Topics: Freshman Seminar. (3 cr; A-F only. Prereq–3101 or #)
Topics specified in Class Schedule.

Art 3101. Intermediate Drawing. (4 cr. Prereq–1001, 1101)
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.

Art 3102. Intermediate Painting. (4 cr. Prereq–1001, 1101, 1102)
Emphasizes development of visual sensibility, individual direction, critical judgment.

Art 3105. Dimensional Painting. (4 cr. Prereq–1001, 1101, 1102)
Application of two-dimensional visual concerns as they relate to sculptural form. Exploration of how painting ideas affect perception of real space.

Art 3106. Drawing: Interpreting the Site. (4 cr. Prereq–1001, 1101)
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.

Art 3111. Life Drawing I. (4 cr. Prereq–1001, 1101)

Art 3112. Life Drawing II. (4 cr. Prereq–3111 or #)
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.

Art 3301. Sculpture: Direct Metal. (4 cr. Prereq–1001, 1301)
Constructive approach to sculpture through welding in steel, other metals. Studio practice, investigation of historical/contemporary methods/concepts.

Focuses on sculptural practice outside traditional media/approaches. Theoretical constructions of space as primary medium of sculpture. Installation, theater, public art, architecture.

Art 3303. Sculpture: Metalcasting. (4 cr. Prereq–1001, 1301)
Metal casting of sculpture in bronze, iron, aluminum, other metals. Studio practice, investigation of historical/contemporary methods/concepts.

Art 3304. Sculpture: Carving and Construction. (4 cr. Prereq–1001, 1301)

The exploration of movement in sculpture (wind, water, electric). Studio practice and investigation of historical and contemporary methods and concepts.

Art 3306. Performance Art and Installation. (4 cr. Prereq–1001, 1301)
Studio practice, investigation of forms of expression involving narrative, performance, installation. Historical art forms introduced by Dada movement in 1920’s, continued by Fluxus movement in 1950’s, to contemporary performance/installation artists.

Art 3307. Sculpture: Traditional Approaches. (4 cr. Prereq–1001, 1301)
Clay modeling of human figure, other forms. Moldmaking, plaster casting with historical/contemporary systems. Studio practice, investigation of traditional sculptural methods/concepts.

Art 3401W. Critical Theories and Their Construction From a Studio Perspective. (3 cr. Prereq–1001, 1301 or #)
Primary critical theories that shape the analysis of works of art. Evaluation of works from the artist’s perspective. Theory as an organizational structure from which to understand contemporary works.

Art 3402. Artists’ Books. (4 cr. Prereq–1001, one visual art course)
Study/creation of unique, handmade books using various structures, media, techniques. Critical, historical, theoretical issues surrounding contemporary book arts.

Art 3403. Women’s Images and Images of Women. (3 cr. Prereq–1001 or #)
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.

Art 3411H. Honors Tutorial in Visual Arts. (1-4 cr [max 6 cr]; A-F only. Prereq–Honors, #)
Individual consultation with a faculty member on visual work, research project, presentation, paper, or bibliography.

Art 3415H. Honors Exhibition. (2 cr; A-F only.)
Prereq–Magna or Summa Honors candidate, #, A
Advanced problems in studio and research, leading to a magna or summa exhibition.

Art 3416H. Honors Thesis. (1 cr; A-F only. Prereq–Summa level honors candidate, #)
Summa thesis paper written in support of honors exhibition or in relation to candidate’s visual/conceptual interests.

Art 3444. Major Project. (1 cr; S–N only, Prereq–#)
Individually designed independent project or exhibition.

Art 3496. Internship in the Arts. (1-4 cr. Prereq–Art major, #, A)
Field work at local, regional, national, or international arts organization or with professional artist provides experience in administration of art-based organizations.

Art 3499. Internship at Katherine E Nash Gallery. (3 cr; S–N only. Prereq–1001, #)
Hands-on experience in day-to-day operation/mission of Department of Art’s professional gallery.

In-depth investigation of intaglio/screenprinting. Application of traditional/contemporary techniques. Emphasizes individual artistic expression. Review of historical/cultural development of the media.

Art 3502. Printmaking: Relief and Lithography. (4 cr. Prereq–1001, 1501)
Expressive/formal aesthetics of woodcut relief, hand lithography. Studio practice/investigation of artistic attitudes as exemplified through historical perspectives, traditional/contemporary usages.

Art 3505. Papermaking as an Art Form. (4 cr. Prereq–1001, 1501)
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.

Conceptual/aesthetic development of digital/interactive works of art. How people-based applications expand formal/conceptual issues of virtuality, community, agency, and non-linear structure within fine art. Critical theory. History of new media/technologies that can enable individual expression.

Art 3602. Time Arts: Video. (4 cr. Prereq–1001, 1601)
Digital/non-linear video processes to explore elements of time, cinematic space, narrative, and montage. Personal aesthetic/conceptual directions. Theory, critical readings about historical/contemporary works in digital media.

Art 3603. Time Arts: 2-D Animation. (4 cr. Prereq–1001, 1601)
Experimentation and creating a personal voice with two-dimensional animation. Historical overview and contemporary issues. Creating 2-D animation with digital technologies focusing on vector and layer-based raster animation.

Art 3604. Time Arts: 3-D Animation. (4 cr. Prereq–1001, 1601)
Conveying creative ideas visually with three-dimensional animation. Creating virtual objects in virtual spaces moving in time. Modeling objects and spaces, creating textures, lighting, movement, and animating to a sound track.

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


Arts 5104. The Nature of Abstraction. (4 cr. Prereq–3102 or #) Exploration of abstraction as concept. Studio practice with attention to developing individual work. Emphasizes understanding topics relevant to abstraction. Approached from discipline of painting, open to various material sensibilities.


Arts 5106. Advanced Drawing: Interpreting the Site. (4 cr. Prereq–3106 or #) 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 5120. Advanced Painting. (4 cr [max 12 cr.] Prereq–3102 or #) Developing personal vision/content through painting. Emphasizes critical thinking, self-evaluation, and independent pursuit of ideas.


Arts 5320. Advanced Sculpture: Spatial Problems. (4 cr [max 12 cr.] Prereq–3302 or #) 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 cr [max 12 cr.] Prereq–3303 or #) Metal casting of sculpture in bronze, iron, aluminum, other metals. Studio practice, investigation of historical/contemporary methods/concepts. Development of personal sculptural imagery.


Arts 5360. Advanced Performance Art and Installation. (4 cr [max 12 cr.] Prereq–3306 or #) Studio practice in performance art and installation; investigation of historical and contemporary methods and concepts of interdisciplinary expression. Development of personal imagery.


Arts 5403. Women’s Images and Images of Women. (3 cr. Prereq–1001 or #) 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’s efforts from late-Renaissance to contemporary feminism; relevant issues.


Arts 5441. Professional Practices. (3 cr. Prereq–Grad or #) Intensive writing seminar provides a context for theoretical issues, business practices, and professional skills required for career management and development in the visual arts.

Arts 5490. Workshop in Art. (1-4 cr [max 12 cr.] Prereq–3501 or #) Selected topics and intensive studio activity. Topics vary yearly.


Arts 5550. Advanced Papermaking. (4 cr [max 12 cr.] Prereq–3505 or #) Distinct expressive qualities of handmade paper, its versatility as contemporary art form. Independent research pursued in consultation with instructor.


Arts 5620. Time Arts: Advanced Video. (4 cr [max 12 cr.] Prereq–3602) Individual projects exploring elements of time, cinematic space, narrative, and montage through experimental, documentary, or installation-based video art. Articulation of relationships between conceptual, aesthetic, and artistic process.

Arts 5630. Time Arts: Advanced 2-D Animation. (4 cr [max 12 cr.] Prereq–3603 or #) Individual projects and further development of a personal voice and critical thinking in time-based art. Creating digital 2-D animation with emphasis on vector and layer-based raster animation techniques. Compositing 2-D animation with video.

Arts 5640. Time Arts: Advanced 3-D Animation. (4 cr [max 12 cr.] Prereq–3604 or #) Advanced exploration of modeled objects in modeled space and time. Compositing of animation images with video images. Individual projects, emphasis of personal voice and visual clarity within the framework of 3-D imagery and time-based artwork.


Arts 5810. Advanced Ceramics. (4 cr [max 12 cr.] Prereq–3801, 3802 or #) Critical discourse of aesthetics, history, and contemporary issues in clay and criticism. Independent, advanced projects.

Arts 5821. Ceramic Materials Analysis. (4 cr. Prereq–3801 or 3802 or #) 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. (1-4 cr [max 12 cr.] Prereq–Major) Independent study project designed by student in consultation with instructor.

Art History (Arth)

Department of Art History

Arth 1001. Introduction to Art History. (4 cr) History of art examined through selected monuments of major periods, from Paleolithic to modern times. Covers Western, other cultures.

Arth 1004V. Honors: Introduction to Asian Art. (4 cr. §1004W, §1016V, §1004W. Prereq–Permission of CLA honors adviser) Issues/themes of South Asian, Southeast Asian, East Asian art from earliest times to present.
Arth 5182. Art and the State: Public Art in the Roman Empire. (3 cr. Prereq–intro art history course or #) Origins of Roman public art; use in maintaining community; exploitation by the first Emperor, Augustus; development and diffusion through the later Empire; varying capabilities to adjust to the demands of a Christian Empire.

Arth 5234. Gothic Sculpture. (3 cr. Prereq–Jr or sr or grad or #) The origin, character, and development of Gothic sculpture in France, the German empire, and the Netherlands. 1150-1400. Emphasis on French sculpture, focusing on the cathedral age and the emergence of a court style in Paris and elsewhere in Europe (e.g., London, Prague).

Arth 5252. History of Early Christian Art in Context. (3-4 cr. Prereq–3xxx Arth course or #) The role played by art in the formation of early Christian and Byzantine communities, and in establishing their relationships with the Pagan world and early Islam.

Arth 5323. Art of the Italian Renaissance: 14th-16th Centuries. (3 cr) Chronological/historical study of painting, sculpture, and architecture. Emphasizes major artists/commissions, but lesser schools/followers also considered.

Arth 5324. 15th-Century Painting in Northern Europe. (3 cr. Prereq–Jr or sr or grad or #) The origin, character, and development of painting in France, the Netherlands, England, and the German Empire during the years 1350 to 1500. Emphasis on the Flemish school (e.g., Van Eyck brothers, Campin, Van der Weyden) and its influences.

Arth 5346. 17th- and 18th-Century Art of Southern Europe. (3 cr. Prereq–3000 or grad or #) 17th-century painting in Spain (e.g., Ribera, Velazquez, Murillo); 17th- and 18th-century architecture, sculpture, and painting in Italy (e.g., Caravaggio, Carracci, Bernini, Algarotti, Borromini, Piranesi).

Arth 5347. 17th- and 18th-Century Art of Northern Europe. (3 cr. Prereq–3001 or grad student or #) Seventeenth-century painting in Holland/Belgium (e.g., Rembrandt, Rubens), Seventeenth- and eighteenth-century French architecture, sculpture, and painting (e.g., Versailles, Poussin, Watteau).


Arth 5431. Age of Revolution: French Painting 1789 to 1870. (3 cr) Major issues and movements in France and leading practitioners: neo-classicism-David, romanticism-Corot, Gericault, Delacroix; landscape and peasant painting-the Barbizon group; realism-Courbet; pre-impressionism-Monet, Manet, Pissarro. Movements linked with historical changes emphasizing contextualization of monuments.

Arth 5454. American Sculpture: The Public Monument. (3 cr) Case studies in American public sculpture of the 19th and 20th centuries including the 1893 Chicago Fair, the Iwo Jima and Vietnam Veterans Memorials, the Washington Monument, the Lincoln Memorial; careers of Daniel Chester French and Augustus St. Gaudens.

Arth 5466. Contemporary Art. (3 cr. Prereq–3464 or #) Survey of the art and important critical literature of the period after 1970. Origins and full development of postmodern and subsequent aesthetic philosophies.

Arth 5521. Modernism and Modernity in American Painting: 1876 to 1945. (3 cr) Relationship between modernity and “modernism” in the visual arts between the Centennial Exposition of 1876 and World War II. Artists addressed include the Ash Can School and the Regionalists.

Arth 5535. Style, Tradition, and Social Content in American Painting: Colonial Era to 1876. (3 cr) America’s colonial, Revolutionary era, and 19th-century painters’ responses to the influence of European aesthetics. Key American painting types: portraiture, rural genre, and landscape from Copley and Gilbert Stuart to the Hudson River School and the chroniclers of the Western frontier.

Arth 5536. Topical Studies in American Art. (3 cr) Course description varies from year to year, depending on the current research interests of the instructor and the needs and interests of advanced undergraduate and graduate students in modern and American art.

Arth 5546. American Architecture: 1840 to 1914. (3 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 5725. Ceramics in the Far East. (3 cr) Selective examination of representative pottery and ceramic wares produced in China, Korea, and Japan from the Neolithic era to modern times. Nearly every major ceramic type is represented.

Arth 5765. Early Chinese Art. (3 cr) Develop a more effective way to understand the unique qualities of individual work of art. Concentration is on accessible works of art in local private and museum collections.

Arth 5766. Chinese Painting. (3 cr) Major works from the late bronze age to the modern era that illustrate the development of Chinese landscape painting and associated literary traditions.

Arth 5767. Japanese Painting. (3 cr) Japanese pictorial arts from the late tomb period to the modern era; special attention to the development of indigenous traditions.

Arth 5769. Connoisseurship in Asian Art. (3 cr) A selective examination of representative works of art produced in China from the Neolithic era to the Han Dynasty. Major archaeological sites and examples of art in local collections.

Arth 5775. Formation of Indian Art: 2500 B.C.E. to 300 C.E. (3 cr. Prereq–Art history course or #) Sculpture and architecture from the Indus Valley civilization through the Kushana period.

Arth 5776. Redefining Tradition: Indian Art 400 to 1500. (3 cr. Prereq–Art history course or #) An examination of India’s art and architecture from the time of the earliest free-standing temples through the 13th century, focusing on temples and their associated sculpture, mural painting, and the beginnings of Islamic architecture in India.

Arth 5777. The Diversity of Traditions: Indian Art 1200 to Present. (3 cr. Prereq–Art history course or #) Issues presented by sculpture, architecture, and painting in India from the prehistoric Indus Valley civilization to the present day.

Arth 5781. Age of Empire: The Mughals, Safavids, and Ottomans. (3 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 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 5925. History of Photography as Art. (3 cr) Origins and development of photography, with attention to technology and cultural impact. Major aesthetic achievements in photography from its beginning to its present time.

Arth 5927. Documentary Cinema. (4 cr; A-F only) History of nonfiction filmmaking, from early forms of reportage and birth of documentary to emergence of “film-verite” and “guerrilla television” and work by independents (e.g., Errol Morris, Michael Moore).

Arth 5940. Topics: Art of the Film. (3-4 cr) Topics in film history including individual directors (e.g., Hitchcock, Welles), genres (e.g., westerns, musicals), and other topics (e.g., American independent filmmaking, film noir).

Arth 5950. Topics: Art History. (2-4 cr max 12 cr) Topics specified in Class Schedule.

Arth 5960. Topics: Art History. (3 cr max 6 cr) Topics specified in Class Schedule.

Arth 5993. Directed Study. (1-4 cr max 12 cr; A-F only. Prereq–#) Arth 5994. Directed Research. (1-4 cr max 12 cr; A-F only. Prereq–#)

Asian Languages and Literatures (ALL) Department of Asian Languages and Literatures College of Liberal Arts

ALL 1904. Freshman Seminar. (3 cr max 6 cr) A-F only. Prereq–Fr or no more than 36 cr Topics specified in Class Schedule and Course Guide.

ALL 1905. Freshman Seminar. (3 cr max 6 cr; A-F only. Prereq–Fr or no more than 36 cr Topics specified in Class Schedule and Course Guide.

ALL 1909W. Freshman Seminar. (3 cr max 6 cr; A-F only. Prereq–Fr or no more than 36 cr Topics specified in Class Schedule and Course Guide.

ALL 1910W. Freshman Seminar. (3 cr max 6 cr; A-F only. Prereq–Fr or no more than 36 cr Topics specified in Class Schedule and Course Guide.

ALL 3110. Study of an Asian Language. (1-5 cr max 10 cr; A-F only) 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 3720. Study Abroad Topics in Asian Culture. (1-4 cr max 12 cr; A-F only) Part of University of Minnesota sponsored study abroad experience.

ALL 3900. Topics in Asian Literature. (1-4 cr max 12 cr) Topics specified in Class Schedule.

ALL 3920. Topics in Asian Culture. (1-4 cr max 12 cr) Topics specified in Class Schedule.
Astronomy (Ast)

Department of Astronomy

Institute of Technology

Ast 1001. Exploring the Universe. (4 cr. §1011) The human place in the Universe. Study of other planets, sun, stars, galaxies. Background and fragility of life on Earth. Scale, origin, history of universe and our relationship to it.

Ast 1004. Mathematics and Our Universe. (3 cr) Selected topics in astronomy. Introduction to how basic mathematical concepts and reasoning further our understanding of the universe.

Ast 1005. Descriptive Astronomy. (3 cr §1001, §1011H) Twentieth century astrophysics, current frontiers of astrophysical research.

Ast 1011H. Exploring the Universe, Honors. (4 cr. §1001) Prereq—High school trigonometry, high school physics or chemistry) 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. Honors version of Ast 1001.


Ast 1910W. Freshman Seminar, Writing Intensive. (1-3 cr Prereq—Fr with no more than 24 cr) Topics vary. See Class Schedule.

Ast 2001. Introduction to Astrophysics. (4 cr. Prereq—1 yr calculus, Phys 2303 or #) Physical principles and study of solar system, stars, galaxies, universe. How observations and conclusions are made.

Ast 2990. Directed Studies. (1-5 cr Prereq—1 yr calculus, Phys 1302, #) Independent, directed study in observational and theoretical astrophysics. Arranged with faculty member.


Ast 4101. Computational Methods in the Physical Sciences. (4 cr Prereq—Upper div CLA or upper div IT or grad or #) Introduction to using computer programs to solve problems in physical sciences. Selected numerical methods, mapping problems onto computational algorithms. Arranged lab.

Ast 4299H. Senior Honors Astrophysics Research Seminar. (1 cr Prereq—Upper div honors student in IT or CLA, #) Based on department’s research seminar.

Ast 4990. Directed Studies. (1-5 cr Prereq—2001, #) Independent, directed study in observational and theoretical astrophysics. Arranged with faculty member.

Ast 4994W. Directed Research. (3-5 cr Prereq—#) Independent research in observational or theoretical astrophysics. Senior Thesis for undergraduate astrophysics majors. Arranged with faculty member.


Ast 5201. Methods of Experimental Astrophysics. (4 cr Prereq—Upper div IT or grad or #) Contemporary astronomical techniques and instrumentation. Emphasizes data reduction and analysis, including image processing. Students make astronomical observations at O’Brien Observatory and use department’s computing facilities for data analysis. Image processing packages include IRAF, AIPS, IDL, MIRA.
production; genetics of industrially useful microorganisms; biological systems useful for biotechnology; and environmental remediation; introduction to fermentation technology.


BioC 5401W. Advanced Metabolism and Its Regulation. (3 cr. Prereq—2031 or 4331 or BioI 3021) Underlying principles that determine metabolism of common/unusual compounds in plants, animals, microorganisms. Regulation of carbon, energy flow in whole organisms.

BioC 5444. Muscle. (3 cr. PrPhil 5444. Prereq—Bio/C 3021 or Biol 4331 or Phil 3061 or #) Muscle structure/function: molecular mechanism by which force is generated.

BioC 5446. Membrane Biochemistry. (2 cr. Prereq—2031 or 4331 or BioI 3021 or #) Membrane structure. Mechanisms and physiological roles of channels, pumps, and membrane enzymes.

BioC 5527. Introduction to Modern Structural Biology. (6 cr. Prereq—Intro biochemistry, intro physics or physical chemistry or #) Methods employed in modern structural biology to elucidate macromolecular structures. Focus on X-ray diffraction, nuclear magnetic resonance (NMR) spectroscopy and mass spectrometry. Principles underlying structural biology and structure/function relationships.


BioC 5530. Selected Topics in Molecular Biophysics. (1-3 cr [max 9 cr]. Prereq—5527 or 5528 or equiv) Topics from current literature on biophysics of proteins, nuclear acids, muscle, membranes. Content/ instructors vary from one offering to another, on an approximately every other year rotation.

BioC 5531. Macromolecular Crystallography I: Fundamentals and Techniques. (1 cr; S-N only. Prereq—[(one organic chemistry or biochemistry course), [two calculus or college physics courses or #] or #] Macromolecular crystallography for protein structure determination/engineering. Determining macromolecule structure by diffraction.


Bioinformatics (BInf)

Department of Laboratory Medicine and Pathology

Medical School

BInf 5490. Topics in Bioinformatics. (1-6 cr [max 12 cr. Prereq—#) Independent or group study in bioinformatics.

Biology (Biol)

College of Biological Sciences


Biol 1002W. Introductory Biology II: Molecular, Cellular, and Developmental Perspectives. (5 cr; A-F only. §1009. Prereq—[1001 or equiv], Chem 1021) Chemistry of living things, cell structure/transport, energy processing in cells, introduction to primary metabolism, molecular genetics, cell physiology, cell cycles, principles of animal/plant development, regulation of development. Lab focuses on molecular scientific techniques, investigative designs.


Biol 1020. Biology Colloquium. (1 cr [max 2 cr]; S-N only) 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 1002W. Introductory Biology II: Molecular, Cellular, and Developmental Perspectives. (5 cr; A-F only. §1009. Prereq—[1001 or equiv], Chem 1021) Chemistry of living things, cell structure/transport, energy processing in cells, introduction to primary metabolism, molecular genetics, cell physiology, cell cycles, principles of animal/plant development, regulation of development. Lab focuses on molecular scientific techniques, investigative designs.


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Biol 1002W. Introductory Biology II: Molecular, Cellular, and Developmental Perspectives. (5 cr; A-F only. §1009. Prereq—[1001 or equiv], Chem 1021) Chemistry of living things, cell structure/transport, energy processing in cells, introduction to primary metabolism, molecular genetics, cell physiology, cell cycles, principles of animal/plant development, regulation of development. Lab focuses on molecular scientific techniques, investigative designs.

Biol 3101. Introduction to Neuroscience I: From Molecules to Madness. (3 cr; A-F only; §NS 3101, §PhS 3101. Prereq–2302 or BioC 3021 or BioC 4331) Basic principles of cellular/molecular neurobiology and nervous systems.

Biol 3102W. Introduction to Neuroscience II: Biological Basis of Behavior. (3 cr; A-F only; §NS 3102, §PhS 3102, §NSc 3102W. Prereq–3101 or NSc 3101 or Phs 3101) Organization of neural systems/subsystems underlying sensory/motor aspects of behavior. Writing intensive.

Biol 3211. Animal Physiology. (3 cr. Prereq–[1002 or 1009], Chem 1021; §2005 strongly recommended) Compares ways different animals solve similar physiological problems.


Biol 3407. Ecology. (3 cr. §3807, §EEBE 3001. Prereq–[1001 or 1009 or equiv] or [1014 or Math 1271 or equiv]) 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, field work.


Biol 3411. Introduction to Animal Behavior. (3 cr. §3811. Prereq–[1002 or 1009 or #]) Biological study of animal behavior. Mechanism development, function, and evolution. Emphasizes evolution of adaptive behavior, social behavior in the natural environment. Lab.


Biol 3600. Directed Instruction. (1-2 cr [max 6 cr]; 5-N only. Prereq–[1020, upper div, application, #; up to 4 cr may apply to major]) Students assist with biology colloquium.

Biol 3610. Internship: Professional Experience in Biological Sciences. (1-6 cr [max 6 cr]; 5-N only. Prereq–Acceptance into CBS Professional Learning Experience Program, internship workshop; # up to 4 cr may apply to major) Matches student’s academic or career goals with opportunities in industry, non-profit organizations, and government agencies.

Biol 3700. Undergraduate Seminar. (1 cr [max 3 cr]; 5-N only) Faculty members lead groups of students in discussions on topics of current interest.

Biol 3807. Ecology. (4 cr. §3407. Prereq–[1001 or 1009 or equiv], [Math 1142 or Math 1271 or equiv], [A] 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, field work.

Biol 3811. Introduction to Animal Behavior. (3 cr. §3411. Prereq–[1002 or 1009 or #]) Biological study of animal behavior. Mechanism development, function, and evolution. Emphasizes evolution of adaptive behavior, social behavior in the natural environment. Lab, field work.

Biol 3901. Honors Seminar. (1-2 cr [max 2 cr]; S-N only. Prereq–Limited to participation in CBS honors program, $) Oral reports on topics of current interest to biologists. Progress reports on laboratory and field research by students.

Biol 3960M. Honors Seminar. (1 cr [max 2 cr]; S-N only. Prereq–Limited to participation in CBS honors program, $) Oral reports on topics of current interest to biologists. Progress reports on laboratory and field research by students.

Biol 4003. Genetics. (5 cr; Prereq–Bio/ BioC 3021 or BioC 4331) Introduction to the nature of genetic information, its transmission from parents to offspring, its expression in cells and organisms, and its course in populations.


Biol 4105. Neurobiology Laboratory I. (1.5 cr; A-F only; §NS 3105. Prereq–[3101 or NSc 3101 or Phs 3101], [3102W or 3102W]) Principles, methods, and laboratory exercises for investigating neural mechanisms and examining experimental evidence.

Biol 4115. Neurobiology Laboratory II. (1.5 cr; A-F only; §NS 3115. Prereq–[3102 or NSc 3102 or Phs 3102], [3102W or 3102W]) Principles, methods, and laboratory exercises for investigating neural mechanisms and examining experimental evidence.

Biol 4185. Recombinant DNA Laboratory. (3 cr; A-F only; §4125. Prereq–Biology or genetics course, [intermediate-level lab in biochemistry or genetics or cell biology or microbiology], enrollment in Summer Undergraduate Research Program in Life Sciences, §) Basic recombinant DNA techniques. Methods for growing, isolating, and purifying recombinant DNAs and for cloning vectors.

Biol 4501. Social Uses of Biology. (3 cr. Prereq–[7 cr in sciences]) Influence of biological science on the quality of human life: agriculture, medicine, occupational health, environmental science, and theories of human nature. Responsibilities and roles of biologists in policy formulation in the scientific and political world.

Biol 4850. Special Topics in Biology. (1-7 cr [max 7 cr]; Prereq–A) In-depth study of special topic in life sciences. Offered at Lake Itasca Forestry and Biological Station.

Biol 4894. Directed Research at Itasca. (1-7 cr [max 7 cr]; S-N only. Prereq–[A]; max of 7 cr of 4894 or 4994 may count toward major curricular requirements) Field investigation of selected areas of research at Itasca Field Station.

Biol 4950. Special Topics in Biology. (1-5 cr [max 10 cr]) In-depth study of a specialized topic in the life sciences.

Biol 5407. Ecology. (3 cr. §3407. Prereq–[1001 or 1009 or equiv], [Math 1142 or Math 1271 or equiv], [grad or #]) 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.

Biol 5409. Evolution. (3 cr. §3409. Prereq–[1001 or 1009], [grad or #]) 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 5501. Biological Collections: Curation and Management. (1 cr. Prereq–[2012 or 2022 or 3007 or 3211]) Roles and value of biological collections in terms of biodiversity; natural history museum management and philosophy; conservation of museum specimens; data access and ethics. Students participate in various curatorial activities.

Biol 5511. Teaching the Biological Sciences. (3 cr; A-F only; Prereq–6 cr in the life sciences) Methods and teaching styles used by outstanding university teachers including reviews and critiques from research on teaching. Opportunities for students to practice and evaluate teaching strategies.

Biol 5910. Special Topics in Biology for Teachers. (0.5-1.5 cr [max 12 cr]; Prereq–BA or BS in science or science education or elementary education or K-12 licensed teacher) 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.

Biol 5913. Biology for Teachers: Monarchs in the Classroom. (3 cr. Prereq–[Elementary or middle school or high school or preservice] teacher or #) Two-week summer workshop. Week one focuses on monarch butterfly biology taught through fieldwork, labs, lecture, and research projects. A 2- to 3-week break follows, when students raise monarchs, conduct simple experiments. Week two focuses on designing classroom activities/projects based on monarch biology. Follow-up meetings held during academic year.

**Biomedical Engineering (BMEn)**

**Department of Biomedical Engineering Institute of Technology**


**BMEn 2601. Biomedical Engineering Undergraduate Seminar I. (1 cr)** Introduction to biomedical engineering from academic/industrial perspectives. Survey of current/emerging areas.

**BMEn 2602. Biomedical Engineering Undergraduate Seminar II. (1 cr; Prereq–2601 or #)** Continuation of 2601. Emphasizes biomedical engineering design and numerical analysis.
BMEn 3301. Biomechanics. (4 cr; A-F only. Prereq—Math 2374, Phys 1302, [BMEn upper div or Δ])
Statics, dynamics, and deformable body mechanics applied to biological/biomedical problems. Mechanical properties of biological and commonly used biomechanical engineering materials. Techniques for numerical solution of biomechanics problems. Lecture/lab.

BMEn 3302. Biomechanics Laboratory. (1 cr; A-F only. Prereq—Math 2374, Phys 1302, [BMEn upper div or Δ]; not intended for students taking 3301) Laboratory experiments in statics, dynamics, and deformable body mechanics applied to biological/biomedical problems.


BMEn 3102. Biomedical Transport Processes Laboratory. (1 cr; A-F only. Prereq—Math 2374, Phys 1302, [BMEn upper div or Δ]; not intended for students taking 3301) Laboratory experiments in momentum, heat, and mass transfer illustrated with applications in physiological processes.

BMEn 3201. Bioelectricity and Bioinstrumentation. (4 cr; A-F only. Prereq—[Math 2263 or Math 2374], Phys 1302, [BMEn upper div or Δ]) Principles of electrical phenomena, instruments relevant to biomedical applications. Lecture/lab.

BMEn 3202. Bioelectricity and Bioinstrumentation Laboratory. (1 cr; A-F only. Prereq—Math 2374, Phys 1302, [BMEn upper div or Δ]; not intended for students taking 3301) Laboratory experiments in electrical phenomena. Instruments relevant to biomedical applications.

BMEn 3301. Biomaterials. (4 cr; A-F only. Prereq—[Math 2263 or Math 2374], Phys 1302, [BMEn upper div or Δ]) Principles of biomaterials. Organic chemistry and biochemistry of natural/artificial biomaterials. Physical characterization and mechanical testing. Biomedical applications. Lecture/lab.

BMEn 3302. Biomaterials Laboratory. (1 cr; A-F only. Prereq—Math 2374, Phys 1302, [BMEn upper div or Δ]; not intended for students taking 3301) Laboratory experiments with biomaterials. Organic chemistry and biochemistry of natural/artificial biomaterials. Physical characterization and mechanical testing. Biomedical applications.

BMEn 3701. Physiology Lab. (2 cr; A-F only. Prereq—[Math 2263 or Math 2374], Phys 3061, Phys 1302, [BMEn upper div or Δ]) Laboratory experiments in physiology. Emphasizes quantitative aspects, including analysis of organ systems.

BMEn 4001W. Biomedical Engineering Design I. (3 cr; A-F only. Prereq—Biol 1009, [CE 3502 or #; [ChEn 5103 or ME 5342] recommended]) 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 cr; A-F only. Prereq—4001W) Continuation of 4001W.

BMEn 4710. Directed Research. (1-4 cr [max 4 cr; A-F only. Prereq—4, Δ]) Independent laboratory research under faculty supervision.

BMEn 4720. Directed Study. (1-4 cr [max 4 cr; A-F only. Prereq—4, Δ]) Directed study under faculty supervision.

BMEn 4910. Special Topics in Biomedical Engineering. (1-4 cr [max 4 cr; A-F only. Prereq—4, Δ]) New or experimental special topics.

BMEn 5001. Advanced Biomaterials. (3 cr; A-F only. Prereq—1st yr grad BMEn major; [general chem, organic chem, biochemistry, polymer sci] recommended) 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 of physical characterization of biomaterials. Effect of additives, stabilizers, processing conditions, and sterilization methods.

BMEn 5041. Tissue Engineering. (3 cr. Prereq—IT upper div or grad student or #) 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/Instrumentation. (3 cr. Prereq—Phls 5440, calculus, college physics) 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 5102. Bioelectric Measurements and Therapeutic Devices II. (3 cr. Prereq—5101) Theory and application of electrical stimulation in areas of therapeutic and functional neuromuscular stimulation and pain control, cardiac pacing, defibrillation, tissue healing, and electrotherapy. Safety of electric fields. Electrical tissue impedance measurements.

BMEn 5151. Biomedical MEMS. (4 cr; A-F only. Prereq—[Analogue circuit principles, basic electromagnetic theory]) Survey of solid-state biomed transducers. Physical principles of operation and technology implementation of microsensors/microactuators. Physical, chemical, and biomedical sensors. Actuators for surgery. Other precision positioning applications, materials, and fabrics. Emphasizes recent advances in biomed microelectromechanical systems.

BMEn 5201. Advanced Biomechanics. (3-4 cr. Prereq—IT upper div or grad student), AEM (statics, deformable media or) 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 5351. Cell Engineering. (3 cr. Prereq—5301 or equiv, 3310 or equiv, 5201 or equiv, IT upper div or grad student or #) Survey of engineering approaches to cell-related phenomena important to cell and tissue engineering; receptor/ligand binding, trafficking and signaling processes; applications to cell proliferation, adhesion, and motility; cell-matrix interactions.


BMEn 5444. Muscle. (3 cr) Muscle structure/function: molecular mechanism by which force is generated.


BMEn 5502. Pathobiology of Medical Devices. (3 cr; A-F only. Prereq—IT upper div or grad student) Biological response to biomaterials presented in context of fundamental principles of cell injury, adaptation, repair, or death. Diversity of medical uses of biomaterials, by organ system. Unique features of specific biological systems in which medical devices are utilized.

BMEn 5910. Special Topics in Biomedical Engineering. (1-4 cr) Special topics.

BMEn 5920. Special Topics in Biomedical Engineering. (2-4 cr)

Biosystems and Agricultural Engineering (BAE)

Institute of Technology

BAE 1011. Biosystems and Agricultural Engineering Orientation. (1 cr; S-N only) Introduction to biosystems and agricultural engineering profession through readings and discussions by faculty, practicing engineers, and students; curriculum and intern, undergraduate research, and honors opportunities. Ethics, safety, environmental issues.


BAE 3013. Engineering Principles of Molecular and Cellular Processes. (3 cr; A-F only. Prereq—Bioi 1009, [Chem 1022 or #Chem 1022]) Applied engineering principles in biomolecular processes, classification of microbes of industrial importance, parameters for cellular control, modeling of cell growth/metabolism, enzymatic catalysis, bioreactor design, product recovery operations design, case studies.


BAE 3093. Directed Studies. (1-5 cr. Prereq—#) Independent study of topic(s) involving physical principles as applied to agricultural production and land resources.

BAE 4013. Transport in Biological Systems. (4 cr; A-F only. Prereq—3003, CE 3502, ME 3324, upper div IT) Application of thermodynamics, fluid flow, heat/ mass transfer to design problems involving biological processes and materials at cell, organism, and system level. Agricultural, environmental, food, and bioproduct applications. Solution of equations involving computer programming assignments. Hands-on instruction in Visual Basic.

BAE 4023. Instrumentation and Control for Biological Systems. (3 cr. Prereq—EE 3005 or #EE 3005, Stat 3021, upper div IT) Measurement of motion, force, pressure, flow, temperature, size, shape, color, texture, rheology, moisture, water mobility, fat, and pH. Linking physical and biological control systems.
BAE 4112W. Senior Design I. (2 cr; A-F only. Prereq—2113, upper div II, or #) Review of design concepts and process. Case studies involving engineering design. Discussion of safety/ethical issues. Development of proposals for senior design project (individual or group) to be completed in 4122. Oral presentation of written proposal.

BAE 4122W. Senior Design II. (2 cr; A-F only. Prereq—4112) Complete design project started in 4112. Report, poster, and oral presentation of final design.

BAE 4313. Design of Machine Systems. (3 cr. Prereq—AEM 2021, AEM 3031, upper div IV) Case studies of machine/processes. Design for world markets; crop production (tractors, harvesters, implements); food- and crop-processing systems (pumping, conveying); animal systems (milking parlor design, waste-handling machines).


BAE 4523. Water Management Engineering. (3 cr; A-F only. Prereq—3023 or CE 3301, CE 3502, upper div IV) Applying engineering principles to management of water for production and environmental protection in agricultural systems. Designing facilities to irrigate/drain croplands and enhance water quality.

BAE 4533. Agricultural Waste Management Engineering. (3 cr. Prereq—3023, upper div IV) Sources and characteristics of agricultural wastes, including livestock, food processing, and domestic wastes. Physical, biological, chemical, ecological, and microbiological properties. Effects on environment. Collection, storage, treatment (aerobic and anaerobic), and use/disposal. Land application.

BAE 4713. Bioprocess Engineering. (3 cr; A-F only. Prereq—3023, upper IV) Separation and fermentation as applied to biological systems; product recovery in bioprocess technology; topics in bioremediation; modeling of separation processes in biological systems.

BAE 4723. Food Process Engineering. (3 cr. Prereq—CE 3502, [ME 3324 or MME 3324], upper div IV) Application of principles of heat transfer and fluid flow to design of food processing operations such as thermal/aseptic processing, freezing, pumping, drying, evaporation, concentration. Marketing, government regulation, nutrition issues.

BAE 4900. Intern Reports. (2 cr [max 4 cr]; S-N only. Prereq—IT or COAISE student in BAE, #) Reports on intern work assignments reviewed by faculty and industry advisers.

BAE 5095. Special Problems. (1-5 cr; Prereq—#) Advanced individual-study project. Application of engineering principles to specific problem.

BAE 5513. Watershed Engineering. (3 cr. Prereq—3023, upper div IV) Application of engineering principles to managing surface runoff from agricultural, range, and urban water-bodies. Design facilities and selection of land use practices for controlling surface runoff to mitigate problems of flooding and degradation of surface-water quality.

BAE 1910W. Freshman Seminar, Writing Intensive. (2 cr [max 6 cr]; A-F only) Topics vary. See Class Schedule.

BAE 1998. Independent Study. (1-4 cr [max 8 cr]; A-F only. Prereq—CSOM for soph or sr) Special project or independent study.

BAE 3000. Career Skills. (1 cr; A-F only. Prereq—CSOM [senior or jr]) Career planning. Use of Carlson School of Management’s Business Career Center. Students gain awareness, knowledge, skills associated with career/job search process.

BAE 3033W. Business Communication. (3 cr; A-F only. Prereq—Fr composition, CSOM upper-division) Written/oral communications skills for effective participation in contemporary organizations. From basic principles to communication strategy. Communication technology. Cases, simulations of “real-world” situations. Students are required to meet with instructor three times a semester in small groups for presentation coaching/feedback. Recitation times are arranged with instructor at start of semester.

BAE 3100. Global Seminar. (3 cr [max 12 cr]; A-F only. Prereq—Undergrad GPA of at least 2.50) Topics may vary from year to year.

BAE 3110. Global Seminar: Supplemental Writing. (1 cr [max 2 cr]; A-F only. Prereq—43100) Projects developed by instructor of Global Seminar. Students analyze/process intercultural experience of studying abroad. Individualized feedback/coaching in writing skills. Taught during intersession. Writing intensive, if core concurrently enrolled in 3100.

BAE 3999H. Honors Topics. (2 cr; A-F only) Offered in conjunction with Minnesota Mutual Foundation leadership perspectives program.

BAE 3998. Independent Study. (1-4 cr. Prereq—CSOM upper div, J) Student-initiated project or independent study.

BAE 3999. Internship Seminar. (1 cr; S-N only. Prereq—30 cr, approved internship, #) Registration for approved undergraduate study abroad programs.

Business and Industry Education (BIE)

Business Administration (BA)

Curtis L. Carlson School of Management

BA 1001. Introduction to Information Technology. (1 cr; S-N only) Assess computing skills. Identify resources to develop skills in word processing, spreadsheets, presentation software, e-mail, LUMINA, remote access, and Web. Self-paced.

BAE 1396. Supervised Career and Technical Education Teaching. (4 cr; S-N only. Prereq—Approval of adviser) Supervised teaching for beginning teachers, or teaching activities for preservice teachers.

BIE 3061. Professional Sales Management. (3 cr; A-F only) 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.

BIE 3111. Exploring Technology Systems. (3 cr) Communication, information, construction, manufacturing, design, technical drawing, biotechnology, energy, power, and transportation technologies. Students develop problem solving and manipulative skills as well as understanding of the principles and processes through hands-on activities in a multiple activity laboratory.

BIE 3112. Technical Drawing and Production Technologies. (3 cr; A-F only) Instruction and laboratory experiences in technical drawing and design technologies; production technologies related to construction and manufacturing. Students will develop manipulative skills and techniques and an understanding of principles and processes of the technologies through hands-on work and lab activities.


BIE 3114. Construction Technology. (3 cr. Prereq—E3111) Introduction to principles, concepts, and techniques involved in civil, commercial, and residential construction. Laboratory experiences in planning, designing, organizing, producing, and testing structures.

BIE 3121. Communication, Power and Energy, Transportation and Machinery Technologies. (3 cr; A-F only) Instruction and laboratory experiences in communication, information, power, energy, and transportation technologies. Topics include power systems; transportation systems; information and communication systems; graphic communication and computer applications.

BIE 3122. Communication and Information Technology. (3 cr; A-F only. Prereq—E3121) Information/communication systems, electronic publishing, printing technology, broadcast/recording technologies, telephone/online communication, photography, multimedia, and computer technology. Lab.


BIE 3151. Technical Development: Advanced. (1-30 cr [max 30 cr]. Prereq—#) Credits awarded for work experience in business/industry.

BIE 3999. Directed Study. BIE. (1-4 cr [max 4 cr]) Self-directed study preceded by classroom instruction in basic research procedures.

BIE 5001. Teaching Marketing Promotion. (3 cr; A-F only) 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.

BIE 5011. Introduction to Computer Applications. (3 cr) Instructional uses of computers and representative business/marketing education applications, including word processing, databases, spreadsheets, and graphics.

BIE 5012. Advanced Word Processing. (3 cr. Prereq—5011 or equiv) Develop/apply solution methods for office problems using word processing software including advanced editing, printing, and desktop publishing capabilities.

BIE 5013. Spreadsheet Analysis Using Computers. (3 cr. Prereq—5011 or equiv) Using spreadsheets to analyze data, monitor business records, and create models.

BIE 5014. Database Computer Applications. (3 cr. Prereq—5011 or equiv) Business needs for computerized databases. Using database software to develop, maintain, and prepare reports.
BIE 5015. Integrated Computer Applications in Business and Marketing Education. (3 cr. PreReq—5011, 5013, 5014 or equiv) Realistic business computer problems requiring integration of two or more application packages. Pedagogical issues of learning/teaching advanced computer applications.

BIE 5080. Special Topics in Business and Industry Education. (1-10 cr) Content varies by offering.

BIE 5101. Technological Problem Solving. (3 cr; A-F only. Pre Req—3111, 3112, 3121, 3122) Capstone technology education course in which students research problems relative to various technological systems and develop solutions to the identified problems.

BIE 5151. Technical Development: Specialized. (1-12 cr [max 12 cr]; A-F only) Students select and study technical processes and principles based on the particular subject matter areas they plan to teach. Experiences allow students to integrate specialized technical instruction in advanced and emerging areas.

BIE 5321. Vocational Guidance in Business and Industry Education. (2 cr; A-F only) Self assessment, use of occupational and labor market information, job seeking skills, work and work satisfaction. For industrial teachers and trainers in school and industry settings.

BIE 5325. Foundations of Industrial Education. (3 cr) Social, economic, psychological, philosophical, legislative, and administrative foundations of industrial education in the United States. Comparison with selected foreign countries. Analysis of contemporary trends against backdrop of early foundations.

BIE 5344. Facilities Management in Business and Industry. (3 cr; A-F only. PreReq—1122) Planning, evaluating, and managing industrial education shop and lab facilities.

BIE 5365. Curriculum Development in Technology Education. (3 cr) Conceptualization and derivation of content for the K-12 technology curriculum. Comparison of U.S. approaches to technology curriculum with selected countries.

BIE 5440. Business and Industry Observation and Seminar. (1-3 cr [max 6 cr]) Current operating practices and career opportunities in business and industry. Planned experiences in work environments and related seminars.

BIE 5452. Methods of Teaching Business and Marketing Concepts. (3 cr; A-F only) 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.

BIE 5457. Methods of Teaching Business Employment and Marketing Employment. (3 cr; A-F only) Recent research/developments in teaching for business employment. Administrative support positions, accounting/information processing, marketing, sales and industry. Planned seminars, other occupations using desktop computing.

BIE 5463. Methods in Teaching Keyboarding and Word Processing. (2 cr; A-F only) Implementing keyboarding and word processing; effective teaching strategies; expected learner outcomes; evaluation methods; selecting hardware; instructional materials (including print, software, Internet); organizing and managing labs.

BIE 5475. Curriculum Development for Business and Marketing Education. (3 cr; A-F only) Introduction to conceptual models for design/development of business/marketing education programs in secondary/postsecondary schools, in adult education settings, and in business/industry. Preparing programs of instruction for secondary/postsecondary level. Making decisions regarding course content.

BIE 5596. Occupational Experience in Business and Industry. (1-10 cr [max 10 cr]; S-N only. PreReq—4000) Observational placement in business/industry to develop technical/occupational competencies. Includes 100 clock hours of supervised work experience per credit.

BIE 5597. Internship: Business and Industry Education. (1-8 cr [max 12 cr]; S-N only. PreReq—4000) Practical experience in business or industry as a professional educator or supervisor. Requires an integrative paper.


BIE 5624. Sales Training. (3 cr; A-F only) Training competent customer service employees as part of a marketing strategy. Explore training strategies using the appropriate instructional methods for different situations and situations.

BIE 5625. Technical Skills Training. (3 cr) Analyze techniques and strategies in business and industry; systems and process analysis; trouble-shooting of work behavior; design methods and developing training materials.

BIE 5626. Customer Service Training. (3 cr; A-F only) Overview of customer service strategies used by successful organizations and training practices used to develop customer-oriented personnel.

BIE 5627. Management and Supervisory Development. (3 cr) Problems, practices, programs, and methodologies relating to the training and development of managers and supervisors, including needed competencies, needs assessment, delivery modes, and evaluation.

BIE 5628. Multimedia Presentations in Business. (3 cr. PreReq—5011 or equiv) Designing, creating, and presenting information using multimedia techniques in business settings.

BIE 5662. Computer Training in School and Industry Settings. (3 cr. PreReq—5011 or equiv) Alternative teaching practices for business applications software: word processors, spreadsheets, graphics, desktop publishing, databases, and communications; public school and industry settings.

BIE 5796. Field Based Projects in Business and Industry. (1-4 cr [max 4 cr]; S-N only) Curricular, instructional, developmental, or evaluative problems and projects applicable to local school or business and industry situations.

BIE 5801. The Business of Tourism. (3 cr; A-F only) Introduction to major theories, concepts, skills, and techniques influencing tourism business/industry.


BIE 5803. Tourism Studies Capstone Seminar. (3 cr; S-N only. PreReq—Tourism studies major) Students present, critique, and discuss implications of supporting programs for tourism.

BIE 5993. Directed Study in Business and Industry. (1-8 cr [max 4 cr]) In-depth individual inquiry in the content areas related to business and industry.

Business Law (BLaw) Department of Accounting

Curtis L. Carlson School of Management

BLaw 3058. The Law of Contracts and Agency. (4 cr; A-F only. PreReq—40 or more credits) Origin of law, its place and effect on society; history and development of law; 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.
Central Asian Studies (CAS)

Institute of Linguistics, ESL, and Slavic Languages and Literatures

College of Liberal Arts

CAS 1904. Freshman Seminar. (3 cr; A-F only) Topics vary. See Class Schedule.

CAS 3511. Ancient Iran. (3 cr, §MELC 3511) Development of ancient Iranian culture under the Achaemenians and Sassanians; the impact of the Zoroastrian religion on Iranians and of Hellenism on the east, especially on domains such as Bactria; Iran’s contribution to the flourishing cultures of the Silk Road.

CAS 3512. Modern Iran. (3 cr, §MELC 3512) The development of medieval Iranian culture under the Arab, Turkish, and Mongol rules. Study two major trends: Islamization beginning after the Arab conquest to A.D. 1500; westernization from the Safavids to the Islamic Republic in 1979.

CAS 3526. Islam and Communism. (3 cr, §MELC 3526) Development of medieval Islamic culture in Transoxiana; formation of Sufi orders; rise and development of Communist ideology; introduction of socialist principles into Central Asia; clash of Islamic principles with Communist dicta; Pan-Islamism; Pan-Turkism.

CAS 3531. Central Asian Culture. (3 cr, §MELC 3531) Development of Central Asian cultures from the rise of the Turkish dynasties (6th c.) to the present. Indo-European indigenous population displaced by the Arabs, Turks, Mongols, and the Soviets. Major themes: Islamization; Turkification; Westernization; and Sovietization.

CAS 3532. Russia and Central Asia. (3 cr, §MELC 3532) Rise and fall of the Mongol Empire, formation of the Chaghatay Khanate and the Golden Horde. Russian expansion into Central Asia and rivalry with Britain. Russia and the Central Asian republics during and after the Soviet period.

CAS 3601. Fiction of Iran and Central Asia in Translation. (3 cr, §MELC 3601) Social, political, and religious thought of Iranian and (Soviet) Central Asian writers of fiction since the early years of the 20th century, emphasizing themes of tradition, modernization (Westernization and Sovietization), women’s rights, and secularization.

CAS 3602. Persian Poetry in Translation. (3 cr, §MELC 3602) Major poetic works of Iran dealing with life at the medieval courts, Sufic poetry, and “new” poetry are studied. Rudaki, Khayyam, Rumi, Hafiz, Yushij, and Farrukhzad are among the poets whose works are examined.

CAS 5594. Directed Research. (1-10 cr, Prereq–A, D, Q)

Chemical Engineering (ChEn)

Department of Chemical Engineering and Materials Science

Institute of Technology

ChEn 1001. Advances in Chemical Engineering and Materials Science. (1 cr; S only) Prereq–Recommended for (chemical engineering, materials science/engineering) majors) Survey of important advances in chemical engineering, materials science/engineering. Design problems, career opportunities. Lectures, demonstrations, interactive exercises.

ChEn 4001. Material and Energy Balances. (4 cr; A-F only) Prereq–ChEn 2001 or ChEn 3002, Math 2323 or Math 2373 or equival.) Principles/applications of heat/mass transfer, fluid statics and dynamics and their applications to chemical engineering systems, construction, and diffusion.

ChEn 4003. Heat and Mass Transfer. (4 cr; A-F only) Prereq–ChEn 4001, upper div ChEn major) Principles/applications of heat/mass transfer in chemical engineering systems.

ChEn 4004. Separation Processes. (4 cr; A-F only) Prereq–ChEn 4003, 4101, upper div ChEn major) Introduction to unit operations and mass transfer operations used in separation processes.

ChEn 4101. Chemical Engineering Thermodynamics. (4 cr; A-F only) Prereq–ChEn 4001 or Chem 3501, upper div ChEn major or Δ) Applications of concepts of thermodynamics and chemical equilibrium to problems in chemical engineering.

ChEn 4102. Reaction Kinetics and Reactor Engineering. (4 cr; A-F only) Prereq–ChEn 4001, 4101, upper div ChEn major or Δ) Chemical equilibrium and chemical kinetics applied to chemical engineering systems. Behavior/design of chemical reactors, interaction between chemical and physical rate processes. Mathematical modeling, design of reactors.
ChEn 4214. Polymers. (3 cr; Prereq—Graduate or at least C in MatS 3011 or #)
Polymer structure-property relations: structure/morphismology of crystalline/amorphous states. Crystallization kinetics. Vitrification and the glass transition. Mechanical properties, failure, permeability, optical/electrical properties, polymer composites, tribology, and surface properties.

ChEn 4401W. Chemical Engineering Lab I. (3 cr; A-F only. Prereq—4003, [4004 or #4004], 4101, [upper div ChEn major or A])
Principles/techniques of efficient design, structure, measurement, planning, analysis, and presentation of experiments and experimental results. Problems in energy balances, fluid flow, heat transfer, and mass transfer. Design of new systems using experimental data obtained in lab. Oral/written presentations.

ChEn 4402W. Chemical Engineering Lab II. (2 cr. Prereq—4003, 4004, 4101, 4401W, [upper div ChEn major or A])
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 Process Design. (3 cr; Prereq—4003, [4004 or #4004], 4101, [upper div ChEn major or A])
Engineering economics of process evaluation, including time/bases for cost estimation. Engineering design through group projects. Case studies.

ChEn 4502W. Chemical Engineering Process Design II. (2 cr; A-F only. Prereq—4004, 4501, [upper div ChEn major or A])
Continue review from (4501) of unit processes/opertations, introducing detail for design, cost analysis, control, operability, modifications, and alternatives for chemical processes.

ChEn 4593. Directed Study. (1-4 cr. A-F only. Prereq—#)
Directed study under faculty supervision.

ChEn 4594. Directed Research. (1-4 cr; A-F only. Prereq—#)
Independent lab research under faculty supervision.

ChEn 4601. Process Control. (3 cr; A-F only. Prereq—4102, [upper div ChEn major or A])
Analysis of dynamic behavior/design of linear control systems for chemical processes. Dynamic response and stability of linear ODE systems, tuning of PID controllers, synthesis of feedback, feedforward/feedback controller.

ChEn 4604. Process Control Laboratory. (2 cr; A-F only. Prereq—ChEn 4601W or #)
Experiments designed to reinforce concepts and principles of process control taught in 4601. Introduce industrial-process instrumentation and control, and use of computers for data acquisition, analysis, and control.

ChEn 4701. Advanced Undergraduate Applied Math I: Linear Analysis. (3 cr; A-F only. Prereq—4002—4002)
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. (3 cr; A-F only. Prereq—4002)
Deformation/flow of non-Newtonian/viscoelastic fluids, practice elasticity, formation, rheology, and testing of rubbery, viscoelastic fluids. Phenomenological/molecular interpretation of rheology of elastomers, polymer melts, polymer solutions. Application of rheology to polymer processing. Undergraduate version of 8102.

ChEn 4703. Advanced Undergraduate Applied Math II: Nonlinear Analysis. (3 cr; A-F only. Prereq—ChEn 4002; grad-level course in linear analysis recommended)
Nonlinear mathematical problems (nonlinear ordinary/partial differential equations) using theoretical-numerical analysis. Undergraduate version of 8202.

ChEn 4704. Advanced Undergraduate Physical Rate Processes II: Transport. (3 cr; A-F only. Prereq—4002)

ChEn 4705. Advanced Undergraduate Physical Rate Processes II: Mass Transfer. (3 cr; A-F only. Prereq—4002)
Applications of mass transfer. Membranes, including gas separation and reverse osmosis. Controlled drug release. Dispersion, including examples of pollution modeling. Adsorption/chromatography. Coupled heat/mass transfer, including cooling towers. Double-diffusive effects. Undergraduate version of 8302.

ChEn 4706. Advanced Undergraduate Physical and Chemical Thermodynamics. (3 cr; A-F only. Prereq—ChEn 3502, 4101, 4002; recommend background in undergraduate engineering or chemistry courses in thermodynamics)
Principles of classical thermodynamics, introduction to nonequilibrium thermodynamics. Applications in chemical engineering, materials science. Undergraduate version of 8401.

ChEn 4707. Advanced Undergraduate Statistical Thermodynamics and Kinetics. (3 cr; A-F only. Prereq—4002, ChEn 3502)
Introduction to statistical mechanical description of equilibrium/non-equilibrium properties of matter. Emphasizes fluids, classical statistical mechanics. Undergraduate version of 8402.

ChEn 4708. Advanced Undergraduate Chemical Rate Processes: Analysis of Chemical Reactors. (3 cr; A-F only. Prereq—4102)

ChEn 4709. Advanced Undergraduate Process Control. (3 cr; A-F only. Prereq—4102)
For linear systems: stability, controllability, observability, pole-placement via state feedback state observers, output feedback, robustness of control systems. For nonlinear systems: solution properties, stability analysis, singular perturbations, feedback linearization via state feedback, direct synthesis via output feedback. Undergraduate version of 8502.

ChEn 4710. Advanced Undergraduate Chemical Rate Processes: Homogeneous Reactions. (3 cr; A-F only. Prereq—4102)
Description/characterization of chemically reacting systems. Theories of elementary reactions. Experimental methods for investigating elementary reactions. Applications of chemical kinetics to complex reactions such as combustion, flames, atmosphere. Undergraduate version of 8503.

ChEn 5103. Porous Media. (3 cr; A-F only. M/En 5103, 5121)

ChEn 5104. Coating Process Fundamentals. (3 cr; A-F only. Prereq—ChEn 4003, ChEn 4302)
Basic process functions; viscous flow and rheology, capillarity, wetting; electrostatic effects; phase change, colloidal transport, mass/heat transfer in drying; kinetics in curing; stress and property development in solidification. Illustrations drawn from theoretical modeling, flow visualization, and stopped-process microscopy.

ChEn 5221. Introduction to Polymer Chemistry. (3 cr; A-F only. Prereq—3502, Chem 2302 or #)
Condensation, radical, ionic, emulsion, ring-opening, metal-catalyzed polymerizations. Chain, conformation, solution thermodynamics, molecular weight characterization, physical properties.

ChEn 5302. Chemical Reaction Engineering and Catalysis. (3 cr; A-F only. Prereq—ChEn 4102)
Continuous and batch reactors, heat management, catalytic reactions and reactors, nonideal flow in reactors, polymerization, solids processing, multiphase reactors. Fundamentals and mechanisms of catalytic reactions. Industrial examples in petroleum/chemical industries.

ChEn 5531. Electrochemical Engineering. (3 cr; Prereq—MatS 3011 or #, [upper div IV or grad student])

ChEn 5595. Special Topics. (1-4 cr. A-F or #)
New or experimental special topics.

ChEn 5751. Biochemical Engineering. (3 cr; A-F only. Prereq—4002, 4003, 4102)
Chemical engineering principles applied to analysis/design of complex cell/enzyme processes. Quantitative framework for design of cells for production of proteins, synthesis of antibodies with mammalian cells, or degradation of toxic compounds in contaminated soil.

ChEn 5752. Quantitative Biology for Engineers. (3 cr; A-F only. Prereq—Engineering background, #)

ChEn 5753. (Biological) Biomedical Transport Processes. (3 cr. S/EM 5318, S/EM 5310. Prereq—ChEn 4003 or ME 3322)

ChEn 5754. Food Processing Technology. (3 cr; A-F only. Prereq—ChEn 4002)
Introduction to food processing as it interfaces with engineering. Case studies. Engineering economics and practical design problems in food processing. Heat transfer; freezing, conduction (unsteady state); thermal processing; extruder design; protein processing; order-of-magnitude estimating; and economic concepts such as ROI, discounted cash flow, and capital estimating.

ChEn 5759. Principles of Mass Transfer in Engineering and Biological Engineering. (2 cr; A-F only. Prereq—ChEn 4002)
Principles of mass transfer in gases, liquids, biological and macromolecular solutions, gels, solids, membranes, and capillaries. Porous solids interaction between molecular and mass transfer. Applications in biological, environmental, mineral, and chemical engineering systems.

ChEn 5771. Colloids and Dispersions. (3 cr; A-F only. Prereq—Physical chemistry)
Preparation, stability, coagulation kinetics or colloidal solutions. DLVO theory, electrokinetic phenomena. Properties of micelles, other microstructures.
Chemistry (Chem)

Department of Chemistry
Institute of Technology

Chem 1011. General Principles of Chemistry. (4 cr.)
Prereq—For students not passing placement exam; high school chemistry or equiv; two yrs high school math; high school physics recommended
Introduction to chemistry, including elementary organic chemistry, chemical energy, atomic compounds, solutions, chemical reactions, mole and chemical calculations, gases, liquids, solids, chemical bonding, and molecular and structural acides, bases, equilibria. Problem solving emphasized. Physical and chemical properties of hydrocarbons and organic compounds containing halogens, nitrogen, or oxygen.

Chem 1012. Chemical Principles I. (4 cr.)
Prereq—Primarily for science or engineering majors; 1011 or passing placement exam
Atomic theory; periodic properties of elements; thermochemistry; reaction stoichiometry; behavior of gases, liquids, and solids; molecular and ionic structure; bonding; organic chemistry and polymers; energy sources and environmental issues related to energy use.

Chem 1022. Chemical Principles II. (4 cr. Prereq—1021 or equiv)
Chemical kinetics: radioactive decay; chemical equilibria; solutions; acids and bases; solubility; second law of thermodynamics; electrochemistry and corrosion; descriptive chemistry of the elements; coordination chemistry; biochemistry; applications of chemical principles to environmental problems.

Chem 301H1. Honors Chemistry I. (4 cr; A-F only. Prereq—IT honors student or consent of IT honors office)

Chem 302. Honors Chemistry II. (4 cr; A-F only. Prereq—[1031 or equiv])
Advanced introduction. Chemical kinetics/reaction mechanisms, chemical/physical equilibria, acids/bases, entropy/second law of thermodynamics, electrochemistry/corrosion; descriptive chemistry of the elements; coordination chemistry; biochemistry; applications of chemical principles to environmental problems.

Chem 303. Physical Chemistry I. (3 cr. Prereq—202 or 2302 or #)

Chem 304. Physical Chemistry II. (3 cr. Prereq—202 or 2302 or #)
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 3501. Chemical Literature and Information Retrieval. (1 cr; S-N only. Prereq—2302 or #)
Introduction to chemical information. Chemical literature: types, use, and evaluation. Introduction to computerized search services.

Chem 3502. Chemical Literature and Information Retrieval Lab. (1 cr; S-N only. Prereq—1 cr or #)
Introduction to chemical information. Chemical literature: types, use, and evaluation. Introduction to computerized search services.

Chem 3511. Physical Chemistry I. (3 cr. Prereq—1022 or 1023H, Math 2263 or Math 2374, Physics 1302 or Physics 1402V)

Chem 350. Physical Chemistry II. (3 cr. Prereq—One yr college chemistry, one yr college physics, one yr college calculus)

Chem 4094W. Directed Research. (1-5 cr. Prereq—Any 3xxx or 4xxx chem course, #)
Learning experience in areas not covered by regular courses. Individually arranged with faculty member.

Chem 4101. Intermediate Analytical Chemistry Lab. (3 cr; A-F only. Prereq—2101, 2111, 2311, or 3501)
Basic electronic, optical, computer technologies employed in design of chemical instrumentation. Advanced topics in spectrophotometry (e.g., FT-nmr, FT-IR, atomic absorption/emission). Electrochemistry. Mass spectrometry.

Chem 4111W. Intermediate Analytical Chemistry Lab. (2 cr; A-F only. Prereq—4101, chemistry major)
Instrumental techniques, including spectrophotometric methods, electrochemical techniques, and analysis based on separation. Emphasis uses of computers in data collection and reduction.

Chem 4121. Process Analytical Chemistry. (3 cr; A-F only. Prereq—2302, 2311, 3501, chemical engineering major)
Strategies and techniques for analysis. Use of modern instruments, including spectrophotometry, chromatography and electrochemistry.

Chem 4311W. Advanced Organic Chemistry Lab. (2 cr. Prereq—2311)
Reactions, techniques, and instrumental methods in synthetic organic chemistry.

Chem 4411. Bioorganic Chemistry. (3 cr. Prereq—2302 or #)
Chemistry of amino acids, peptides, proteins, lipids, carbohydrates, and nucleic acids. Structure, nomenclature, synthesis, and reactivity. Techniques to characterize biomolecules.

Chem 4501. Physical Chemistry I. (3 cr; A-F only. Prereq—Grad student, one yr college chemistry, one yr college physics, one yr college calculus, #)

Chem 4502. Physical Chemistry II. (3 cr; A-F only. Prereq—Grad student, one yr college chemistry, one yr college physics, one yr college calculus, #)

Chem 4511W. Advanced Physical Chemistry Lab. (2 cr. Prereq—3501-3502, chemistry major)
Experiments illustrating principles and methods of thermodynamics, reaction kinetics, and quantum mechanics.

Chem 4701. Inorganic Chemistry. (3 cr. Prereq—2311, 3501 or #3501 or #3502)
Advanced introduction to inorganic chemistry. Periodic trends. Structure and bonding concepts in compounds where s and p electrons are important. Descriptive chemistry of solids and transition metal compounds. Emphasizes transition metal chemistry. Advanced topics in main group and materials chemistry.

Chem 4711W. Advanced Inorganic Chemistry Lab. (2 cr; A-F only. Prereq—4701, chemistry major)
Lab experiments in inorganic/organometallic chemistry illustrating synthetic/spectroscopic techniques.

Chem 5011. Mechanisms of Chemical Reactions. (3 cr. Prereq—2302 or #)

Chem 5021. Computation Chemistry. (3 cr. Prereq—3502 or #)

Chem 5201. Materials Chemistry. (3 cr. Prereq—#3502 or #4701 or #)
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 5210. Materials Characterization. (4 cr.; A-F only. Prereq—Graduate student or #) Modern 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 5221. Introduction to Polymer Chemistry. (3 cr. & MatS 5223. Prereq—5221 or 2811) or equiv) Synthesis, characterization, and physical properties of polymers. Free radical, condensation, emulsion, anionic polymerization. Infrared spectroscopy/gel permeation chromatography. Viscoelasticity, rubber elasticity, crystallization.

Chem 5311. Chemistry of Industry. (3 cr. Prereq—Chem 4 or grad student or #) Industrial and polymer chemistry technology. Relation of basic properties to industrial utility. Economics, social problems, industrial environment.

Chem 5321. Organic Synthesis. (3 cr. Prereq—[2302 or equiv] or grad student or #) Fundamental concepts, reactions, reagents, structural/stereochemical issues, and mechanistic skills for organic chemistry.

Chem 5322. Advanced Organic Chemistry. (3 cr. Prereq—5321 or equiv) Topics vary, including natural products, heterocycles, asymmetric synthesis, organometallic chemistry, and polymer chemistry. (See instructor for details.)

Chem 5352. Physical Organic Chemistry. (3 cr. Prereq—2302, [5011 or 8011]) Fundamental concepts and modern computational tools for analysis of organic reaction mechanisms. Solvation, reactive intermediates, gas phase chemistry, photochemistry or strained-ring chemistry or bond.

Chem 5361. Interpretation of Organic Spectra. (3 cr. Prereq—2302 or equiv) Application of nuclear magnetic resonance, mass, ultraviolet, and infrared spectral analyses to organic structural problems.

Chem 5412. Enzyme Mechanisms. (3 cr. Prereq—2302 or equiv) Enzyme classification with examples from current literature; strategies to decipher enzyme mechanisms; chemical approaches to control enzyme catalysis.

Chem 5413. Nucleic Acids. (3 cr. Prereq—2302 or equiv) Chemistry and biology of nucleic acids. Structure, thermodynamics, reactivity, DNA repair, chemical oligonucleotide synthesis, antisense approaches, ribozymes, techniques for nucleic acid research, interactions with small molecules and proteins.

Chem 5715. Physical Inorganic Chemistry. (3 cr. Prereq—4701 or equiv, chem major or #) 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 5725. Organometallic Chemistry. (3 cr. Prereq—4701 or equiv, chem major or #) 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 5735. Bioinorganic Chemistry. (3 cr. Prereq—4701 or equiv, chem grad or #) Role of metal ions in biology. Emphasizes structure, function, and spectroscopy of metalloproteins and their synthetic analogs.

Chem 5745. Advanced Inorganic Chemistry. (3 cr. Prereq—4701, chem major, #) Topics in main group and transition metal chemistry. Emphasizes synthesis, structure, physical properties, and chemical reactivity.

Chem 5755. X-Ray Crystallography. (4 cr.; A-F only. Prereq—Chem grad student or #) Essentials of crystallography as applied to modern, single crystal X-ray methods. Practical training in use of instrumentation in X-ray crystallography facility in Department of Chemistry. Data collection, correction/refinement, structure solutions, generation of publication materials, use of Cambridge Crystallographic Structure Database.

Chicano Studies (Chic) Department of Chicano Studies College of Liberal Arts

Chic 1105. Introduction to Chicana/o Studies: The Beginnings to 1875. (3 cr.) Convergence of Europe and America in Mesoamerica and the formation of Mexican society. Literary, social, cultural, and historical perspectives. Pre-Columbian period to 1875.


Chic 1106. Introduction to Chicana/o Studies: Mexico and the United States From 1871 to Present. (3 cr.) Convergence of Spanish-Mexican/Anglo-American societies in Spanish borderlands. Formation of contemporary Chicano political, economic, and cultural consciousness; forms in which it has been expressed.

Chic 1106H. Honors: Introduction to Chicana/o Studies: Mexico and the United States From 1871 to Present. (4 cr. §1106. Prereq—Honors) Convergence of Spanish-Mexican/Anglo-American societies in Spanish borderlands. Formation of contemporary Chicano political, economic, cultural consciousness; forms in which it has been expressed.

Chic 3114. International Perspectives: U.S.-Mexico Border Cultures. (3 cr.) The relations of Mexico and the United States from an international perspective with central focus on the cultural interchange in the borderlands between them; using both literary and historical materials.

Chic 3212. La Chicana. (3 cr.) This class centers on Chicanas or politically defined women of the Mexican American community. Our method is interdisciplinary. It emphasizes the importance of historical context and cultural process to any discussion of the Chicana experience.

Chic 3375. Folklore of Greater Mexico. (3 cr.) Scholarly survey and exploration of the sociocultural function of various types of folklore in Greater Mexico. Students analyze the ways in which folklore constructs and maintains community, as well as resists and engenders cultural shifts.

Chic 3402. Las Mujeres. (3 cr.) Focus on Chicanas: women of the Mexican American community. Exploration of racial, economic, political, and gender issues of concern to all Mexican Americans and diverse Latino cultures.

Chic 3427. History of Cuba and Puerto Rico. (3 cr.) Historical development of Cuba and Puerto Rico from pre-Columbian times through the Spanish conquest to the present. Conquest and colonization, slavery, Hispanic Caribbean society and culture, Operation Bootstrap, Cuban Revolution.

Chic 3428. History of Relations Between U.S. and Mexico: 1821 to Present. (3 cr.) U.S.-Mexico relations in the 19th and 20th centuries; examining histories as they intersect in the late 1820s; loss of Texas; Mexican-American War; economic relations between the two countries including NAFTA and the Chiapas rebellion of 1994.

Chic 3441. Chicana/o History to 1900. (3 cr.) 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.

Chic 3442. Chicana/o History: 1900 to Present. (3 cr.) Migration, repatriation, the Bracero program, politics, the Chicana/o movement, work, society, and culture.

Chic 3507. Introduction to Chicana/o Literature. (3 cr.) Creative literature by Chicana and Chicano authors will be analyzed and interpreted through our understanding of Mexican American history, culture, and sociopolitical processes; narratives as aesthetic production; merits and limitations of literary analysis.

Chic 3712. Chicanas(0)s: Psychological Perspectives. (3 cr.) Textual analysis of Chicana/Latina writings with special emphasis on the psychological motivations of the subjects pertaining to race, class, and gender relationships.

Chic 3993. Directed Studies. (1-9 cr. max 16 cr. Prereq—#) Guided individual reading, research, and study. Students often do preliminary readings and research in conjunction with plans for education abroad programs.

Chic 4231. The Color of Public Policy: African Americans, American Indians, and Chicanos in the United States. (3 cr.) 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 4401. Chicana/Latina Culture Studies. (3 cr.) 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 5114. International Perspectives: U.S.-Mexico Border Cultures. (3 cr. & MatS 5114. Prereq—Grad) The relations of Mexico and the United States from an international perspective with central focus on the cultural interchange in the borderlands between them; using both literary and historical materials.


Chic 5402. Chicana/os/Women and Work. (3 cr. Prereq—5 or #) Chicanas and their various relationships to family and community; local, national, and global work forces. Exploration of larger questions and issues related to the growing integration of the world’s systems of production.

Chic 5403. Chicana/Latina Feminisms. (3 cr. Prereq—5, #) The historical and social development of Chicana and Latina feminisms in general and their various specific types. Includes women activists who do not self-identify as “feminists,” but are fighting for equality.

For definitions of course numbers, symbols, and abbreviations, see page 296.
Development environment. Developing infant in his or her social and physical development during the first two years of life; the CPsy 4302. Infant Development. 

discuss their research projects with seminar and in related departments. Faculty are invited to CPsy 3360. Child Psychology Honors Seminar. 

Techniques used in the study of child development; (4 cr) CPsy 3308. Introduction to Research Methods in Child Psychology. (4 cr; A-F only. Prereq–Psy 1001) 

Overview of development in the second decade of life. Interactions of adolescents with family, school, and society. CPsy 4303. Adolescent Psychology. (4 cr; A-F only. Prereq–Psy 1001) 

Special Topics in Child Development. (1-4 cr [max 12 cr]; A-F only. Prereq–Psy 1001) Topics/credits vary. CPsy 3410. Special Topics in Child Development. (1-4 cr [max 12 cr]; A-F only. Prereq–Psy 1001) 

Behavioral and Emotional Problems of Children. (4 cr; A-F only. Prereq–intro psych) Behavioral and emotional problems of children and adolescents; psychopathology contrasted to normal development; symptoms, causes, course, and prevention of common disorders, excluding physical and sensory handicaps. CPsy 3431. Disabilities and Development. (4 cr. Prereq–Psy 1001) 


Evolutionary theory and behavioral genetics applied to understanding of development of human behavior; formation of species-typical adaptive behavior and individual differences in infancy, childhood, and adolescence. CPsy 4331. Social and Personality Development. (4 cr; A-F only. Prereq–CPsy 2301, Psy 1001) 

Development of social relations and personality; research, methodology, and contrasting theoretical perspectives. Survey of findings on interpersonal relationships, the concept of self, prosocial and antisocial behavior, and acquisition of social roles. CPsy 4334W. Children, Youth in Society. (4 cr; A-F only. Prereq–2301) 

Child development principles relative to social policy decision making. Issues in applying theories, findings to problems (e.g., media influences, mainstreaming, day care, child abuse, effects of peers). CPsy 4336W. Development and Interpersonal Relations. (4 cr; A-F only. Prereq–2301 or equiv, 4331) Processes and functions of interactions with parents and peers; analysis of theory and research on developmental changes and influences. CPsy 4341W. Perceptual Development. (4 cr. Prereq–2301) 

Perceptual learning, development of sensory/perceptual processes. CPsy 3434. Cognitive Development. (4 cr; A-F only. Prereq–2301) 

Cognitive processes; relevant theory, research literature, and methodology. CPsy 3435. Language Development and Communication. (4 cr; A-F only. Prereq–CPsy 2301) 

Structure and function of language; factors influencing development; methodological problems, language scales, theories. CPsy 3437. Senior Project. (2 cr; A-F only. Prereq–CPsy 4347) 

Current literature on self-selected developmental topic. Students write a literature review. CPsy 4993. Directed Instruction in Child Psychology. (1-4 cr [max 8 cr]; S-N only. Prereq–4 cr CPsy, #) 

Students serve as teaching assistants or peer advisers. CPsy 4994. Directed Research in Child Psychology. (1-4 cr [max 8 cr]. Prereq–4 cr in CPsy, R, A) 


Individual empirical investigation. Students help plan/implement scientific studies while gaining experience/expertise in research methodology. CPsy 4996. Field Study in Child Psychology. (1-4 cr [max 8 cr]; S-N only. Prereq–4 cr CPsy, #) 

Independent reading. Varies depending on student’s specific area of interest. Students receive credit while interning in metropolitan area. 

Chinese (Chn) 

Department of Asian Languages and Literatures 

College of Liberal Arts 


Chn 1012. Beginning Modern Chinese. (6 cr. Prereq–1011 or equiv or #) Speaking and reading modern standard Chinese through structured practice. 


Chn 3021. Intermediate Modern Chinese. (5 cr. Prereq–1012 or 1015 or equiv or #) Modern standard Chinese skills developed further through conversations, writing, and reading. 


Chn 3031. Advanced Modern Chinese. (4 cr. Prereq–3022 or equiv or #) Reading and analysis of 20th-century texts. 

Chn 3032. Advanced Modern Chinese. (4 cr. Prereq–3031 or equiv or #) Reading and analysis of 20th-century texts. 

Chn 3041. Business Chinese. (4 cr. Prereq–3032 or equiv or #) Reading and analysis of commercial and business texts. 

Chn 3111. Introductory Classical Chinese. (4 cr. Prereq–3022 or equiv or #) Study of classical Chinese through reading and analysis of representative texts. 


Chn 3161. Media Cultures in Modern China. (3 cr. Prereq–Soph or higher; Chinese language not required, background in modern Chinese history recommended). Relations among media technologies, cultural identities, and politics in China from 19th century to present. Emphasizes photography, graphic arts, popular music/recording. Some attention to cinema and popular fiction. Ways of analyzing popular/mass culture. 

Chn 3166W. Chinese Film. (3 cr) Survey of Chinese cinema from China (PRC), Taiwan, Hong Kong. Emphasizes global, social, economic, sexual, gender, psychological, other themes as represented through film. 

Chn 3201. Chinese Calligraphy. (2 cr.) Appreciation and execution of Chinese calligraphy through guided practice. 


Chn 3900. Topics in Chinese Literature. (1-4 cr [max 12 cr]) Topics specified in Class Schedule.
Chn 3920. Topics in Chinese Culture. (1-4 cr [max 12 cr])
Topics specified in Class Schedule.

Chn 4011. Chinese Traditional Literature in Translation I. (4 cr)
Representative works of Chinese literature in translation from ancient times until the end of the T’ang dynasty.

Chn 4012W. Chinese Traditional Literature in Translation II. (4 cr)
Representative works of Chinese literature in translation from end of T’ang dynasty until end of 19th Century.

Chn 4023. 20th-Century Chinese Literature in Translation. (4 cr. Prereq—Background in modern Chinese history desirable; knowledge of Chinese language not required)
Main trends in Chinese literature from May 4th, 1919 to 1979, including Taipaisan literature.

Chn 4024. Contemporary Chinese Literature in Translation. (4 cr. Prereq—Background in modern Chinese history desirable; knowledge of Chinese language not required)
Main trends in Chinese literature from 1979 to the present.

Chn 4121. History of the Chinese Language. (4 cr. Prereq—3111)
Sources and methods in the study of the historical development of the Chinese language.

Chn 4125. Structure of Modern Chinese. (4 cr. Prereq—3032 or equiv or #)
Analysis of the grammatical structures of modern standard Chinese.

Chn 4234. Chinese Poetry in Translation. (4 cr. Prereq—No knowledge of Chinese required.)
Major themes, genres, and technical conventions of Chinese poetry from the classical age of poetry to the modern period.

Chn 4235. Chinese Fiction in Translation. (4 cr. Prereq—No knowledge of Chinese is required.)
An introduction to narrative and fictional traditions in premodern China.

Chn 4241. Filmic Construction of Modernity in China. (4 cr)
A survey of important films made after the Cultural Revolution with a special emphasis on the critically acclaimed “Fifth Generation” filmmakers.

Chn 4292. Directed Reading. (1-5 cr. Prereq—# or #)
Guided individual reading or study.

Chn 5011. Research Methods. (4 cr. Prereq—3032 or 3112)
Introduction to the sources and approaches of research in language and literature.

Chn 5015. Chinese Philosophical/Historical Texts. (4 cr. Prereq—3112)
Readings from major texts in Chinese philosophical and historical traditions.

Traditional Chinese religious systems through selected texts.

Chn 5040. Readings in Chinese Text. (4 cr [max 12 cr]; A-F only. Prereq—3032 or equiv or #)
Students read authentic materials of various types to increase reading/speaking ability. Topics specified in Class Schedule.

Chn 5120. Topics in Chinese Linguistics. (4 cr [max 8 cr]; Prereq—4121 or 4125)
Studies of the structure and change in the Chinese language.

Chn 5230. Topics in 20th-Century Chinese Literature. (4 cr [max 8 cr]; Prereq—3032)
Studies of representative literary works from May 4, 1919 to the present.

Chn 5240. Topics in Chinese Poetry. (4 cr [max 8 cr]. Prereq—3112)
Selected major Chinese poets and poetic forms.

Chn 5242W. Chinese Classical Drama and Theatre. (4 cr)
A multimedia course on traditional Chinese theatre.

Chn 5250. Topics in Chinese Fiction. (4 cr [max 8 cr]. Prereq—3032 or 3112)
Studies of traditional and modern Chinese fiction.

Chn 5260. Topics in Pre-modern Chinese Prose. (4 cr [max 8 cr]. Prereq—3112)
Studies of representative Chinese prose writings of the pre-modern period.

Chn 5393. Directed Study. (1-5 cr [max 18 cr]. Prereq—A, Q)
Guided individual reading or study.

Civil Engineering (CE)

Department of Civil Engineering
Institute of Technology

CE 0005. Refresher Course for Civil Engineers. (0 cr; S-N only. Prereq—BCE or equivalent degree or completion of Parts I and II of the State Board Examination)

CE 1101. Civil Engineering Orientation. (1 cr; S-N only)
Introduction to the Civil Engineering Department and civil engineering practice. Presented by faculty members and professional engineers.

CE 3101. Computer Applications in Civil Engineering I. (3 cr; A-F only. Prereq—Math 1272, CE or GeoE or MatS) student

CE 3111. ADD for Civil Engineers. (2 cr; A-F only. Prereq—3201)
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 cr. Prereq—Phys 1301)
Apply laws of motion to describe vehicle performance and determine constraints for highway designs. Traffic flow principles and their relation to capacity and level of service. Introduction to geometric design, pavement design, and transportation planning.

CE 3202. Surveying and Mapping. (2-5 cr; A-F only. Prereq—Math 1271, 1272)
Theory of precision measurements of distance, elevation, angle, and direction of points and lines above, on, or beneath the earth’s surface; establishing such points or lines. Elements of coordinate systems, datum planes, and maps.

CE 3301. Soil Mechanics I. (3 cr; A-F only. Prereq—IT, AEM 3031)

CE 3311. Rock Mechanics I. (3 cr; A-F only. Prereq—IT, AEM 3031)

CE 3401. Linear Structural Analysis. (3 cr; A-F only. Prereq—Grade of at least C- in AEM 3031, IT)
Analysis of determinate/inindeterminate 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 3402. Construction Materials. (3 cr; A-F only. Prereq—Grade of at least C- in AEM 3031, IT)
Basic concepts of behavior mechanisms for construction materials such as concrete, metals, asphalt, plastics, and wood. Standard specifications for material properties. Techniques for testing.

Course Descriptions

CE 3406. Construction Materials for Managers. (3-4 cr; A-F only. Prereq—AEM 2011 or WPS 4301)
Construction management major.
Basic concepts of physical properties and behavior mechanisms for construction materials such as concrete, steel, aluminum, and wood. Standard specifications for material properties. Laboratory techniques for evaluation of each material.

CE 3501. Environmental Engineering. (3 cr; A-F only. Prereq—Chem 1022, Phys 1302)
Introduction to environmental engineering.
Quantitative approach to environmental problems. Scientific background for understanding roles of engineers and scientists.

CE 3502. Fluid Mechanics. (4 cr; A-F only. Prereq—AEM 2012 or AEM 3031, Math 2373, [IT or ForP major])

CE 4101W. Project Management. (3 cr. Prereq—Upper div IT)
Survey of broad areas in engineering project management and economics. Project planning, scheduling, and controlling; budgeting, staffing, task and cost control; communicating with, motivating, leading, and managing conflict among team members; engineering economics.

CE 4102W. Capstone Design. (3 cr; A-F only. Prereq—3201, 3301, 3401, 3402, 3501, 3502)
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 4111. Engineering Systems Analysis. (3 cr. Prereq—Upper div IT)
“Systems” approach to problems. Operations research—decision engineering, network analysis, simulation, linear programming, and expert systems—is used to represent systems and assess trade-offs.

CE 4121. Computer Applications in Civil Engineering II. (3 cr; A-F only. Prereq—CE or upper div GeoE, 3101, Math 2243, Math 2263)
Advanced application of computer tools and methods in solving partial differential equations from civil engineering problems. The major tools are Spreadsheet and Visual Basic programming.

Methods include finite differences, boundary element, finite element, and control volume finite element.

CE 4170. Independent Study I. (1-4 cr [max 4 cr]. Prereq—#)
Special studies in planning, designing, or analyzing civil engineering systems. Lab problems, literature studies, or reports supervised by staff.

CE 4180. Independent Study II. (1-4 cr [max 4 cr]. Prereq—#)
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. (2-6 cr; S-N only. Prereq—Upper div CE, approval of department co-op director)
Formal written report of work during six-month professional assignment.

CE 4201. Highway Design. (3 cr; A-F only. Prereq—CE or upper div GeoE or grad, 3202, 3201 or #)
Vertical and horizontal alignment, earthworks computations, highway capacity, forecast of traffic volume demand, impact of vehicle type on geometric design, intersection design.

CE 4231. Pavement Engineering. (3 cr. Prereq—Upper div IT, CE 3201, CE 3301, CE 3402 or #)
Concepts and principles in rigid and flexible pavement design. Traffic loads, soil considerations, and material characteristics for highway and airfield pavement design.


CE 4311. Rock Mechanics I, II (3 cr; A-F only, Prereq–Upper div IT or Grad, CE 3311, GeoE 3311 or #) Failure mechanisms in rock masses. Elastic-plastic solutions applied to underground excavations. Design of linings and support systems; rock-support interaction. In situ stresses and excavation shape. Instrumentation and monitoring.

CE 4341. Engineering Geostatistics. (3 cr; A-F only. Prereq–CE, GeoE or upper div Geo or grad, Stat 3021 or #) Problem solving and decision making in civil and geological engineering using applied statistics. Emphasizes spatially correlated data, e.g., geologic site characterization, spatial sampling design.


CE 4352. Groundwater Modeling. (3 cr; A-F only. Prereq–Upper div IT or grad, CE 4351, GeoE 4351 or #) Analytic element method. Mathematical and computer modeling of single and multiple aquifer systems. Field problems. Theory and application of contaminant transport models, including capture zone analysis.

CE 4401. Steel and Reinforced Concrete Design. (4 cr; A-F only. Prereq–Grade of at least C- in 3401, ¶3402, [upper div IT or grad student]) 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 4411. Matrix Structural Analysis. (3 cr; A-F only. Prereq–[Grade of at least C- in 3401, [upper div IT or grad student]] or #) 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 cr; A-F only. Prereq–[Grade of at least C- in 4401, [upper div IT or grad student]] or #; 4411 recommended) 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 cr; A-F only. Prereq–[Grade of at least C- in 4401, [upper div IT or grad student]] or #; 4411 recommended) Design of steel and composite steel/concrete structures, including multistory frames and plate-girders bridges. Beam-columns, torsion, connections, frames.


CE 4512. Open Channel Hydraulics. (4 cr; A-F only. Prereq–IT or grad, 3502 or #) Theories of flow, 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 movable bed mechanics.

CE 4531. Environmental Process Engineering. (3 cr; A-F only. Prereq–3501, ¶4541) Physical principles that influence behavior of engineered and natural environmental systems. Flow behavior through reactors, mass transfer, interfacial effects, stability, kinetics.


CE 4551. Environmental Microbiology/Lab. (4 cr; A-F only. Prereq–Upper div IT, 3501) Role of microorganisms in environmental bioremediation, pollution control, water and wastewater treatment, biogeochemistry, and human health. Basic microbiological techniques: isolation, identification, enumeration, quantification of bacteria, BOD, biodegradation kinetics, and disinfection. Lecture plus three hrs weekly lab.

CE 4561. Solid Hazardous Wastes. (3 cr; A-F only. Prereq–IT or grad, Chem 1022, 3501 or #) 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 cr; A-F only. Prereq–[3501, 4501] or #) 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 5170. Internet Based Study. (1-5 cr [max 15 cr]; A-F only. Prereq–Upper div IT) Internet based teaching with bi-weekly exercises on topic of concern.

CE 5180. Special Topics. (1-4 cr [max 15 cr]; A-F only. Prereq–Upper div IT) Topics vary depending on faculty and student interests.


CE 5212. Urban Transportation Planning. (3 cr. Prereq–3201 or equiv) 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. (3 cr. Prereq–3201) 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 5232. Advanced Portland Cement Concrete. (3 cr. Prereq–Upper div IT or Grad, CE 4232 or #) Advanced topics in cement chemistry and selection of materials for and design of portland cement concrete mixtures. Lab assignments pertaining to mixture design and short-term and long-term behavior. Use of admixtures and fiber reinforcement. Effects of proportionment of standard materials.

CE 5233. Advanced Bituminous Materials. (3 cr. Prereq–Upper div IT or grad, CE 4302 or #) Advanced topics in selection and design of bituminous materials. Asphalt cement, rheology, emulsions, chip seals, hot-mix asphalt design, viscoelastic characterization. Lab assignments pertaining to rheology, mixture design and viscoelastic behavior.

CE 5311. Experimental Geomechanics. (3 cr; A-F only. Prereq–Upper div IT or grad, 4301, GeoE 4301 or #) Machine stiffness, closed-loop testing. Small-strain theory. Measurement of deformation: strain gages, LVDTs, accelerometers, and associated circuits. Direct and indirect testing. Material behavior: experiments on anisotropic, damaged, and fluid-filled solids.

CE 5321. Geomechanics. (3 cr; A-F only. Prereq–Upper div IT or grad, 4301 or GeoE 4301) Elasticity theory and solution of elastic boundary value problems. Wave propagation in unbounded elastic media. Elements of fracture mechanics and applications. Elements of poroelasticity and applications.

CE 5331. Geomechanics Modeling. (3 cr; A-F only. Prereq–Upper div IT or grad, 4301 or #) Soil and rock response in triaxial testing; drained and undrained behavior; elastic and plastic properties. Modeling stresses, strains, and failure in geomechanics problems.

CE 5411. Applied Structural Mechanics. (3 cr; A-F only. Prereq–[Grad of at least C- in 4401, [upper div IT or grad student]] or #) Principal stresses and failure criteria in 3 dimensions. Introduction to plane elasticity, energy methods, torsion of beams, and bending of unsymmetrical beams.

CE 5412. Prestressed Concrete Design. (3 cr; A-F only. Prereq–[Grad of at least C- in 4401, [upper div IT or grad student]] or #; 4412 recommended) Design of prestressed concrete structures. Structure dependent effects, behavior, flexure, shear, torsion, deflections, continuous systems.

CE 5413. Masonry Structures. (3 cr; A-F only. Prereq–[Grad of at least C- in 3401, [upper div IT or grad student]] or #; 4401 recommended) Masonry materials and their production. Mortsars, grouts. Design of unreinforced, reinforced, and prestressed masonry structural systems. Walls, columns, lintels, arches. Codes/specifications, testing, inspection.

CE 5421. Wave Methods for Nondestructive Testing. (4 cr; A-F only. §GeoE 5431. Prereq–[AEM 2021, AEM 3031] or #) Introduction to contemporary methods for nondestructive characterization of objects of civil infrastructure (e.g., highways, bridges, geotechnical
Course Descriptions

Clas 1001. Ancient Greece: Poet and Hero in the Age of Homer. (3 cr)
Homer and his epic poetry; Trojan war; Greek lyric poets (Sappho and Pindar); early Greek philosophy.

Clas 1002. Ancient Greece: The Golden Age of Athens. (3 cr)
Emergence of democracy in shadows of two brutal wars: one foreign, one civil. Democracy, war, empire through lens of tragedy, comedy, art from 5th-century Athens.

Clas 1003. Ancient Greece: Alexander and the East. (3 cr)
Achievements of Alexander the Great and their effect on the Greek-speaking world; Greek colonization of Egypt; Hellenistic art, literature, and philosophy.

Clas 1004. Ancient Rome: Power, Politics, and the Roman Republic. (3 cr)
The Roman Republic from its origins to Caesar’s death.

Clas 1005. Ancient Rome: The Roman Revolution. (3 cr)
Transition from republic to empire; political strategies of Augustus (the first emperor). “Golden age” of Latin literature; the monuments of Roman civilization.

Clas 1006. Ancient Rome: The Age of Nero. (3 cr)
The Roman Empire. “Silver age” of Latin literature, rise of Christianity. Art/architecture.

Clas 1023. The Age of Constantine the Great. (3 cr)
Change/continuity in Roman Empire from its 2nd-century zenith to third-century crisis, first Christian emperor (306 to 337), and beyond. Replacement of classical paganism by Christianity. Beginnings of monasticism. Superpower relations between Roman, Persian empires.

Clas 1024. The Age of St. Augustine of Hippo. (3 cr)
Cultural diversity (A.D. 363 to circa A.D. 500). Replacement of Roman Empire in Western Europe by barbarian kingdoms, consolidation of Constantipole as capital in the East. Literature, art, thought resulting from new dominance of Christianity, particularly Augustine of Hippo. Meets with 3024.

Clas 1042. Greek and Roman Mythology. (4 cr)
Introduction to the stories and the study of Greek and Roman mythology.

Clas 1042H. Honors Course: Greek and Roman Mythology. (4 cr)
Introduction to stories/study of Greek/Roman mythology.

Clas 1043. Classical Archaeology: Introduction to the Archaeology of Ancient Greece and Rome. (4 cr)
Role that material culture, including art and architecture, plays in forming our picture of the Classical past. Relationship between archaeology and other disciplines dealing with the past. Study of selected sites considers the motives and methods of research and how the results are used by archaeologists and the general public.

Clas 1045. Etymology: Word Study in the Sciences and Humanities. (3 cr)
English prefixes, suffixes and roots from Greek and Latin are taught through computer-assisted instruction; techniques of word analysis. Historical overview of Greek and Latin; their relationship with and influence on English.

Clas 1082. Jesus in History. (3 cr)
Jesus of Nazareth in his original setting. Modern approaches to the historical Jesus. Perspectives and needs of early gospel writers and effects on portrayals of Jesus. Shifting representations of Jesus in new historical and cultural situations. Meets with Clas 1182.

Clas 1082H. Honors Course: Jesus in History. (4 cr)
Greek and Latin prefixes, suffixes, and roots basic to the vocabulary of health professions; taught through computer-assisted instruction.

Clas 1148. Technical Terminology for the Health Professions. (3 cr)
Greek and Latin prefixes, suffixes, and roots basic to the vocabulary of health professions; taught through computer-assisted instruction.

Clas 3001W. Classical Lyric and Satire. (3 cr)
Greek and Roman lyric poetry; Roman satire.

Clas 3008. History of Ancient Art. (3 cr)
Architecture, sculpture, and painting of selected early cultures; emphasis on influences on the development of Western art.

Clas 3023. The Age of Constantine the Great. (3 cr)

Clas 3024. The Age of St. Augustine of Hippos. (3 cr)
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 the East. Literature, art, thought resulting from new dominance of Christianity, particularly Augustin of Hippo. Meets with 3024.

Clas 3035. Classical Myth in Western Art. (4 cr)
An exploration of the role of myth in the visual arts through examination of major figures and stories that became popular in the ancient world and have fascinated artists and audiences ever since.

Clas 3070. Topics in Ancient Religion. (3 cr)
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.
CLAS 5182. Art and the State: Public Art in the Roman Empire. (3 cr. Prereq—Intro art history course or #) Origins of Roman public art; use in maintaining community; exploitation by the first emperor, Augustus; development and diffusion through the later empire; varying capacities to adjust to the demands of a Christian Empire.

CLAS 5251. Archaeology of Herodian Israel. (3 cr; A-F only. Prereq—One course in [archaeology or ancient history] or grad student) Archaeological sites in Israel dating to era of Herod the Great (37-4 BC). Palaces and religious edifices. Remains from Jewish/gentile settlements throughout the kingdom. Course readings consist of contemporary literary sources and excavation reports.

CLAS 5252. History of Early Christian Art in Context. (3-4 cr; Prereq—3xxx art history course or #) Role played by art in the formation of early Christian and Byzantine communities, and in establishing their relationships with the Pagan world and early Islam.

CLAS 5340. Practicum in Archaeological Field and Computer Techniques. (3 cr; §3340. Prereq—CLCv major or ancient art and archaeology course or #) Methods used for excavation of Old and New World sites. Meets at archaeology/computer lab for part of the semester and at a selected site in Minnesota for day-long sessions for 9 to 10 weeks. Meets with 3340.

CLAS 5794. Introduction to Classical and Near Eastern Studies. (1 cr. S-N only. Prereq—Grad major or minor or #) Introduction to core research materials and reference materials in the various disciplines which make up classical studies.

CLAS 5940. Topics in Classical Literature. (3 cr [max 9 cr]; §3940. Prereq—Two literature courses or #) Additional work for graduate credit. Topics specified in Class Schedule. Meets with 3940.


CLAS 5993. Directed Studies. (1-4 cr. Prereq—#, A, Q) Guided individual reading or study.

CLAS 5994. Directed Research. (1-12 cr. Prereq—#, A, Q)

CLAS 5996. Directed Instruction. (1-12 cr. Prereq—#, A, Q)

Clinical Laboratory Science (CLS)

Department of Laboratory Medicine and Pathology

Medical School

CLS 5064. Introduction to Clinical Immunohematology. (2 cr; A-F only. Prereq—#) Principles of blood grouping, antibody identification, compatibility testing, serology, and immunology.

CLS 5065. Introduction to Clinical Immunohematology: Laboratory. (2 cr; A-F only. Prereq—#) Exercises illustrating techniques in blood grouping, antibody identification, compatibility testing, and detection of antibodies by serological and immunological methods.

CLS 5090. Special Laboratory Methods. (1-2 cr; A-F only. Prereq—#) Assignment on an individual basis to one of a variety of special areas of experience in the clinical lab.

CLS 5100. Virology, Mycology, and Parasitology for Medical Technologists. (2 cr; A-F only. Prereq—Microbiology course with lab, biochem course) Lab diagnosis of viral, fungal, and parasitic infections. Lecture.

CLS 5104. Principles of Diagnostic Microbiology: Lecture. (2 cr; A-F only. Prereq—One microbiology course with lab, one biochemistry course, #) Current techniques used in lab diagnosis of infectious disease. Isolating/identifying bacteria and yeasts. Antimicrobial susceptibility testing. Lecture.

CLS 5105. Principles of Diagnostic Microbiology: Laboratory. (2 cr; A-F only. Prereq—One microbiology course with lab, one biochemistry course, #) Current techniques used in lab diagnosis of infectious disease. Isolating/identifying bacteria/yeasts. Antimicrobial testing. Laboratory.

CLS 5120. Seminar: Clinical Laboratory Science. (1 cr [max 3 cr]; S-N only. Prereq—#) Current literature. Presentation/discussion of research.


CLS 5125. Practicum Teaching. (1-2 cr; A-F only. Prereq—#) Supervised teaching experience, develop skills using instructional materials, tests, and measurements.

CLS 5127. Introduction to Management and Education I. (1 cr; A-F only. Prereq—#)

CLS 5129. Elements of Laboratory Administration. (2 cr; A-F only. Prereq—#) Leadership styles, employee selection and evaluation, communications, motivation, morale, discipline, job descriptions, record keeping, budgets, cost accounting, purchasing, product evaluation, lab safety, labor relations, government regulations.

CLS 5130. Practicum in Laboratory Administration. (2 cr; A-F only. Prereq—#) Supervised experience and assignment of specific problems related to lab service and management in health care institutions.

CLS 5135. Advanced Clinical Microbiology. (3 cr. Prereq—#) Observation, study, and practice in special problems, advanced techniques, and methodology.

CLS 5140. Techniques for Teaching. (2 cr; A-F only. Prereq—#) Developing objectives, classroom activities, and evaluation criteria for medical technology education.

CLS 5155. Advanced Clinical Hematology. (3 cr. Prereq—#) Observation, study, and practice in special problems, advanced techniques, and methodology.

CLS 5165. Advanced Clinical Immunohematology. (3 cr. Prereq—#) Observation, study, and practice in special problems, advanced techniques, and methodology.

CLS 5175. Advanced Clinical Chemistry. (3 cr. Prereq—#) Observation, study, and practice in special problems, advanced techniques, and methodology.

CLS 5251. Hematology I: Basic Techniques. (3 cr; A-F only. Prereq—#) Theory and application of basic principles and techniques in clinical hematology and hemostasis. Lecture and lab.

CLS 5252. Hematology II: Morphology and Correlation. (2 cr; A-F only. Prereq—5251 or MedT 4251) Fundamentals of blood and bone marrow examination emphasizing microscopic identification of immature and abnormal cells. Clinical correlation of lab findings in hematology and hemostasis. Lecture and lab.

CLS 5253. Hemostasis. (1 cr; A-F only. Prereq—5251 or MedT 4251) Theory and application of specific concepts and techniques in hemostasis and coagulation. Lecture and lab.

CLS 5310. Clinical Chemistry I: Lecture. (2 cr; A-F only. Prereq—Organic chem course with lab, biochem course, #) Principles and theory of clinical chemistry for assessing renal and metabolic disease/dysfunction, electrolyte balance, and acid-base balance. Principles and processes for quality management in the clinical lab.

CLS 5311. Clinical Chemistry I: Laboratory Applications. (2 cr; A-F only. Prereq—One organic chemistry course with laboratory; one biochemistry course, #) Application of clinical chemistry principles and laboratory techniques in the analysis of urine, plasma, and body fluids. Emphasis on laboratory tests to evaluate renal function, electrolytes, and acid-base balance. Introduction to principles and processes for managing test quality. Laboratory.

CLS 5320. Clinical Chemistry II: Lecture. (2 cr; A-F only. Prereq—Organic chem course with lab, biochem course, 5310 or MedT 4310, #) Principles and theory of clinical chemistry for assessing metabolic disease/dysfunction involving hormones, enzymes, lipids/lipoproteins, cardiac function, liver, and digestive tracts. Emphasis on measurement methods and physiological significance.

CLS 5321. Clinical Chemistry II: Laboratory Applications. (2 cr; A-F only. Prereq—Organic chem course with lab, biochem course, 5310 or MedT 4310, #) Application of clinical chemistry principles and laboratory techniques in analyzing serum, plasma, and urine. Focus on tests to evaluate selected disorders. Developing lab and instrumentation use skills with emphasis on quality control and technique.

CLS 5768. Advanced Hematology. (5-10 cr [max 30 cr]; Prereq—#) Practical experience collecting bone marrow from patients. Diagnosing hematological diseases by evaluating and interpreting cells from clinical specimens of bone marrow, peripheral blood, and, if applicable, lymph nodes.

CLS 5864. Research Seminar. (1 cr [max 10 cr]; S-N only. Prereq—#) Departmental research seminar series.

CLS 5865. Departmental Seminar. (1 cr [max 10 cr]; S-N only. Prereq—#) Departmental clinical lab research seminar series.

College of Liberal Arts (CLA)

College of Liberal Arts

CLA 1050. Faculty Mentor Freshman Seminar. (2 cr; A-F only. Prereq—A, Faculty Mentor Program) Discussions led by faculty mentors on liberal education, nature of University life, major exploration, study skills appropriate to various disciplines.

CLA 1301. SEAM First Year Seminar. (2 cr; A-F only. Prereq—SEAM) Exploration of issues related to students’ academic/career interests. Multiculturalism, other skills. Small-group discussions.

CLA 1302. SEAM First-Year Colloquium. (2 cr; A-F only. Prereq—SEAM) Introduction to resources that enhance academic/professional interests. Focus on multiculturalism. Small group discussions led by professional staff, guest speakers.

CLA 1901, 1902, 1903, 1904, 1905, 1906W, 1907W, 1908W. Small group discussions led by professional staff, one biochemistry course, #) Application of clinical chemistry principles and laboratory techniques in the analysis of urine, plasma, and body fluids. Emphasis on laboratory tests to evaluate renal function, electrolytes, and acid-base balance. Introduction to principles and processes for managing test quality. Laboratory.

For definitions of course numbers, symbols, and abbreviations, see page 296.
Veterinary Medicine (CVM)

College of Veterinary Medicine

CVM 1000. Introduction to Veterinary Medicine. (1 cr; S-N only) History of veterinary profession, careers within the profession, employment trends. Information about admission to DVM. Veterinary technology programs.


Communication Disorders (CDis)

Department of Communication Disorders

College of Liberal Arts

CDis 1301W. The Physics and Biology of Spoken Language. (3 cr. Prereq–3303) Physics and biology of spoken language, from the talker’s production of sounds and words, to the transmission of sound, to the listener’s perception of what was said. Computer analysis and synthesis of speech.

CDis 1401. Introduction to Communication Disorders. (4 cr. Prereq–401) Disorders of spoken communication, their functional effect on quality of life for individuals with communication disorders. In-depth techniques for specific disorders of speech, language/hearing in context of social, cultural, linguistic diversity.

CDis 1902. Freshman Seminar. (3 cr. A-F only) Topics vary. See Class Schedule.

CDis 3301. Introduction to Acoustics. (3 cr) Elements of acoustics necessary to understand quantitative aspects of speech and hearing science: speech-language pathology, and audiology. Nature of sound, sound transmission, simple harmonic motion, sound intensity and pressure, complex waves, resonance and filtering, and distortion.

CDis 3302. Anatomy and Physiology of the Speech and Hearing Mechanisms. (3 cr) Gross anatomy and basic physiology of the nervous, auditory, respiratory, laryngeal, velopharyngeal, and orofacial systems with emphasis on normal communication processes.

CDis 3303. Language Acquisition and Science. (4 cr) Survey of typical language development and major theoretical perspectives about development. Applications of current theory to analysis of children’s language.


CDis 3305W. Speech Science. (4 cr. Prereq–3301, 3302, 3304 or #) A survey of theories, methods, and research in the discipline of speech science, including speech acoustics, speech perception, and speech production.

CDis 3306. Hearing Science. (3 cr. Prereq–3301, 3302 or #) Theories, methods, and research in psychological and physiological acoustics with emphasis on the relation between physiological measures and perception. Topics include cochlear mechanics, auditory nerve firing patterns, scaling, and object perception.

CDis 3307. Introduction to Communication Disorders. (4 cr. Prereq–401) Disorders of spoken communication, their functional effect on quality of life for individuals with communication disorders. Intervention techniques for specific disorders of speech/language/hearing in context of social, cultural, linguistic diversity.

CDis 3402W. Major Project in Speech and Hearing Science. (3 cr; S-N only. Prereq–Jr or Sr Cdis major) Seminar for completion of the undergraduate major project paper by students in their junior or senior years.

CDis 3403W. Communication Disorders and Cultural Diversity. (3 cr) Examination of the influence of culture on communication disorders and the role of the speech-language pathologist in serving increasingly diverse populations in public schools.

CDis 4301. Neural Bases of Communication. (3 cr) Basic neuroanatomy and neurophysiology, especially as they relate to normal speech, language, and hearing processes.

CDis 4501. Speech Disorders. (3 cr. Prereq–3302 or #) Current concepts of the nature and treatment of disorders related to voice, resonance, fluency, and swallowing. Disorders associated with dysarthria, cleft palate, laryngeotomy, stuttering, voice quality, and dysphagia.

CDis 4601. Language Disorders. (3 cr. Prereq–3303 or #) Acquaints students with language delay and disorders and offers an overview of assessment and intervention strategies that are commonly used by speech/language pathologists.


CDis 4802. Rehabilitative Audiology. (3 cr. Prereq–3305, 4801 or #) Survey of sensory aids and methods used in rehabilitation across the life span after the diagnosis of hearing loss. Discussion of degree of hearing loss, developmental level, communication modalities, client/family choice, disability, and cultural considerations.

CDis 4803. Hearing Loss in Children: Rehabilitation. (3 cr. Prereq–1301 or #) Oral language, listening, and speech production skills in infants and children with hearing losses. The normal developmental processes of speech perception and production, specific methodologies of auditory and speech production training, oral language intervention, and discussion of existing curricula.

CDis 5401. Counseling and Professional Issues. (4 cr. Prereq–4501 or 4601 or 4801 or #) 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.

CDis 5501. Fluency Disorders. (3 cr. Prereq–4501 or #) Description, nature, and treatment of fluency disorders in children and adults. Involvement in therapeutic and research activities.

CDis 5502. Voice and Resonance Disorders. (3 cr. Prereq–3305, 4301, 4501 or #) Normal and disordered aspects of voice and resonance. Organic and functional voice disorders, laryngectomy, and cleft palate. Basic information regarding the nature and clinical management of these disorders.

CDis 5503. Motor Speech Disorders. (3 cr. Prereq–3305, 4301, 4501 or #) Dysarthria, speech-production disorders resulting from neurologic disorders or lesions, and apraxia of speech, a disorder of the volitional control of speech. Nature and management of motor speech disorders in adults and children.

CDis 5504. Dysphagia. (3 cr. Prereq–3305, 4301, 4501, 4801 or #) Normal and disordered aspects of swallowing. The nature, etiologies, evaluation, and management of swallowing disorders will be covered.

CDis 5602. Phonological Disorders. (3 cr. Prereq–3304, 4601 or #) Theory and research related to the nature, assessment, and treatment of phonological disorders in children.

CDis 5603. Child Language Disorders: Assessment and Intervention. (4 cr. Prereq–3303, grad student or #) Language assessment, teaching procedures used with children/adolescents. Procedures apply to children who face language disabilities such as developmental delays, autism, learning disabilities.

CDis 5604. Language Assessment and Intervention: School Age Children. (3 cr. Prereq–4601 or #) Strategies, models, and service-delivery options in assessment and intervention for school-age children with language impairments. Emphasis on practical applications for speech-language pathologists.

CDis 5605. Language and Cognitive Disorders in Adults. (3 cr. Prereq–3302, 4301, 4601 or #) 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.

CDis 5606. Introduction to Augmentative and Alternative Communication. (3 cr. Prereq–4501, 4601 or #) Description of the range of augmentative and alternative communication applications for persons with developmental and acquired disabilities.

CDis 5607. Electronic Communication Aids. (3 cr. Prereq–5606 or #) Operational procedures for dedicated augmentative communication aids and related software applications. Design and implement assessment and intervention strategies relevant to dynamic and fixed display devices. Troubleshoot common technical difficulties encountered by individuals using electronic communication aids.

CDis 5801. Audiologic Assessment I. (3 cr. Prereq–4801 or #) Basic audiometric battery including pure tones, speech, masking, and immittance in adults; industrial audiology and otoacoustic emissions.

CDis 5802. Hearing Aids I. (3 cr. Prereq–3305, 4801 or #) Survey of modern hearing aids including history of development, electrophysiological functions, clinical and laboratory measurement techniques, sound field acoustics, techniques for selection.

CDis 5803. Hearing Loss in Children: Diagnosis. (3 cr. Prereq–4801 or #) 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.

CDis 5810. Laboratory Module in Audiology. (1-2 cr. Prereq–5501, 5801 or #) Intensive study of clinical methods in audiology. Supplements didactic courses in audiology curriculum. Laboratory study, individually or in small groups.

CDis 5900. Topics: Communication Disorders. (1-3 cr) Topics listed in communication disorders office.

CDis 5993. Directed Study. (1-12 cr. [max 18 cr. Prereq–#) Directed readings and preparation of reports on selected topics.


Comm 1102. Introduction to Communication. (3 cr) Verbal and nonverbal communication: public address, interpersonal, organizational, intercultural, and electronic. Ways in which new communication technologies influence and are influenced by existing forms of communication.

Comm 1102H. Honors: Introduction to Communication. (3 cr; §1102, Prereq–Honors) Verbal/nonverbal communication: public address, interpersonal, organizational, intercultural, electronic. Ways in which new communication technologies influence/are influenced by existing forms of communication.


Comm 1902. Freshman Seminar. (3 cr [max 6 cr]; A-F only) Topics specified in Class Schedule.

Comm 1905. Freshman Seminar. (3 cr [max 6 cr]; A-F only) Topics specified in Class Schedule.

Comm 1907W–1909. Freshman Seminar. (3 cr [max 6 cr]; A-F only) Topics specified in Class Schedule.

Comm 3110. Topics in Speech-Communication. (3 cr [max 6 cr]; Prereq–[3211 or 3401 or 3601] [whichever is relevant to topic]) Cases illustrating speech-communication theory, underlying issues.

Comm 3131. Leadership Theory and Practice. (3 cr [max 6 cr]; S-N only. Prereq–Student hired for leadership position in New Student Programs, §) Preparation for New Student Program leadership position. Attitudes/skills with leadership and student life issues. Building authentic community.


Comm 3201. Introduction to Electronic Media Production. (3 cr; A-F only. Prereq–1101 or §) Production and criticism of messages for the electronic media. Theory and practice in planning, scripting, production, and criticism in various electronic media. Student productions in laboratory.

Comm 3211. Introduction to U.S. Electronic Media. (3 cr [max 3 cr]) 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 3401. Introduction to Communication Theory. (3 cr. Prereq–1102) Social scientific theories in communication. Communication history; logic of scientific theories and communication types of theories in interpersonal, small group, organizational, intercultural, and electronically mediated communication.

Comm 3402. Introduction to Interpersonal Communication. (3 cr) Nature and function of communication between individuals in formal and informal relationships. Communicative interactions from theoretical and practical viewpoints.


Comm 3405. Language and Gender. (3 cr; §WoSt 3305) Gender/communication. Interdisciplinary theory. Role of communication in creating, maintaining, reinforcing, and changing gender relations in society.

Comm 3406. Language and Sexual Diversity. (3 cr) Language use in lesbian, gay, bi-sexual, and transgender communities. Ways in which sexual diversity affects language use.

Comm 3411. Introduction to Small Group Communication. (3 cr) 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 cr; A-F only, Prereq–1101 or §) Application of communication concepts in information interview process. Practical experience in planning, conducting, and evaluating informational, journalistic/elite, helping, persuasive, appraisal, and employment interviews. Class training and field experience.


Comm 3441. Introduction to Organizational Communication. (3 cr. Prereq–1101 or equiv.) Functions of communication in work groups, in organizational hierarchies, and between organizations.

Comm 3451W. Intercultural Communication: Theory and Practice. (3 cr. Prereq–Planning an intercultural experience) Theories of and factors influencing intercultural communication. Development of effective intercultural communication skills.

Comm 3452W. Communication and the Intercultural Reentry. (3 cr. Prereq–Return from an intercultural experience) 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 cr. Prereq–1101) Theoretical systems intended to explain or direct the creation of public discourse. Traditional rhetoric to contemporary perspectives. Using theory to explain the practice of public discourse.

Comm 3605W. Persuasive Speaking and Speech Writing. (3 cr [max 3 cr]; Prereq–Soph) Performance and composition with critical inquiry into rhetorical theories. Develops writing, thinking, and speaking skills.


Comm 3625. Communication Ethics. (3 cr; A-F only. Prereq–1102 or §) Applying concepts and theories from philosophy and social science to ethical issues in interpersonal, group, organizational, intercultural, and media communication.

Comm 3631W. Freedom of Speech. (3 cr) 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 3970. Directed Study. (1-3 cr [max 6 cr]. Prereq–One Comm course, §; A-F only. Prereq–Comm majors) Guided individual reading or study.

Comm 3980. Directed Instruction. (3 cr [max 6 cr]. §) Individualized instruction leading to completion of senior project.

Comm 4231. Comparing Electronic Media Systems. (3 cr. Prereq–3211 or §) Historical, political, and sociological aspects of electronic media systems throughout the world, including United States, Canada, Great Britain, France, Germany, and Russia. Regulation and impact on political, social, and economic development.

Comm 4235. Electronic Media and Ethnic Minorities—A World View. (3 cr) 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 4291. New Telecommunication Media. (3 cr; A-F only. 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 4407. Communication and Conflict. (3 cr; A-F only. Prereq–3401 or 3402 or §) 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 4452W. Intercultural Interaction: Theory and Application. (3 cr. Prereq–§) Small group interaction across cultures for both international and U.S. students. Discussion, simulations, readings.

Comm 4471. Communication in Marriage and Family. (3 cr. Prereq–3401 or 3402 or §) 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 4616. African American Civil Rights Rhetoric. (3 cr. Prereq–§) Uses the struggle of African Americans to explore and analyze philosophical concepts, political issues, moral complexities, and discursive characteristics of civil rights rhetoric.

Comm 4621. W. Rhetoric of Feminism. (3 cr. Prereq–4615 or §) History and criticism of the rhetoric of feminism from 19th century to the present.
Comm 5110. Special Topics in Communication Theory. (3 cr [max 6 cr]) Advanced theoretical problems. See department office for current offering.


Comm 5220. Television Genres. (3 cr [max 3 cr]) Nature, historical development, and influence on society of specific genres of television programming: drama, situation comedy, mystery, soap opera. Program genre change over time and how society, government regulation, and economics of production influence that historical process.

Comm 5233W. Electronic Media and National Development. (3 cr) Use of electronic media to change social, political, economic, and cultural life. Use by developing nations to improve agricultural practices, hygienic standards, literacy, and awareness of civic responsibility.

Comm 5261. Political Economy of Media Culture. (3 cr [Prereq—3211 or #]) 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 cr [Prereq—3401 or grad]) Survey of major theoretical approaches to communication including, positivism, constructivism, and systems.

Comm 5402. Advanced Interpersonal Communication. (3 cr [Prereq—1102, 3402 or 3411 or 3431 or 3441 or 3451] Social scientific approaches to interpersonal communication; theory and research findings.


Comm 5406. Communication and Gender. (3 cr, Prereq—One women's studies course or #) 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 cr; A-F only, Prereq—3411 or #) Survey of small group communication research; theory and practice. Group decision-making and leadership.

Comm 5421. Quantitative Methods in Communication Research. (3 cr; A-F only, Prereq—3401 or #) Social scientific methods used in studying human communication. Optional data processing laboratory for additional credit.

Comm 5431. The Process of Persuasion. (3 cr, Prereq—3431) Communication campaigns (e.g., advertising, political) illustrating persuasive processes and theories. Research paper required.

Comm 5441. Communication in Human Organizations. (3 cr, Prereq—9 cr social science, 3441 or #) Communication in organizational settings. Organizational structure and dynamics and their effect upon the communication process. Individual projects.

Comm 5451W. Intercultural Communication Processes. (3 cr) Theory and research on cultural differences in values, norms, behaviors, and perceptions that affect communication across cultures internationally and domestically.

Comm 5461. Conversation Analysis. (3 cr, Prereq—Ling 3001 or Ling 5001) Discourse processes in dyadic and multiparty conversation. Application of concepts through analysis of conversations.

Comm 5462. Field Research in Spoken Language. (3 cr, Prereq—5461, Ling 3001 or Ling 5001) Transcribing and analyzing verbal communication and movement related to it. Applying concepts to recorded conversations.

Comm 5511. Survey of Rhetorical Theory. (3 cr, Prereq—1101) Survey of rhetorical theory from ancient to contemporary period; application of theory to public discourse.


Comm 5517. History and Criticism of U.S. Public Discourse: 1630-1865. (3 cr, Prereq—J) 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 5518. History and Criticism of U.S. Public Discourse: 1865-1950. (3 cr, Prereq—J) How discourse has been used to establish or maintain power. Speeches and public debates used to examine U.S. public address from the mid 19th century to 1950.

Comm 5970. Directed Study. (1-3 cr [max 6 cr]; S-N only, Prereq—Nine three-week 6000 level cr, A, N) Guided individual research or study.

Comm 5994. Communication Research Practicum. (1-3 cr [max 9 cr]; S-N only, Prereq—#) Students participate in research group.

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Comparative Literature (CLit)

Department of Cultural Studies and Comparative Literature

College of Liberal Arts

CLIT 5331. Discourse of the Novel. (3 cr, §CLIT 5331) Comparative study of the novel (eighteenth century to present): its relation to ordinary language practices, emergence of reading publics, technologies of cultural dissemination, problems of subjectivity; its role in articulating international cultural relations.

CLIT 5555. Introduction to Semiotics. (3 cr, §CLIT 5555) 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).


CLIT 5910. Topics in Comparative Literature. (3 cr [max 24 cr]) Topics specified in Class Schedule.

CLIT 5992. Directed Reading in Comparative Literature. (1-3 cr [max 9 cr], Prereq—#) Guided individual reading and study.

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Comparative Studies in Discourse and Society (CSDS)

Department of Cultural Studies and Comparative Literature

College of Liberal Arts

CSDS 5301. Society, Ideology, and the Production of Art. (3 cr, §CSDS 5301) Recent critical theories of relation of arts to social/ideological forces. Selected artifacts from Western culture (e.g., Renaissance to 20th century; high, popular, mass culture). Music, visual art, literature.

CSDS 5302. Aesthetics and the Valuation of Art. (3 cr, §CSDS 5302) Society, ideology, aesthetic value in light of recent critical theories of visual art, music, literature. Mediations of place, social class, gender, ideology on aesthetic judgment in post-renaissance Western culture.


CSDS 5910. Topics in Comparative Studies in Discourse and Society. (3 cr [max 24 cr]) Themes in comparative, sociohistorical analysis of discursive practices. Individually or team taught. Topics specified in Class Schedule.

CSDS 5993. Directed Study. (1-3 cr [max 9 cr], Prereq—#) Guided individual reading and study.

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Computer Science (CSci)

Department of Computer Science

Institute of Technology


CSCI 1107. Introduction to FORTRAN Programming for Scientists and Engineers. (3 cr, Prereq—Math 1271 or Math 1371 or #) Algorithm development and principles of computer programming using FORTRAN. Emphasizes numerical methods for science and engineering applications.

CSCI 1113. Introduction to C/C++ Programming for Scientists and Engineers. (4 cr, Prereq—Math 1271 or Math 1371) Programming for scientists/engineers. C/C++ programming constructs, object-oriented programming, software development, fundamental numerical techniques. Exercises/examples from various scientific fields.

CSCI 1121. Introduction to the Internet 1. (4 cr; A-F only) Concepts of the internet, analog vs. digital communication, networking, packet switching, software protocols. E-mail, search engines, file transfer (ftp), remote login (Telnet). Creating Web pages using HTML and Cascading Style Sheets. Advanced programming concepts such as Java, Perl, and CGI.
Course Descriptions

CSci 1901. Structure of Computer Programming I. (4 cr. Prereq—Math 1271 or equiv or #) Principles and paradigms (message-passing, data-driven, event-driven). Students develop algorithms/data types using language such as Scheme and techniques such as abstraction, procedures, recursion, iteration.

CSci 1902. Structure of Computer Programming II. (4 cr. Prereq—Math 1272 or equiv or #) Object-oriented programming using language such as C++ or Java. Builds on 1901, presenting additional data structures/algorithms. Object-oriented approach to implement data structures/operations as abstract data types.

CSci 2031. Introduction to Numerical Computing. (4 cr. §CSci 5201, §2248 or #) Introduction to numerical computing for CSci, mathematics, and science/engineering students. Uses Mathematica or Matlab to cover numerical error, root finding, systems of equations, interpolation, numerical differentiation and integration, least squares, and differential equations.

CSci 2101W. Social, Legal, and Ethical Issues in Computing. (3 cr. §2109. Prereq—At least soph or #) Impact of computers on society. Computer science perspective of ethical, legal, social, philosophical, political, and economic aspects of computing.

CSci 2109. Social, Legal, and Ethical Issues in Computing (non-W). (3 cr. §2101. Prereq—At least soph or #) Impact of computers on society. Computer science perspective of ethical, legal, social, philosophical, political, and economic aspects of computing.

CSci 2121. Introduction to the Internet 2. (4 cr. A-F only. Prereq—1121) Programming for the Internet using HTML, JavaScript, and Perl. CGI, database programming with Perl. Database concepts such as relational vs. object oriented database technologies, querying data using SQL. Interfacing databases to the Web. E-commerce, emerging trends such as XML.

CSci 2980. Special Topics in Computer Science. (1-4 cr. (max 1 cr. A-F only. Prereq—#) Special topics. Lectures, informal discussions.

CSci 3970. Industrial Student Co-op Assignment. (2 cr. (max 8 cr.; S-N only. Prereq—CSci, in co-op program) Industrial work assignment in a co-op program involving advanced computer technology. Reviewed by a faculty member based on final written report covering the work assignment.

CSci 3980. Undergraduate Colloquium. (1 cr. (max 2 cr. Prereq—Upper div CSci; can be repeated for cr) Current computing trends and hot topics; industrial and career related topics; research topics; research projects and undergraduate research opportunities; graduate school options.


CSci 4081W. Introduction to Software Engineering. (4 cr. §5801, §4089. Prereq—(1902, 2011) or #) Basic theory/practice of software engineering. Software development, requirements/specifications, design, verification, and validation.


CSci 4211. Introduction to Computer Networks. (3 cr. §5211. Prereq—4006 or #; basic knowledge of [computer architecture, operating systems] recommended, cannot be taken for grad CSci cr) 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 cr. §5707. Prereq—4004 or #; cannot be taken for grad CSci cr) Concepts, conceptual data models with case studies, common data manipulation languages, logical data models, database design, facilities for database security/integrity, applications.

CSci 4921. History of Computing. (3 cr. §HSci 4321) 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 4970W. Advanced Project Laboratory. (3 cr. §9 cr. Prereq—Upper div CSci, 4061; #; cannot be taken for grad cr) Formulate and solve open-ended project: design, implementation, interface, document, test. Team work strongly encouraged. Arranged with CSci faculty.

CSci 5103. Operating Systems. (3 cr. Prereq—4001 or #) Conceptual foundations of operating system designs and implementations. Relationships between operating system structures and machine architectures. UNIX implementation mechanisms as examples.

CSci 5106. Programming Languages. (3 cr. Prereq—4001 or #) 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 5701. Fundamentals of Computer Graphics 1. (3 cr. §5107. Prereq—4041 or #) Emphasizes fundamental concepts in linear algebra

CSci 5115. User Interface Design, Implementation and Evaluation. (3 cr. §5107. Prereq—4041 or #) Theory, design, programming, and evaluation of interactive application interfaces. Human factors and capabilities, 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 5116. GUI Toolkits and Their Implementation. (3 cr. Prereq—5115 or §5107 or #) Structure and design of user interface toolkits and frameworks. Aspects of GUI toolkits (e.g., window system protocols, event processing, geometry management, resource management, data management, constraints). Course is built around implementation assignments and case studies of toolkits.

CSci 5131. Advanced Internet Programming. (3 cr. §5131. Prereq—5106 or §5211 or #; 4081 or §3041; §3070 recommended) Issues in internet programming: Java programming, concurrent programming, workflow, distributed databases, security, collaborative computing, object-oriented architecture/design, network publishing, messaging architecture, distributed object computing, internets.

CSci 5161. Introduction to Compilers. (3 cr. Prereq—4011 or #) Theories and mechanisms of programming language processing tools. General compiler organization: lexical scanner, syntax parser, symbol table, internal program representation, code generator. Relationship between design and implementation. Run-time memory management mechanism.

CSci 5201. Computer Architecture. (3 cr. §EE 5361. Prereq—2021 or #) Introduction to computer architecture. Pipelining, memory hierarchy, and input/output systems. Performance metrics. Examination of each component of a complicated computer system.

CSci 5211. Data Communications and Computer Networks. (3 cr. §4211. Prereq—§4061 or #; basic knowledge of [computer architecture, operating systems, probability]) Fundamental 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, multiprotocol/multiflow in C/C++, networking technologies, network programming interfaces, networked applications. Case studies using Ethernet, Token Ring, FDDI, TCP/IP, ATM, Email, HTTP, and WWW.


CSci 5321. Linear and Nonlinear Programming. (4 cr. Prereq—5301, some programming experience) Standard form for linear programming (LP), simplex method and geometry of LP; revised simplex method, duality theory and sensitivity, approximation of data by LP, interior methods, affine scaling algorithms, unconstrained optimization.

CSci 5403. Computational Complexity. (3 cr. Prereq—4041 or #) Computational models, complexity measures in each model, and related complexity classes.


CSci 5451. Introduction to Parallel Computing: Architectures, Algorithms, and Programming. (3 cr. Prereq—4041 or #) Parallel architectures design, embeddings, routing, examples of parallel computers, fundamental communication operations, performance metrics, parallel algorithms for sorting, matrix problems, graph problems, dynamic load balancing, types of parallelism, parallel programming paradigms, message passing in programming in MPI, data parallel programming in HPF, shared-address space programming in threads.


CSci 5551. Introduction to Intelligent Robotical Systems. (3 cr. Prereq—5511 or #) Transformations, inverse kinematics, dynamics, control. Sensing (robot vision, force control, tactile sensing), applications of sensor-based robot control, robot programming, mobile robotics, and microrobotics.

CSci 5561. Computer Vision. (3 cr. Prereq—5511 or #) 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 5801. Software Engineering I. (3 cr. §4081, 3 cr. §4082) Introduction to software engineering. Reviews and evaluates software life cycle: development models; software requirements analysis; software design, coding, and maintenance.

CSci 5802. Software Engineering II. (3 cr. Prereq—5801 or #) 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 5980. Special Topics in Computer Science. (1-3 cr; max 9 cr. Prereq—#) Lectures and informal discussions on current topics in computer science.

CSci 5991. Independent Study. (1-3 cr; max 9 cr. Prereq—#) Independent study arranged with CS faculty member.

CSci 5994. Directed Research. (1-3 cr; max 9 cr. Prereq—#) Directed research arranged with faculty member.

CSci 5996. Curricular Practical Training. (1 cr; max 3 cr; S-N only. Prereq—[CSci or CompE] major, #) Industrial work as segment involving advanced computer technology. Reviewed by faculty member. Grade based on final report covering work assignment.

Construction Management (CMgt)

College of Continuing Education

CSci 3001. Introduction to Construction. (2 cr; A-F only) Introduction to construction/processes that shape our environment. Construction types, their differences. Key participants, their vocabulary, delivery systems. Construction specialists, their roles. Elements of construction management. Lectures, field trips.

CSci 4011. Construction Documents and Contracts. (2 cr. Prereq—Technical writing course [available at North Hennepin or Inver Hills Community College] or equiv or #) Definition, interpretation, drawings, specifications, agreements, bidding forms, general conditions, bonds, contracts, subcontracts, related documents.

CSci 4012. Risk Management, Bonds, and Insurance. (2 cr. Prereq—BAS student in construction management program or construction worker) How to recognize/evaluate property, liability, health, and financial risks associated with construction projects. Risk control/financial insurance marketing, pricing, surety bond underwriting, financial analysis, claims administration.

CSci 4013. Legal and Ethical Issues in Construction. (2 cr. Prereq—4011) Role of construction management professional in society. Principles of conduct, goals for professional performance/behavior, review of mandatory requirements.

CSci 4016. Construction Software. (2 cr; A-F only) Prereq—Beginning estimating course or currently employed in construction industry) Current/future uses of technology by owners, general contractors, subcontractors, and facilities management personnel. Networking, databases, wireless communication, software selection, Web-based project management, online plan rooms. Hands-on, workshop environment.

CSci 4018. E-Business in Construction. (2 cr; A-F only) Selection/implementation of Web-based project management tools. Software such as Bidcom, E-builder, Bricnet, Constructware, Frametech. Hands-on work with live building sites. Digital technologies in construction industry. Wire/wireless communication, online plan/communication, software selection, Web-based project management, online plan rooms.


CSci 4021. Construction Planning and Scheduling. (2 cr. Prereq—CMGT 2860 [available through NHCC], primarily for BAS students in const mgmt program or those working in construction) Project planning, scheduling, and control. Considering/understanding alternatives. Industry techniques (e.g., critical path method). Using commercial software on personal computers. Updating/analyzing project schedules.


CSci 4023. Value Engineering. (2 cr) Primarily for students in the BCM program or those working in construction. Study of step approaches of defining building system and materials function, allocating cost, defining alternative methods for performing, and evaluating to yield the best value.
Five phases of function analysis (value engineering): information, creative, evaluation, planning, and implementation.

CMgt 4024. Estimating and Value Engineering. (4 cr; A-F only; §4022, §4023. Prereq–CMSV 2860 [available at materials of construction, and structural systems on construction, structure). Impact of ecological issues, building technology (materials, methods of microclimate, thermal, aural, luminous design) and relationship between architectural form, human (3 cr; A-F only)

CMgt 4025. Planning and Scheduling II. (2 cr; A-F only. Prereq–§4021, upper div; see BAS Web site at www.cce.umn.edu/bas for more info)

Computer-based continuation of Planning and Scheduling I. Project planning, scheduling, and control. Critical path method. Updating/analyzing project schedules.

CMgt 4026. Construction Bidding and Estimating II. (2 cr; A-F only. Prereq–§4022)


CMgt 4040. Construction Safety and Loss Control. (2 cr; A-F only. Prereq–Upper div; primarily for BAS students in const mgmt program or those working in construction)


CMgt 4051. Construction Materials for Managers. (3 cr; A-F only)

Relationship between architectural form, human experience, and building technologies. Design principles/concepts of environmental technology (microclimate, thermal, aural, luminous design) and building technology (materials, methods of construction, structure). Impact of ecological issues, materials of construction, and structural systems on architectural design.

CMgt 4193. Directed Study. (1-4 cr [max 16 cr]. Prereq–BAS student in const mgmt program, A) Topic arranged with BAS construction management academic advisor.

CMgt 4196. Construction Management Internship. (3-4 cr [max 12 cr]; S-N only. Prereq–BAS student in const mgmt program)

Professional experience internship requirement for BAS Construction Management program. Subject to faculty adviser approval.

CMgt 4350. Topics in Construction Management. (3 cr [max 9 cr]; A-F only)

Relationship between architectural form, human experience and building technologies. Design principles/concepts of environmental technology (microclimate, thermal, aural, luminous design) and building technology (materials, methods of construction, structure). Impact of ecological issues, materials of construction, and structural systems on architectural design.

CMgt 4901. Seminar: Communication and the Construction Process. (2 cr; A-F only)

Traces construction project from inception to completion. Interaction skills/techniques (written/oral) important to manager in delivering project through myriad of hoards, hurdles, and pitfalls.

Coptic (Copt)

Department of Classical and Near Eastern Studies
College of Liberal Arts

Copt 5001. Elementary Coptic. (3 cr)

Introduction to Coptic grammar and vocabulary, chiefly in the Sahidic dialect.

Copt 5002. Elementary Coptic. (3 cr; Prereq–§5001 or equiv)

Reading a variety of Coptic literature, such as Gnostic, martyrological, or monastic texts.

Cultural Studies and Comparative Literature (CSCL)

Department of Cultural Studies and Comparative Literature
College of Liberal Arts

CSCL 1001. Introduction to Cultural Studies: Rhetoric, Power, Desire. (4 cr)

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 1101. Literature. (4 cr)

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 1201. Introduction to Cinema and Media Culture. (4 cr)

Critical analysis of films, particularly as they emerge within context of mass culture. Determining discourse specificity of cinema. Network of institutions that expose this discourse to other media discourses. Rudiments of film theory. Brief engagement with production.

CSCL 1301W. Reading Culture: Theory and Practice. (4 cr)

How can we understand the concepts of culture, cultural conflict? Emphasizes practice in reading cultural theory. Texts such as film, literature, music, fashion, commercial art, built environment.

CSCL 1401W. Reading Literature: Theory and Practice. (4 cr)

How can we read/understand different ways that literature is meaningful? Emphasizes practice in reading a broad spectrum of world literature, literary theory.

CSCL 1501W. Reading History: Theory and Practice. (4 cr)

What is history? How can we understand its significance for development of ethics, religion, political/economic philosophy, civics, and their significance for development of ethics, religion, political/economic philosophy, civics, and environmentalism in Western/other civilizations. Lecture/discussion, film assignments.

CSCL 1907W. Freshman Seminar. (3 cr; A-F only. Prereq–Fr or no more than 36 cr) Topics specified in Class Schedule.

CSCL 1910W. Freshman Seminar. (3 cr [max 6 cr]; A-F only. Prereq–Fr or no more than 36 cr) Topics specified in Class Schedule.

CSCL 1921. Introduction to Film Study. (4 cr)

Fundamentals 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 3000. Topics. (1-3 cr [max 2 cr]) Selected topics.

CSCL 3115. Cinema and Ideology. (4 cr)

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 cr)

Close examination of widely varying musical forms and modes, “classical” and “popular,” in relation to human subjectivity and configurations of culture, ideology, and power.

CSCL 3173W. The Rhetoric of Everyday Life. (3 cr)

How discourse reproduces consciousness and persuades 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 cr)

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 cr)

Comic forms (joke, camp and ethnic humor, classic drama, TV sitcom, film) examined in relation to a broad spectrum of theory concerning the nature, mechanics, and uses of comedy in society.

CSCL 3176. Oppositional Cinemas. (4 cr)

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 cr, S5CMC 3177)

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 3179. Reading Literary Movements. (3 cr)

Literary movement that emerges when a group of writers puts forth a new definition of literature. Literary movements created by scholars after the fact. Focuses on one or two related movements (e.g., surrealism and dadaism).

CSCL 3321W. Theories of Culture. (3 cr)

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 the Humanities. (3 cr)

The sciences and humanities battle over “truth” and “reality,” while technology recasts the world of knowledge and work. The new texts-as-truth also facilitates the ongoing religious attacks on science in this momentous millennial.

CSCL 3361. Visions of Nature:The Natural World and Political Thought. (4 cr; SEEB 3361)

Theories about organization of nature, human nature, and their significance for development of ethics, religion, political/economic philosophy, civics, and environmentalism in Western/other civilizations. Lecture/discussion, film assignments.
Course does not engage in the reading of literature.


History of cultural, perceptual and/or conceptual changes in Western societies, 1600 to 1750; confusing and conflicting understandings of the human imagination, subjectivity, identity, and the body; addressed through philosophy, literature, visual arts, music, pedagogical and medical treatises, and treatises.


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.

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, perceptual and/or conceptual changes, especially in America. Ideology, mythology, planning, development, geography, transportation, the family. Specific sites and designs; representations in film, television, popular literature, and music.

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.

Suburbia 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.

Three modules focus on important aspects of contemporary urban elementary school teaching: the principal’s role, the teacher’s role, and the students. Central to each module are school-based visits, observations, and interviews.

Relationship between democratic citizenship and education. Role of economics/ethics in defining character of education. Relationship between school/ university programs and citizenship. Relevance of education in contemporary society.

Introduction to pictorial expression, design, and the function of art in the social environment.

Introduction to children’s literature as a field of study and as part of the elementary school curriculum. Attention to classic and contemporary books in all genres; research in children’s reading interests and response to literature.

Note: Undergraduate students in CEHD may have access to some 5xxx courses. For more information, contact an Student & Professional Services or faculty adviser, or view a complete listing of CEHD courses at <www.coled.umn.edu/catalogs/catalog_intro.html>.
Course Descriptions

Dnce 1010. Modern Dance Technique 3. (2 cr [max 4 cr]. Prereq–1002, A) Continuation of physical training. Theory of space, time, and energy. Correct placement, power from pelvic center, rotation/turnout, muscular tonality, articulation of joints, clarity of emotional intent, physical stretch, strength, and stamina.


Dnce 1101. Ballet Technique 1. (1 cr) Principles, basic technique, and vocabulary of ballet; barre, center, and allegro.


Dnce 1201. Jazz Technique 1. (1 cr) Jazz dance technique and its origins. Warm-up, center-floor work, and across-the-floor combinations.


Dnce 1210. Jazz Technique 3. (1 cr [max 2 cr]. Prereq–1202, A) Jazz technique; body isolations, placement, and musicality.


Dnce 1301. Tap Technique 1. (1 cr) Learning fundamental terms, basic rhythm structures, step sticks, and standard time steps.

Dnce 1302. Tap Technique 2. (1 cr Prereq–1301 or #) Fundamental tap, basic rhythms and syncopation, step sticks, and standard time steps; clarity of sound and rhythm.

Dnce 1311. International Folk Dance 1. (1 cr) Basic folk steps including the schottische, polka, waltz, and grapevine; technical emphasis on footwork and phrasing.

Dnce 1312. International Folk Dance 2. (1 cr. Prereq–1311, A) Continuation of 1311. Basic folk steps including the schottische, polka, waltz, and grapevine; technical emphasis on footwork and partnering.

Dnce 1313. African Based Movement. (1 cr) Varied movements 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 cr) Basic terminology and movement styles of Spanish Flamenco dance technique. Focuses on arm movements and footwork. Basic choreography. One class period is devoted to viewing videos of traditional Flamenco dance.


Dnce 1323. Swing Dance. (1 cr) Traditional swing dances popular in the United States from 1920s through early 1960s. Each week new movements/figures are taught and previous dances reviewed. Students are expected to change partners.

Dnce 1325. Latin Dance. (1 cr) Basic vocabulary, lead/follow techniques of most popular Latin social dance styles. Salsa, ChaCha, Rumba, Merengue. First half of class focuses on basic footwork/partnering; second half focuses on rhythm and musical styling.


Dnce 1349. Contact Improvisation. (1 cr) Safe, clear introduction to principles of contact improvisation. Reinforcement of point of contact, supporting/being supported, falling/recouping, connecting with center as source/support for movement. Classes include warm-up.

Dnce 1401. Introduction to Dance. (3 cr) Modern dance, ballet, and world dance, primarily in the 20th century. Dance forms, choreographers, and dance issues through lecture, discussion, and viewing of live and taped performance.

Dnce 1402. Dance History. (3 cr. Prereq–1401) “Ways of knowing” in dance history by reading the works of critics, historians, and philosophers who address questions concerning the nature of dance.

Dnce 1500. Topics in Dance. (1-3 cr [max 10 cr] Topics specified in Class Schedule.

Dnce 1601. Dance Improvisation. (1 cr; A-F only. Prereq–Concurrent registration in a modern dance technique course, A) 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 cr. Prereq–1002, 1102 or #) Elements of music theory, form, analysis, and history necessary for the potential dancer, choreographer, and musician to better understand each art.

Dnce 2203. Dance History. (2 cr [max 4 cr]. Prereq–A; audit registration not permitted) Application of principles of space, time, energy, Alignment, power from pelvic center, rotation/turnout, muscular tonality, joint articulation, clarity of intent, stretch, strength, stamina.

Dnce 3020. Modern Dance Technique 6. (2 cr [max 4 cr]. Prereq–3010 or A; audit registration not permitted) Continuation of 3010. Application of principles of space, time, energy, Alignment, power from pelvic center, rotation/turnout, muscular tonality, joint articulation, clarity of intent, stretch, strength, stamina.


Dnce 3210. Jazz Technique 5. (1 cr [max 2 cr. Prereq–A; audit registration not permitted) Continuation of jazz technique. Rhythm structures, longer phrases, greater physical speed, attack/control.

Dnce 3220. Jazz Technique 6. (1 cr [max 2 cr. Prereq–3210 or A; audit registration not permitted) Continuation of 3210. Jazz technique. Rhythm structures, longer phrases, greater physical speed, attack/control.

Dnce 3301. Tap Technique 3. (1 cr. Prereq–1302 or #) Tap techniques and creative development through improvisational traditions.

Dnce 3302. Tap Technique 4. (1 cr. Prereq–3301 or #) Tap techniques and rhythm structures.

Dnce 3337. Body Mind Centering. (2 cr) Improvisational movement explorations, hands-on re-patternning 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 3401. Dance History 1. (3 cr History/theory of dance in varied forms/aspects. From origins of dance as movement-form, through early Renaissance. First half of year-long survey.


Dnce 3433. Articulate Body. (3 cr Prereq–Dance major or minor, A) Lectures and movement sessions in bio-metabolic considerations for optimal dance performance and bio-metabolic demands of dance.

Dnce 3487. Ethnic Dance Traditions in American Society. (3 cr) Traditional dances as preserved and transformed by Native Americans, African-Americans, Latinos, Asian-Americans, and European-Americans in the United States. Interpretation of roles of dance in these cultures.

Dnce 3487W. Ethnic Dance Traditions in American Society. (3 cr) Traditional dances as preserved and transformed by Native Americans, African-Americans, Latinos, Asian-Americans, and European-Americans in the United States. Interpretation of roles of dance in these cultures.

Dnce 3488. Dance as Cultural Practice. (3 cr) Study of dance as art, ritual, social activity, and entertainment in selected cultures of Asia, Africa, Eastern Europe, the Middle East, and the Americas.
Dnce 3488W. Dance as Cultural Practice. (3 cr) Study of dance as art, ritual, social activity, and entertainment in selected cultures of Asia, Africa, Eastern Europe, the Middle East, and the Americas.

Dnce 3500. Topics in Dance. (1-2 cr [max 10 cr]) Topics specified in Class Schedule.

Dnce 3601. Dance Composition 1. (3 cr; Prereq–1020 or, concurrent regis in a modern dance technique course) Movement, vocabulary in relation to theme, space, time, energy, and body parts; solo, duet, and trio forms.

Dnce 3602. Dance Composition 2. (3 cr; Prereq–3601 or, concurrent regis in a modern dance technique course) Movement, vocabulary in relation to theme, space, time, energy, and body parts; solo, duet, and trio forms.

Dnce 3621. Dance Production I. (2 cr; A-F only. Prereq–Dance major, N) 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 cr; A-F only. Prereq–3621, dance major, C) Continuation of 3621. Students produce the spring Student Dance Concert.

Dnce 3700. Performance. (1 cr [max 4 cr]. Prereq–Concurrent regis in a technique class, audition, A) 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 4443. Philosophy and Aesthetics. (3 cr. Prereq–1401) Major developments in Western philosophic thought on dance and dance theory from its beginnings to the present.

Dnce 4454W. (Re)Writing the Dancing Body. (3 cr) Modes of verbal expression that best capture the meaning created by primarily non-verbal artistic forms. Chapters from text and issues are discussed/debated in class. Writing during every class period.

Dnce 4601. Dance Composition 3. (3 cr; Prereq–1020, concurrent regis in a modern dance technique course, A) Continuation of movement vocabulary through improvisation, analysis of form and structure, experimentation with tone and performance persona; effects of light/costumes/text/props/music; dance composition. Specific styles: swing, bebop, lyrical, funk, latin.


Dnce 4901. Senior Seminar. (2 cr; S-N only, Prereq–Sr, [Dnce or Th maj] or offered fall semester only) Development of senior project, alone or in groups, under guidance of faculty members.


Dnce 5500. Topics in Dance. (1-2 cr [max 10 cr]) Topics specified in Class Schedule.


Dnce 5700. Performance. (1 cr [max 4 cr. Prereq–Technique course, A) Technique, improvisation, choreography, music, design, and technical production as they relate to dance performance.

Dnce 5858. Teaching Dance. (4 cr. Prereq–1020, A or #) Methods, principles, and techniques of teaching dance.

Dnce 5970. Directed Studies. (1-4 cr [max 10 cr)] Guided individual study.


Dan 1002. Intermediate Danish. (3 cr; A-F only) Methods, principles, and techniques of teaching dance.

Dan 1003. Advanced Danish. (4 cr Prereq–Passing score on GPT) Discussion of novels, short stories, plays, articles complemented by structural, stylistic, vocabulary building exercises.

Dan 4001. Beginning Danish. (2 cr S-N only. Prereq–Passing score on GPT in another language or grad) Meets concurrently with Dan 1001; see Dan 1001 for course description. This option is designed for students who have satisfied the GPT requirements in another language or are graduate students or are otherwise exempt.

Dan 4002. Beginning Danish. (2 cr S-N only. Prereq–Passing score on GPT in another language or grad) Meets concurrently with Dan 1002; see Dan 1002 for description. This option is designed for students who have satisfied the GPT requirements in another language or are graduate students or are otherwise exempt.

Dan 4003. Intermediate Danish. (2 cr §1003. Prereq–Passing score on GPT in another language or grad) Meets concurrently with Dan 1003; see Dan 1003 for description. This option is designed for students who have satisfied the GPT requirements in another language or are graduate students or are otherwise exempt.

Dan 4004. Intermediate Danish. (2 cr §1004. Prereq–Passing score on GPT in another language or grad) Meets concurrently with Dan 1004; see Dan 1004 for description. This option is designed for students who have satisfied the GPT requirements in another language or are graduate students or are otherwise exempt.

Dental Hygiene (DH) Department of Preventive Sciences School of Dentistry DH 0001. Oral and Maxillofacial Radiology Preclinical Lab. (1 cr) Preclinical demonstration and participation phases in oral radiology using mounted human skills.

DH 1191. Dental Hygiene Care Process. (6 cr; A-F only §190) Assessment principles related to medical and oral health status, dental hygiene clinical procedures, and development of instrumentation and hypertension screening skills.

DH 1203. Dental Specialties. (2 cr; S-N only) Various dental specialties and the dental hygienist’s role in services provided.

DH 2111. Dental Anatomy. (2 cr; A-F only) All deciduous and permanent teeth, including tooth form, function and relationship to oral health; calcification, eruption and exfoliation patterns; ideal static occlusion, dental terminology, and tooth annotation systems. Lab experiences include identification and annotation of teeth and restoration, in wax, of portions of a typodont tooth.

DH 2121. The Dental Hygiene Care Process Clinical Application I. (5 cr; A-F only) 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 cr; A-F only) Anatomical structures of the head and neck as they relate to the practice of dental hygiene.

DH 2191. Independent Study. (0-6 cr [max 6 cr]) Individually arranged study, instruction, or research with faculty to meet student needs and interests.

DH 2211. Oral Histology and Embryology. (2 cr; A-F only) Study of the application of pathophysiologic to specific organ systems and disorders by the mouth. Emphasis on the identification and management of selected oral conditions.
DH 2212. Dental Hygienist-Patient Relationship. (1 cr; A-F only)
Use of clinical research and evidence-based clinical decision making when communicating scientifically based clinical therapy and treatment modalities; promotion of active participation by patient in clinical decision making.

DH 2221. Periodontology. (3 cr; A-F only)
Periodontal diseases; etiology, assessment and treatment options. Clinical experience in debridement, root planing, and placing periodontal dressings.

DH 2222. The Dental Hygiene Care Process Clinical Application II. (1-4 cr; A-F only)

DH 2231. Cariology. (2 cr; A-F only)
Dental caries; etiology, pathology, and prevention.

DH 2235. Oral and Maxillofacial Radiology. (2 cr; A-F only)
General principles of radiology; radiation physics, dosimetry, radiation protection, regulations and recent concepts of imaging.

DH 3111. Biomaterials for the Dental Hygienist. (3 cr; A-F only)
Physical, chemical, and mechanical properties; indications and contraindications for use; manipulation of techniques; biological considerations of materials used in dentistry; dental specialties.

DH 3112. General and Oral Pathology. (2 cr; A-F only)
Circulatory disturbances, inflammation, and tumors with emphasis on diseases affecting the oral cavity, dental caries, periodontal diseases, oral neoplasias, and similar problems.

DH 3123. The Dental Hygiene Care Process Clinical Application III. (1-4 cr; A-F only)
Dental hygiene treatment planning, alternative instruments and advanced skills related to the implementation of dental hygiene care. Clinical experience in dental hygiene patient care and dental dietary counseling.

DH 3126. Oral and Maxillofacial Radiology Clinic I. (0 cr; A-F only)
Exposing patient radiographs, interpretation, panoramic and extraoral technique, and quality assurance procedures.

DH 3131. Periodontology I Lecture. (1 cr; A-F only)
Periodontal anatomy; physiology and etiology of periodontal diseases. Clinical, histopathological, and pathogenesis of gingivitis and periodontitis, as well as the role of microorganisms, endotoxins, and systemic disorders. Preventive and therapeutic procedures associated with diagnosis, prognosis, treatment planning and initial phase of periodontal therapy.

DH 3132. Applied Nutrition in Dental Hygiene Care. (2 cr; A-F only)
Principles of diet and nutrition applied to dental hygiene patient care; skills in dental dietary counseling.

DH 3133. Pharmacology. (2 cr; A-F only. Prereq–#)
Principles of pharmacology; physical/chemical properties of drugs, modes of administration, therapeutic/adverse effects, drug actions/interactions.

DH 3134. Dental Hygiene Care for Special Needs Patients I. (2 cr; A-F only)
Knowledge, skills, and attitudes required for providing dental hygiene care for pediatric, orthodontic and geriatric patients and individuals with disabilities.

DH 3135. Oral and Maxillofacial Radiology: Theory, Principles, and Radiographic Analysis. (2 cr; A-F only)
Atomic radiations; characteristics, production, and control of radiographs; radiographic exposures; recent concepts; radiation biology, dosimetry, protection, and regulations. Discrepancies and technical errors in intraoral radiographs; radiographic anatomy; radiographic evidence of deviations from normal anatomic variations.

DH 3191. Independent Study. (0-4 cr [max 6 cr])
Individually arranged study, instruction, or research with faculty to meet student needs and interests.

DH 3203. Dental Hygiene Care for Special Needs Patients I. (2 cr; A-F only)
Knowledge, skills, and attitudes required for providing dental hygiene care for pediatric, orthodontic and geriatric patients and individuals with disabilities.

DH 3221. Local Anesthesia and Pain Management. (2 cr; A-F only)

DH 3224W. The Dental Hygiene Care Process Clinical Application IV. (1-4 cr; A-F only)

DH 3225. Extramural Clinical Dental Hygiene. (0-6 cr; S-N only. Prereq–#)
Students participate in educational/clinical experiences with diverse patient populations in community outreach clinics.

DH 3226. Extramural Clinical Dental Hygiene. (0-6 cr; A-F only)
Students participate in educational/clinical experiences with migrant worker health care program.

DH 3227. Oral and Maxillofacial Radiology Clinic II. (0 cr; A-F only)
Exposing patient radiographs, interpretation, panoramic and extraoral technique, and quality assurance procedures.

DH 3231W. The Dental Hygiene Care Process Clinical Application III. (1-6 cr; A-F only)
Develop skills in scientific method and analyzing research findings; emphasis on types of research, problem selection, hypothesis writing, research planning and design, data collection and measuring techniques, analysis and interpretation of data, and writing the research proposal.

DH 3235. Dental Hygiene Care for Special Needs Patients II. (2 cr; A-F only)
Knowledge, skills, and attitudes required for providing dental hygiene care for pediatric, orthodontic and geriatric patients and individuals with disabilities.

DH 4125W. The Dental Hygiene Care Process Clinical Application VI. (1-5 cr; A-F only)
Adapt dental hygiene care process to meet preventive and treatment needs of traditional and special needs patients. Analyze patient preventive and treatment need through case presentation. Discuss community service, cultural diversity, and family violence issues as well as new products, techniques, and research.

DH 4127. Oral and Maxillofacial Radiology Clinic IV. (3 cr; A-F only)
Exposing patient radiographs, interpretation, panoramic and extraoral technique, and quality assurance procedures.

DH 4131. Epidemiology, Prevention, Dental Public Health, and Community Outreach. (3 cr; A-F only)
Epidemiological methods of investigation and patterns of oral diseases; scope and content of the specialty of dental public health; public health process as related to community setting.

DH 4132W. Ethics, Jurisprudence, and Principles of Practice. (2 cr; A-F only)
Career planning, team building, employment seeking, jurisprudence, and ethical decision making.

DH 4137. Patient Management IV (PCG). (1 cr; A-F only)
Small-group, cooperative learning setting integrates dental and dental hygiene students. Apply patient care skills taught in other courses. Focus is on communication skills, patient management, teamwork, collegiality, and practice philosophy.

DH 4139. Independent Study. (0-6 cr [max 6 cr])
Individually arranged study, instruction, or research with faculty to meet student needs and interests.

DH 4226. The Dental Hygiene Care Process Clinical Application VI. (1-5 cr; A-F only)
Development of skills in sonic/ultrasonic scaling/assessment, treatment planning, documentation, implementation/evaluation of dental hygiene care.

DH 4228. Advanced Dental Hygiene Clinical Experience II. (0-5 cr)
Development of skills in sonic/ultrasonic scaling/assessment, treatment planning, documentation, implementation/evaluation of dental hygiene care.

DH 4229. Oral and Maxillofacial Radiology Clinic IV. (3 cr; A-F only)
Exposing patient radiographs, interpretation, panoramic and extraoral technique, and quality assurance procedures.

DH 4231. Periodontology III Lecture. (1 cr; A-F only)
Clinical procedures associated with surgical phase of periodontal therapy. Emphasis on evaluation of periodontal treatment as well as the maintenance phase and the relationship between periodontics and other dentistry disciplines. Roles of clinical research in periodontics.

DH 4232. Community Outreach. (1 cr; S-N only)
Dental hygiene education in a variety of community settings.

DH 4233. Legislative, Social, Economic, and Practice Factors in Oral Health. (2 cr; A-F only)
Current status and trends in dentistry in relation to health care promotion, regulation, and delivery and political and legislative process.

DH 4238. Patient Management IV (PCG). (1 cr; A-F only)
Small-group, cooperative learning setting integrates dental and dental hygiene students. Apply patient care skills taught in other courses. Focus is on communication skills, patient management, teamwork, collegiality, and practice philosophy.

DH 4241. Extramural Clinical Dental Hygiene. (0-6 cr [max 6 cr]; A-F only. Prereq–#)
Students participate in educational/clinical experiences with diverse patient populations in community outreach clinics.

DH 4242. Extramural Clinical Dental Hygiene. (0-6 cr; A-F only. Prereq–#)
Students participate in educational/clinical experiences with Jamaica Mission Program.

DH 4250. Dental Hygiene Community Outreach Elective. (0-8 cr; S-N only)
Individually arranged dental hygiene clinical experience in community outreach clinics.

DH 4292. Educational Philosophy and Program Planning. (0-4 cr)
Program planning based on self and faculty assessment; building knowledge and skills to become a self-directed and lifelong learner.

DH 4293. Directed Study. (0-4 cr)
Individual and/or group study on selected topics, and/or problems, with emphasis on selected readings and use of scientific literature. Arranged by student(s) and faculty member(s).
Design, Housing, and Apparel (DHA)

Department of Design, Housing, and Apparel
College of Human Ecology

DHA 1101W. Introduction to Design Thinking. (4 cr; A-F only)
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.

DHA 1170. Special Topics in Design, Housing, and Apparel. (1-4 cr; max 16 cr; A-F only)
In-depth investigation of specific topic, announced in advance.

DHA 171. Freshman Seminar in Design, Housing, and Apparel. (1-3 cr; A-F only. Prereq-Fr) Topic in design, housing, or apparel. Small-group seminar.

DHA 1201. Clothing Design, Merchandising, and the Consumer. (3 cr; A-F only)
An orientation to the apparel business covering the multiple steps in the process of creating and merchandising apparel, and the ethical positions reflected in decision making at each step.

DHA 1221. Clothing Assembly Fundamentals. (3 cr; A-F only. Prereq—Prep-clothing design major or #) Methods/applications of clothing assembly, from micro to macro perspective.

DHA 1311. Foundations: Drawing and Design in Two and Three Dimensions. (4 cr; A-F only. Prereq—DHA major or premajor)
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.

DHA 1312. Foundations: Color and Design in Two and Three Dimensions. (4 cr; A-F only. Prereq—DHA major or premajor)
Color theory and its application in two- and three-dimensional design. Emphasizes effective use of color by studying traditional color systems, perception, and interaction. Lectures, demonstrations, extensive studio work, critiques.

DHA 1315. Foundations: The Graphic Studio. (4 cr; A-F only. Prereq—DHA major or premajor or #)

DHA 1601. Interior Design Studio I. (4 cr; A-F only. Prereq—DHA pre-major)
Theories used to solve interior design problems related to human behavior. Design process. Communication skills that are required for interior design profession.

DHA 1602. Interior Design Studio II. (4 cr; A-F only. Prereq—DHA pre-major), 1601 with grade of at least C)
Introduction to interior design programming as method for understanding behaviors/requirements of humans in space. Use of color in three-dimensional environments. Developing communication skills. Problem-solving.

DHA 2211. Illustration for Clothing Design. (2 cr; A-F only)
Development of illustration skills specific to garments/textiles. Exploration of various traditional media/CAD applications. Critique/analysis of visual communication of clothing design concepts.

DHA 2213. Textile Analysis. (4 cr; A-F only)
Physical, chemical, and biological characteristics of fibers, yarns, textile structures, and finishes. Their effect on performance/appearance of textile products, including clothing, interior, and industrial textiles.

DHA 2214. Softlines Analysis. (3 cr; A-F only. Prereq—1201, 2213)
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.

DHA 2221. Clothing Design Studio I. (4 cr; A-F only. Prereq—[1201 or pass sewing proficiency exam], 1221, 1311, 1312, DHA major or pre-major)
Theories/methods in designing clothing for various user groups. Relation of a 2-dimensional pattern shape to a 3-dimensional body. Introduction to flat-pattern draping.

DHA 2222. Clothing Design Studio II. (4 cr; A-F only. Prereq—one of DHA major, pass portfolio review) Design process in developing clothing for a specific user group. Advanced principles/methods of developing patterns for the body, including advanced flat pattern, draping, fitting. Computer-aided design tools for illustration, patternmaking.

DHA 2311. Drawing and Illustration. (3 cr; A-F only. Prereq—1311, 1312, [DHA major or premajor])
Advanced drawing skills. Illustration concepts/techniques. Illustration assignments for concepts, stories, and ideas.

DHA 2334. Computer Applications I: Digital Composition for Design. (3 cr; A-F only. Prereq—DHA major or pre-major), 1311, 1312, 1315)
Composition of visual elements in electronic realm. Use of computer to design for traditional media, digital environments.

DHA 2345. Typographic Design. (3 cr; A-F only. Prereq—DHA major, pass portfolio review) History of typographic forms, principles of composition, expressive potential of type. Design process from problem-solving through exploration, experimental work, critique, and refinement. Readings, research, exercises, design production.

DHA 2351. Graphic Design I: Text and Image. (3 cr; A-F only. Prereq—2345, DHA major, pass portfolio review) Composition of visual information using grid structures to integrate text/image. Informational/expressive aspects of graphic design, hierarchical relationships of text elements. Methods of text layout that enhance communication.


DHA 2401. Introduction to Housing. (3 cr; A-F only. Prereq—1101 or #)
Physical, social, economic, psychological aspects of housing design/construction. Housing as product/services in context of the individual, the family, the community. Effects of federal, state, local governmental policies, economic trends.

DHA 2402. Residential Technology. (3 cr; A-F only. Prereq—1101 or #1101)
Survey of technological systems in housing with emphasis on the consumption and conservation of natural resources and energy sources, and human factor considerations in kitchen design.

DHA 2463. Housing and Community Development. (3 cr; A-F only. Prereq—1602 with grade of at least C, pass portfolio review, DHA major)
Expanding presentation skills, visual communication of design process. Design of interior environment as influenced by neighborhood, adjacent structures, regional context, diverse cultures.

DHA 2604. Interior Design Studio IV. (4 cr; A-F only. Prereq—1602 with grade of at least C, pass portfolio review, DHA major)

DHA 2613. Lighting Design and Building Systems. (4 cr; A-F only. Prereq—DHA major, pass portfolio review or #)
Elements/principles of design merged with functional/aesthetic/human aspects of lighting. Applications/types of lighting technology to solve design problems for interior spaces. Interface of electrical, HVAC, and plumbing systems in buildings.

DHA 2621. Computer Aided Design: Interior Design. (4 cr; A-F only. Prereq—DHA major, pass portfolio review or #)
Application of two- and three-dimensional computer drawing in design/visualization of interior space. AutoCAD software used on Windows-based system.

DHA 3217. Fashion: Trends and Visual Analysis. (3 cr; A-F only. Prereq—2213, 2214)
Relation of fashion trends to visual analysis of apparel. Application to design/retail.

DHA 3223. Clothing Design Studio III. (4 cr; A-F only. Prereq—DHA major, pass portfolio review or #)
Study tailored/non-tailored clothing structures. Experiment with various materials/structures using traditional/finnovative methods. Basic principles of manipulating materials/textures applied to series of garments.

DHA 3224. Clothing Design Studio IV. (4 cr; A-F only. Prereq—3223, DHA major)
Principles/theory of functional clothing design. Conduct/apply research in designing clothing for situations requiring thermal or impact protection, accommodation for mobility, or facilitation for bodily function.
Course Descriptions

DHA 3243. Visual Merchandising. (3 cr; A-F only. Prereq—1101, 1201) Study of the retail store environment to address the physical and psychological effects that initiate and motivate consumers’ behavior. Aspects of merchandise display include creativity, department layout, fixtures, lighting, cross merchandising, visual resolution, signs, and maintenance.

DHA 3245. Nonstore Retailing. (3 cr; A-F only. Prereq—1201) An overview of nonstore retailing practices that utilize selling strategies other than those found in store formats.

DHA 3312. Color and Form in Surface Design. (3 cr; A-F only. Prereq—DHA major, pass portfolio review) Use of color/form representation in two-dimensional and three-dimensional surface applications. Historical use of color and of spatial representation in visual communication.

DHA 3352. Graphic Design II: Identity and Symbols. (3 cr; A-F only. Prereq—2351, DHA major) Representation of abstract ideas through symbols. Development of visual identity systems.

DHA 3353. Graphic Design III: Packaging and Display. (3 cr; A-F only. Prereq—3352 or 3335, DHA major) Application of graphic design principles to three-dimensional projects. Principles of three-dimensional design/space applied to labeling/packaging.

DHA 3605. Interior Design Studio V. (4 cr; A-F only. Prereq—2604 with grade of at least C, DHA major) Advanced interior design problems dealing with small to medium scale spaces. Emphasizes special-needs populations.

DHA 3606. Interior Design Studio VI. (4 cr; A-F only. Prereq—3605 with grade of at least C, DHA major) Advanced interior design problems dealing with large-scale spaces. Emphasizes environmental concerns.

DHA 3614. Interior Design Ethics and Professional Practice. (4 cr; A-F only. Prereq—2604–2606, pass portfolio review) The business of interior design, professional ethics, and responsible design are emphasized. Students investigate their responsibility to their business, clients, colleagues, and the community at large. Professional portfolios and credentials will be discussed.

DHA 4001. Design Minor Seminar. (1 cr; A-F only. Prereq—Design minor) Students share ideas/conclusions with one another, create a summary statement (e.g., document, multimedia display, designed object) of a significant learning insight.

DHA 4121. History of Costume. (4 cr; A-F only. Prereq—General art history course, jr or sr or grad student) Survey of clothing/appareances 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.

DHA 4131. History of Visual Communication. (4 cr; A-F only. Prereq—Intro history or art history course) Historical analysis of visual communication with an emphasis on the technological, cultural, and aesthetic influences on graphic design. Examination of how historical events are communicated and perceived through graphic presentation and imagery.

DHA 4161. History of Interiors and Furnishings: Ancient to 1750. (4 cr; A-F only. Prereq—Arch history course or Jr) Study of European and American interiors and furnishings including furniture, textiles, and decorative objects.

DHA 4162. History of Interiors and Furnishings: 1750 to Present. (4 cr; A-F only. Prereq—4161 or Jr) Study of European and American interiors and furnishings including furniture, textiles, and decorative objects.

DHA 4196. Internship in DHA. (1-4 cr; S-N only. Prereq—Completion of at least one-half of professional sequence, pass portfolio review) Supervised work experience relating activity in business, industry, or government to the student’s area of study. Integrative paper/project may be required.

DHA 4212W. Dress, Society, and Culture. (3 cr; A-F only. Prereq—[1101, jr] or grad student) Contemporary dress from diverse cultures within/outside USA analyzed using social science concepts. Dress as a nonverbal communication system.

DHA 4215. Product Development: Softlines. (4 cr; A-F only. Prereq—2213 or clothing design major or retail merchandising major or grad student or Jr) Product development for apparel and other sewn products. Developing products in a laboratory studio setting for effectiveness, reliability, and marketability. Team approach using merchandising and design principles to develop products for specific markets.

DHA 4217. International Developments in Textiles and Apparel. (4 cr; A-F only. Prereq—2213, DHA major) Market research information/implementation. Designing for specific audience, market, user group. Applying market research to design line of clothing. Research of promotional methods for design project.


DHA 4241. Retail Promotion. (3 cr; A-F only. Prereq—1201, Mktg 3001 or equiv, Jr or sr) Integration of communication/consumer behavior theories with elements of retail promotion. Advertising, sales promotions, point-of-purchase communications, personal selling.

DHA 4242. Retail Buying. (3 cr; A-F only. Prereq—1201, Math 1031, Jr or sr) Principles/mathematics of merchandise inventory control, merchandise selection.

DHA 4330. Surface Fabric Design Workshop. (4 cr [max 8 cr]; A-F only) Studio experience in the development and production of surface design. Screen printing, batik, resist dyeing, shibori, cyanotypes, and dye transfers are included.

DHA 4334. Computer Applications II: Design for the Digital Environment. (3 cr; A-F only. Prereq—[2334 or #], DHA major or grad student, pass portfolio review) Design of visual communication for electronic environments. Use of software to manipulate/create digital images/animation. Sound/video input combined with graphic images.

DHA 4340. Woven, Knit, and Non-Woven Fiber Design Workshop. (4 cr [max 8 cr]; A-F only) Studio experiences in the development and production of woven, knit, and non-woven fiber projects. Explore several design methods and complete a major project using one of the structure techniques.

DHA 4345. Advanced Typographic Design. (4 cr; A-F only. Prereq—3352, DHA major or grad student) Expressive visual composition of words. Fundamental legibility of ‘the invisible art,’ overt expression through type. Students complete extended typographic project.

DHA 4351. Design Process: Photography. (3 cr; A-F only. Prereq—[DHA major or grad student], pass portfolio review) Relationship between photography, design projects. Composition, developing of film, printing.

DHA 4352. Design Process: Bookmaking. (3 cr; A-F only. Prereq—[DHA major or grad student], pass portfolio review) Construction of traditional/non-traditional book forms. Emphasizes material aspects of handmade books.

DHA 4354. Graphic Design IV: Integrative Campaign. (4 cr; A-F only. Prereq—3353, DHA major) Multifaceted graphic communication campaign project involving substantial investigation and conceptual development. Project supports a unified concept for an identified client and is aimed at a specific market or interest group.

DHA 4355. Graphic Design Portfolio. (2 cr; S-N only. Prereq—4354 or 4365, DHA major) Preparation of professional portfolio. Discussion of professional issues.

DHA 4365W. Graphic Design Senior Seminar. (4 cr; A-F only. Prereq—4354, DHA major) Students complete senior research/design project involving social, conceptual, and technical aspects. Capstone course.

DHA 4384. Interactive Media. (3 cr; A-F only. Prereq—[4334 or #], DHA major or grad student) Design of interactive multi-media projects. Experience developing interactive presentations and electronic publishing. Software includes hypermedia, scripting, video/sound editing, animation, digital output.

DHA 4461. Multifamily Housing Management. (4 cr; A-F only. Prereq—[2401, 2402, 2463] or #) Multifamily housing development, management approaches, psychosocial impact of housing/community design. Management issues with specific populations (e.g., elderly, families with children). Students conduct post-occupancy evaluation of a housing complex.

DHA 4465. Housing in a Global Perspective. (3 cr; A-F only. Prereq—[2401, 2463] or #) Housing, its relationship to global patterns of social/economic development examined in comparative framework. Emphasizes housing low income populations in rapidly growing cities of developing countries.

DHA 4482. Residential Environmental Quality. (3 cr; A-F only. Prereq—[2402 or #]) Analysis of the residential environment and factors contributing to the degradation of environmental quality and human health. Relationship between the natural environment and human behavior and their influences on environmental quality in housing.

DHA 4607. Interior Design Studio VII. (4 cr; A-F only. Prereq—[3606 with grade of at least C, 3614, DHA major] Sense of place. Contribution of artifacts to interior environments. Historic precedent, adaptive use, renovation, universal design projects.

DHA 4608W. Interior Design Thesis. (6 cr; A-F only. Prereq—[3607 with grade of at least C, DHA major] Current issues that affect interior design research/practice. Methods for programming/solutions. Comprehensive independent interior design project developed from student-conducted research.

DHA 5111. History of Decorative Arts. (4 cr; A-F only. Prereq—General art history survey course or #) In-depth study of textiles, ceramics, metal, and glass from selected historical periods. Focus on the Goldstein Gallery collections.

DHA 5170. Special Topics in Design, Housing, and Apparel. (1-4 cr; max 8 cr; A-F only. Prereq—Depends on topic, check with dept) In-depth investigation of a single specific topic, announced in advance.

For definitions of course numbers, symbols, and abbreviations, see page 296.
DHA 5193. Directed Study in Design, Housing, and Apparel. (1-4 cr; A-F only. Prereq–#) Faculty-directed field study in a national or international setting.

DHA 5196. Field Study: National/International. (1-10 cr [max 10 cr]; A-F only. Prereq–#) Faculty-directed field study in a national or international setting.

DHA 5216. Textile and Apparel Consumer. (3 cr; A-F only. Prereq–[2101, 2123] or #, Mktg 4040, Jr or Sr or grad student) Consumer actions concerning textile/clothing products for home and other physical interiors. Personal use as part of daily living in different social, economic, and cultural settings, nationally and internationally.

DHA 5381. Digital Illustration. (3 cr; A-F only. Prereq–4334, [DHA major or grad student]) Integration of design with computer applications. Use of raster-vector-based programs for illustration.

DHA 5382. Digital Sound and Video. (3 cr; A-F only. Prereq–[4334, [DHA major or grad student]]) or Design solutions involving time-based media. Emphasizes sound/video. Electronic publishing via Internet.

DHA 5383. Animation Design. (3 cr; A-F only. Prereq–[4334, [DHA major or grad student]]) or Designing interactive presentations (using various operating systems) for Internet/Web. Electronic publishing. Development of internet-based communication.

DHA 5388. Design Planning, Analysis, and Evaluation. (3 cr; A-F only. Prereq–[4354, DHA major] or grad or #) Preliminary research, including theoretical, applied, and legal aspects. Planning/developmental models. Design prototyping, testing, and analysis.

DHA 5399W. Theory of Electronic Design. (3 cr; A-F only. Prereq–[4334, [DHA major or grad student]]) or Designing interactive presentations (using various operating systems) for Internet/Web. Electronic publishing. Development of internet-based communication.

DHA 5463. Housing Policy. (3 cr; A-F only. Prereq–2401 or #) Emphasis on understanding of the design, its impact on visual communications. Digital theories, methodologies, histories of electronic design, its impact on visual communications. Digital artifacts, processes, paradigms.

DHA 5464. Housing Policy. (3 cr; A-F only. Prereq–2401, 2463 or #) Emphasis on institutional and environmental settings that make up housing policy in the United States. Examining competing ideas about solving the nation’s housing problems through public intervention in the market. Federal and local public sector responses to housing problems will be evaluated.

DHA 5467W. Housing and the Social Environment. (3 cr; A-F only. Prereq–2401 or #) Housing choices are explored in the context of the social environment with an emphasis on the special needs of the elderly, disabled, minorities, large families, female-headed households, and low-income households.

DHA 5481. Housing for the Elderly and Special Populations. (3 cr; A-F only. Prereq–2401 or #) An introduction to the changing housing needs of individuals and families across the life span. Particular emphasis will be on housing needs of children, older adults, and persons with disabilities.

DHA 5484. Rural Housing Issues. (3 cr; A-F only. Prereq–2401, 2463 or #) Housing issues in nonmetropolitan areas. The housing concerns of specific rural populations (e.g., low income, elderly persons, American Indians, migrant workers) are identified and comparisons with urban housing issues are made.

**Dutch (Dutch)**

**Department of German, Scandinavian, and Dutch**

**College of Liberal Arts**

Dutch 1001. Beginning Dutch. (5 cr) 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.).

Dutch 1002. Beginning Dutch. (5 cr. Prereq–1001) 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.

Dutch 1003. Intermediate Dutch. (5 cr. Prereq–1002) Emphasis on intermediate proficiency in listening, reading, speaking, and writing. Contextualized work on grammar and vocabulary is combined with authentic readings and essay assignments.

Dutch 1004. Intermediate Dutch. (5 cr. Prereq–1003) 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.

Dutch 3011. Conversation and Composition. (4 cr. Prereq–Passing score on GPT or #) Further practice and refinement of spoken and written Dutch beyond the intermediate level; development of compositional skills and vocabulary based on the reading, viewing, and discussion of relevant Dutch and Flemish media reports. Grammar review and development of critical corrective grammatical skills.

Dutch 3012. Conversation and Composition. (4 cr. Prereq–3011) Further practice and refinement of spoken and written Dutch beyond the intermediate level; development of compositional skills and vocabulary based on the reading, viewing, and discussion of relevant Dutch and Flemish media reports. Grammar review and development of critical corrective grammatical skills.

Dutch 3310. Studies in Dutch Literature. (3 cr [max 9 cr]. Prereq–Reading knowledge of Dutch) 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.

Dutch 3510. Topics in Dutch Culture. (3 cr [max 9 cr]. Prereq–Knowledge of Dutch required) 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.

Dutch 3610. Dutch Literature in Translation. (3 cr [max 9 cr]. Prereq–Knowledge of Dutch required) An in-depth study of authors or topics from various periods in Dutch literature. All primary/secondary literature is read in English translation.

Dutch 3993. Directed Studies. (1-5 cr [max 12 cr]. Prereq–A, A-L) Guided reading in or study of Dutch literature, culture, or advanced language skills.

Dutch 4001. Beginning Dutch. (2 cr. §1001. Prereq–Passing score on GPT in another language or grad) Meets concurrently with Dutch 1001; see Dutch 1001 for description. This option is designed for students who have satisfied the GPT requirements in another language or are graduate students or are otherwise exempt.

Dutch 4002. Beginning Dutch. (2 cr. §1002. Prereq–Passing score on GPT in another language or grad) Meets concurrently with Dutch 1002; see Dutch 1002 for description. This option is designed for students who have satisfied the GPT requirements in another language or are graduate students or are otherwise exempt.

Dutch 4003. Intermediate Dutch. (2 cr. §1003. Prereq–Passing score on GPT in another language or grad) Meets concurrently with Dutch 1003; see Dutch 1003 for description. This option is designed for students who have satisfied the GPT requirements in another language or are graduate students or are otherwise exempt.

Dutch 4004. Intermediate Dutch. (2 cr. §1004. Prereq–Passing score on GPT in another language or grad) Meets concurrently with Dutch 1004; see Dutch 1004 for description. This option is designed for students who have satisfied the GPT requirements in another language or are graduate students or are otherwise exempt.

Dutch 5490. Topics in Dutch Literature. (3 cr [max 9 cr]) Topic may focus on a specific author, group of authors, genre, period, or subject matter. Topics specified in Class Schedule.

Dutch 5741. Medieval and Early Modern Dutch. (3 cr) Introduction to the linguistic aspects of medieval and early modern Dutch. Reading and analysis of representative literary texts from the Dutch Middle Ages to 1700.


**East Asian Studies (EAS)**

**Institute of International Studies**

**College of Liberal Arts**


EAS 3013. Introduction to East Asian Art. (3 cr) Introduction to the linguistic aspects of medieval and early modern Dutch. Reading and analysis of representative literary texts from the Dutch Middle Ages to 1700.

EAS 3211. Geography of East Asia. (3 cr) Introduction to the linguistic aspects of medieval and early modern Dutch. Reading and analysis of representative literary texts from the Dutch Middle Ages to 1700.

EAS 3461. Introduction to East Asia I: The Imperial Age. (4 cr. §1501) 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 3464. China in the Song, Yuan, and Ming Dynasties. (3 cr. §1510) China during the Song (977-1279), Yuan (1279-1368) and Ming (1368-1644) dynasties, political institutions and social structures. Attention to primary sources and how historians ask and answer questions about the past.

EAS 3465W. China in the Ming and Qing Dynasties. (3 cr. §1515) The political and social history of China from about 1600 until the end of the Qing dynasty in 1911. Topics include ethnicity, daily life, legal structures, city life, and peasantry.
Course Descriptions

EAS 4676W. State and Revolution in Modern China. (3 cr; §Hist 3476)
Modern China's political evolution including the Taiping Rebellion, Republican Revolution, rise of Nationalist and Communist parties, Maoist era; reform under Deng Xiaoping, and the emergence of democracy in Taiwan.

EAS 4688W. Social Change in Modern China. (3 cr; §Hist 3478)
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. 20th-Century Japan: 1910s to 1990s. (3. cr; §Hist 3471)

EAS 3472. Early Modern Japan. (3 cr; §Hist 3472)

EAS 3473. Family, School, and Work in Modern Japanese History. (3. cr; §Hist 3473)
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 3474. The Rise of Modern Japan: 1850s to 1900s. (3 cr; S-N only. §Hist 3474)
The Meiji Revolution from Commodore Perry to the eve of World War II; origins of constitutional monarchy, industrial economy, Western influences, and modern cultural change.

EAS 3661. Japanese Society Today. (3 cr; A-F only. §Hist 3661)
A-F only. §Hist 3661. Prereq-Soc 1001 or courses on East Asia or experience in East Asia or #)
Major aspects of Japanese society. Forms of social relations and values, religion, childhood, family, community, education, work, business organization, politics, social classes, crime and deviance, police, popular culture, status of women and minorities, social protest movements, and international relations.

EAS 3671. Contemporary Chinese Society: Mainland China, Hong Kong, Taiwan. (3 cr; A-F only. §Geo 3671, §Hist 3671. Prereq-Geog 1301 or Soc 1001 or equiv in other social sciences or humanities or #)
Chinese society and culture, with focus on post-1949 mainland China, Taiwan, and Hong Kong. Chinese family, dating and marriage, rural and urban societies, population, work and occupation, socioeconomic development and inequalities, and impacts of post-1978 reforms.

EAS 3940. Topics in Asian History. (1-4 cr; max 16 cr).
Prereq-Jr or sr or #)
Selected topics in Asian history not covered in regular courses.

EAS 4457. Politics and Market in Contemporary Japan. (3 cr; §Pol 4457. Prereq-Pol 1054 or 3051 or non-pol sci grad or #)
Study how Japan combined rapid economic development and relative social stability in the postwar period and the problems Japan faces in today's "globalized" world. Focus on major economic and political actors including bureaucracy, business and labor, and the role of political and economic institutions. Assess strengths and weaknesses of the Japanese-style of Capitalism.

EAS 4473. Chinese Politics. (3-4 cr; §Pol 4473)
Focuses on fundamental conflicts in Chinese society; the democracy movement, human rights, class divisions, gender struggles, environmental issues, and capitalist vs. socialist development strategies. Secondary topics include Chinese foreign relations and domestic and foreign political issues in Taiwan.

EAS 4662. Comparative East Asian Development: A New Mode for Growth and Prosperity? (3-4 cr; §Soc 4662. Prereq-3661 or related Asian or sociology courses or East Asian experience or #)
Social and cultural reasons for the rapid growth and relative equity of Japan, South Korea, Taiwan, Hong Kong, Singapore and more recently, China. Relation of these examples to more general theories of development.

EAS 5940. Topics in Asian History. (1-4 cr; max 16 cr).
Prereq-Grad or #)
Selected topics such as cultural, economic, intellectual, political, and social history.

Ecology, Evolution, and Behavior (EEB)

Department of Ecology, Evolution, and Behavior College of Biological Sciences

EEB 1019. Our Changing Planet. (4 cr; Prereq-Sect 1019, §Geo 1019)
Interdisciplinary study of Earth as a set of interacting, evolving systems—solid earth, oceans, atmosphere, and biosphere—and its relationship with the sun and stars. Cycling of matter and energy in Earth systems, their equilibria, and the effect of natural and human perturbations.

EAS 3468W. Social Change in Modern China. (3 cr; §Hist 3468)
Interdisciplinary study of China's social and economic development and relative social stability in the postwar period and the problems China faces in today's "globalized" world. Focus on major economic and political actors including bureaucracy, business and labor, and the role of political and economic institutions. Assess strengths and weaknesses of the Chinese-style of Capitalism.

EAS 4662. Comparative East Asian Development: A New Mode for Growth and Prosperity? (3-4 cr; §Soc 4662. Prereq-3661 or related Asian or sociology courses or East Asian experience or #)
Social and cultural reasons for the rapid growth and relative equity of Japan, South Korea, Taiwan, Hong Kong, Singapore and more recently, China. Relation of these examples to more general theories of development.

EAS 5940. Topics in Asian History. (1-4 cr; max 16 cr).
Prereq-Grad or #)
Selected topics such as cultural, economic, intellectual, political, and social history.

EEB 4014W. Ecology of Vegetation. (3 cr; Prereq-Biol 3407. Prereq-Grad or #)

EEB 3361. Visions of Nature: The Natural World and Political Thought. (4 cr; §CSCL 3361; Prereq-Soph or jr or sr; biological sciences students may not apply these credits toward the major)
Basic concepts in ecology. Organization, development, function of ecosystem. Population numbers of species within ecosystems; effects of human-induced global changes on the functioning of ecosystems.

EEB 4016W. Ecological Biogeography. (3 cr; Prereq-Biol 3407)
Evolutionary and biogeographic history of mammal. 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 4014W. Ecology of Vegetation. (3 cr; Prereq-Biol 3407)
Methods of describing, sampling, classifying vegetation. Spatial/temporal variation of vegetation, ecosystem properties on landscapes. Theory of structure/dynamics of ecosystems, community, and ecosystems. Analysis of quantitative data. Field trips to local ecosystem types.

EEB 4793W. Directed Studies: Writing Intensive. (1-7 cr; max 7 cr; S-N only. Prereq-Grad or #)
Individual study on selected topics or problems. Emphasizes readings, use of scientific literature. Written report.

EEB 4794W. Directed Research: Writing Intensive. (1-7 cr; max 7 cr; S-N only. Prereq-Grad or #)
Laboratory or field investigation of selected areas of research, including written report.

EEB 4793W. Directed Studies: Writing Intensive. (1-7 cr; max 7 cr; S-N only. Prereq-Grad or #)
Individual study on selected topics or problems. Emphasizes readings, use of scientific literature. Written report.

Eeb 4794W. Directed Research: Writing Intensive. (1-7 cr; max 7 cr; S-N only. Prereq-Grad or #)
Laboratory or field investigation of selected areas of research, including written report.

Eeb 4793W. Directed Studies: Writing Intensive. (1-7 cr; max 7 cr; S-N only. Prereq-Grad or #)
Individual study on selected topics or problems. Emphasizes readings, use of scientific literature. Written report.

Eeb 4794W. Directed Research: Writing Intensive. (1-7 cr; max 7 cr; S-N only. Prereq-Grad or #)
Laboratory or field investigation of selected areas of research, including written report.

Eeb 4793W. Directed Studies: Writing Intensive. (1-7 cr; max 7 cr; S-N only. Prereq-Grad or #)
Individual study on selected topics or problems. Emphasizes readings, use of scientific literature. Written report.

Eeb 4794W. Directed Research: Writing Intensive. (1-7 cr; max 7 cr; S-N only. Prereq-Grad or #)
Laboratory or field investigation of selected areas of research, including written report.
Prereq–PBio 4321 or 4511 or #)

3407 or 3409)

2 cr. §1104, §1105, §ApEc 1101. Prereq–Math 1271


Econ 1102. Principles of Macroeconomics. (4 cr. §1105, §1112, §ApEc 1102. Prereq–[1101 or equiv], knowledge of [plane geometry, advanced algebra])


Econ 1102H. Honors Course: Principles of Macroeconomics. (4 cr. §1102, §1105, §ApEc 1102. Prereq–[1111 or equiv], Math 1271)


Econ 1105. Principles of Macroeconomics. (4 cr. §1102, §1112, §ApEc 1102. Prereq–[1104 or equiv], Math 1271)


Econ 1900. Freshman Seminar. (3 cr; A-F only)

Topics specified in Class Schedule.

Econ 1904. Freshman Seminar. (3 cr; A-F only)

Topics specified in Class Schedule.

Econ 1905. Freshman Seminar. (3 cr; A-F only. Prereq–Fr or no more than 36 cr)

Topics specified in Class Schedule.

Econ 1910W. Freshman Seminar. (3 cr; A-F only. Prereq–Fr or no more than 36 cr)

Topics specified in Class Schedule.

Econ 3021. Survey of Economic Ideas. (3 cr. §4022. Prereq–[1101, 1102 or equiv, not for econ majors])

A historical and analytical treatment of how important economic ideas developed over time, and their relationship to prevailing economic conditions and politics. Economic ideas from Adam Smith to the present.

Econ 3031. American Economic Problems. (3 cr. §4031. Prereq–[1101, [1102 or equiv]). Econ majors consult first with CLA adviser) American economic problems/relationships. Relevance of simple economic principles to economic problems in the United States.

Econ 3033. Current Economic Issues. (3 cr [max 6 cr]. §4033. Prereq–[1101, 1102 or equiv, not for econ majors])

Current controversies over economic policies used to deal with some economic problems. Students focus in part on a specific issue of their choice. Different economic issues are discussed each time the course is offered (every three years).

Econ 3041. Prospective World Economy. (3 cr. §4041. Prereq–[1101, 1102] or equiv or econ major with CLA adviser approval)

What economic future holds. What can be done about global issues. How to improve economic prospects of countries.
Econ 3101. Intermediate Microeconomics. (4 cr. §3105, §3111. Prereq—1101, 1102 or equiv, Math 1271 or equiv) Behavior of households, firms, and industries under competitive and monopolistic conditions; factors influencing production, price, and other decisions of the firm; applications of the theory. Economic efficiency and distribution of well-being.

Econ 3101H. Honors Course: Intermediate Microeconomics. (4 cr. §3101, §3105. Prereq—1101, 1102 or equiv, Math 1271 or equiv) Behavior of households, firms, and industries under competitive and monopolistic conditions; factors influencing production, price, and other decisions of the firm; applications of the theory. Economic efficiency and distribution of well-being.

Econ 3102. Intermediate Macroeconomics. (4 cr. §3112. Prereq—3101 or equiv) 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.

Econ 3102H. Honors Course: Intermediate Macroeconomics. (4 cr. §3102. Prereq—3101 or equiv) Determinants of national income, employment, and price level; effects of monetary and fiscal policies; emphasis on a general equilibrium approach. Applications of economic efficiency and distribution of well-being.


Econ 3501. Labor Economics. (3 cr. §4531. Prereq—1101, [1102 or equiv], Math 1271 or equiv; not open to Econ majors) Role of labor in economy; labor as factor of production, population, and labor force; economics of labor markets; labor market institutions; theories of wages and employment; unions and collective bargaining; public policy.

Econ 3601. Industrial Organization and Antitrust Policy. (3 cr. §4631, §4639. Prereq—1101, 1102 or equiv; not open to Econ majors) Industrial organization and market structures. Relations between market structure, economic efficiency, and welfare. Purposes and effects of antitrust and related legislation. Industrial policy.

Econ 3611. Environmental Economics. (3 cr. Prereq—1101, 1102, or equiv; not open to Econ majors) Dependence of the economy on the environment; alternative visions of the future and issues on which actual outcome will depend, particular attention to global warming; future generations and sustainability; economic incentives for environmental protection and degradation; economic aspects of environmental policies.

Econ 3701. Money and Banking. (3 cr. §4721, §4729. Prereq—1101, 1102 or equiv; not open to Econ majors) 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 cr. §4821, §5821. Prereq—1101, [1102 or equiv]; not open to Econ majors) Competing views on proper role of government in economy. Effects of tax/spending policies. Private agents’ response to government actions. Optimal policies. Applications primarily to U.S. federal government.

Econ 3951. Major Project Seminar. (2 cr. Prereq—3101, 3102 or equiv, EngC 3027) Students prepare a significant piece of written work in economics. Project should demonstrate critical thinking, collection and analysis of data, problem solving, effective interpretation of findings. Students should attain understanding and proficiency in modes of inquiry in economics.

Econ 3960. Topics in Economics. (3 cr. [max 6 cr. Prereq—1101, 1102 or equiv (others may be stated in Class Schedule)]. Topics specified in Class Schedule.

Econ 3991. Independent Study. (1-3 cr; A-F only) Prereq—[1101, 1102] or #) Students conduct formal study subject to faculty supervisor or with director of undergraduate studies before beginning (otherwise credit approved).

Econ 3993. Directed Studies. (1-3 cr; A-F only) Prereq—1101, 1102 or equiv, #) Guided individual reading or study in areas not available in regular course offerings.

Econ 4021. Economics, Ethics, and Economic Philosophy. (3 cr. [max 8 cr] Prereq—1101, 1102 or equiv) Types of economics, ethics and its economic applications, and bases of different economic philosophies. Topics vary by semester. Examples include relationships between freedoms and responsibilities; economics and ethics of the stakeholder concept; different concepts of property rights or justice.

Econ 4022. Survey of Economic Ideas. (3 cr. §3021. Prereq—3101, 3102 or equiv) Historical and analytical view of how important economic ideas developed and their relationship to prevailing economic conditions and politics. Economic ideas from Adam Smith to the present.


Econ 4033. Current Economic Issues. (3 cr. [max 6 cr.] §3033. Prereq—3101, 3102 or equiv) Current controversies over economic policies used deal with some economic problems. Students focus in part on a specific issue. Different economic issues are discussed every time the course is offered (every three years).

Econ 4041. The Prospective World Economy. (3 cr. §3041. Prereq—3102 or equiv) Considers what the economic future holds, what can be done now to deal with global issues, and how to improve economic prospects of countries.

Econ 4100W. Undergraduate Writing in Economics. (1-2 cr. [max 2 cr; A-F only] Prereq—3101, §4831 or §4630, #) Research essay.

Econ 4109H. Honors Course: Game Theory and Applications. (4 cr. Prereq—3101, 3102 or equiv, Math 1271-1272 or equiv) Games: normal form and extensive form; wars of attrition; games of timing; bargaining applications in industrial organization, macroeconomics, and international economics.

Econ 4113. Introduction to Mathematical Economics. (4 cr. Prereq—3101, 3102 or equiv, Math 1271-1272-2243 or equiv) Development of selected models of economic behavior in mathematical terms. Topics selected to illustrate the advantages of a mathematical formulation.

Econ 4161. Microeconomic Analysis. (2 cr. Prereq—3101 or 5151 or equiv, Math 2243, Math 2263) Theories of consumer demand, producer supply, and market equilibrium; general equilibrium and welfare. May include topics such as externalities, economics of information and uncertainty, and game theory. This 7-week course meets with 8001.

Econ 4162. Microeconomic Analysis. (2 cr. Prereq—4161) Theories of consumer demand, producer supply, and market equilibrium; general equilibrium and welfare. May include topics such as externalities, economics of information and uncertainty, and game theory. This 7-week course meets with 8002.

Econ 4163. Microeconomic Analysis. (2 cr. Prereq—4162) Theories of consumer demand, producer supply, and market equilibrium; general equilibrium and welfare. May include topics such as externalities, economics of information and uncertainty, and game theory. This seven-week course meets with 8003.

Econ 4164. Microeconomic Analysis. (2 cr. Prereq—4163) Theories of consumer demand, producer supply, and market equilibrium; general equilibrium and welfare. May include topics such as externalities, economics of information and uncertainty, and game theory. This seven-week course meets with 8004.

Econ 4165. Macroeconomic Theory. (2 cr. Prereq—3102, Math 2243, Math 2263 or equiv or #) Dynamic general equilibrium models: solving for paths of interest rates, consumption, investment, and prices. This seven-week course meets with 8105.

Econ 4166. Macroeconomic Theory. (2 cr. Prereq—4165) Dynamic general equilibrium models: solving for paths of interest rates, consumption, investment, and prices. This seven-week course meets with 8106.

Econ 4167. Macroeconomic Theory. (2 cr. Prereq—4166) General equilibrium models with uncertainty, search, matching, indivisibilities, private information, etc. Implications of theory for measurement and data reporting. Overlapping generations and dynasty models with money and government. Variational and recursive methods. This seven-week course meets with 8107.

Econ 4168. Macroeconomic Theory. (2 cr. Prereq—4167) General equilibrium models with uncertainty, search, matching, indivisibilities, private information, etc. Implications of theory for measurement and data reporting. Overlapping generations and dynasty models with money and government. Variational and recursive methods. This seven-week course meets with 8108.

Econ 4171. History of Economic Thought. (3 cr. Prereq—3101, 3102 or equiv) Primarily a critical reading course. Topics include Smith, Ricardo, Malthus, and Marx; neoclassicists, Keynes, the mercantilist and physiocratic doctrines; and modern theory.

Econ 4211. Principles of Econometrics. (4 cr. Prereq—[1101, 1102] or equiv, Math 2243 or equiv, [Stat 3021, Stat 3022 or equiv], familiarity with computers) Analysis of simple econometric models with money and government. Variational and recursive methods. This seven-week course meets with 8108.

Econ 4212. The Prospective World Economy. (3 cr. Prereq—3101, 3102 or equiv) Primarily a critical reading course. Topics include Smith, Ricardo, Malthus, and Marx; neoclassicists, Keynes, the mercantilist and physiocratic doctrines; and modern theory.


Econ 4262. Introduction to Econometrics. (4 cr. A-F only Prereq—4261) 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 4307. Comparative Economic Systems. (3 cr. §4337. Prereq--[1101, 1102 or equiv; not open to Econ majors]) Functions of economic systems; market economy vs. centrally planned economy. Post socialist transitions in Eastern Europe, Russia, and China and reforms undertaken. Initial conditions and strategies for reforms; results of reforms in terms of key economic indicators.

Econ 4311. Economy of Latin America. (3 cr. Prereq--[1101, 1102 or equiv]) Economic evolution in Latin America since 1950. Trade orientation, foreign investment, development strategies in selected Latin American countries. Theory/applications of important issues.


Econ 4315. The Japanese Economy. (3 cr. Prereq--1101, 1102 or equiv) Economic development following contact with western civilization. Issues covered include trade, development and growth, population growth, capital formation, international economic relations, agricultural and industrial policies; role of the government in the economy, and current issues of interest.


Econ 4337. Comparative Economic Systems. (3 cr. §3073. Prereq--3101, 3102 or equiv) 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 4421W. Economic Integration of the Americas. (3 cr. Prereq--3101, 3102 or equiv or #) 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 4432W. International Finance. (3 cr. §4401. Prereq--3101, 3102 or equiv; 4431 or 4439 or equiv recommended) 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 4531. Labor Economics. (3 cr. §3501. Prereq--3101, 3102 or equiv) Economic analysis of labor markets and their operations; population and labor force; labor market institutions, welfare, employment theories; unions and collective bargaining; public policy.

Econ 4560. Economics of Discrimination. (3 cr. Prereq--3101, 3102 or equiv; [Stat 3011, Stat 3022 recommended]) Theory and empirical evidence of labor/consumer markets discrimination. Race/gender differentials. Effects of anti-discrimination policies such as affirmative action. Use of economic models, formal statistical analysis.

Econ 4611H. Honors Course: Environmental Valuation. (4 cr. §4631, §4631V, §4611W. Prereq--[3101 or equiv; Math 1271 or equiv]) Principles of cost-benefit analysis used for valuing the environment, costs of pollution. Defining, measuring, valuating benefits/costs. Economic growth, sustainability, Economic, ecological, ethical issues in using renewable/non-renewable resources. Optimal rate of use. Optimal pollution control.


Econ 4721. Money and Banking. (3 cr. §4701, §4729. Prereq--3101 or equiv) 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 cr. §4701, §4721, §4721W. Prereq--[3101 or equiv; Math 1271) 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 4731. Macroeconomic Policy. (3 cr. §4739. Prereq--3101, 3102 or equiv) 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 versus discretion; budget deficits; unemployment and inflation.

Econ 4731H. Honors Course: Macroeconomic Policy. (4 cr. §4731, §4731V. Prereq--[3101, 3102 or equiv; Math 1271) 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 4821. Public Economics. (3 cr. §5301. Prereq--3101, 3102 or equiv) Competing views on the proper role of government in the economy. Effects of tax and spending policies, taking into account private agents' response to government actions and the ways government officials may use their powers; optimal policies. Applications primarily to U.S. government.

Econ 4831. Cost-Benefit Analysis. (3 cr. §4611V, §461H, §4619, §4831W. Prereq--3101 or equiv) Principles for evaluation of benefits/costs of public projects or programs. Issues connected with definition/measurement of benefits/costs. Rate of return, rate of discount. Market imperfections, risk, and uncertainty. Case studies of applications of theory.

Econ 4960. Topics in Economics. (3 cr. [max 6 cr.] Prereq--3101, 3102 or equiv; Math 1271 [may change based on topic]) Topics specified in Class Schedule.

Econ 4991. Independent Study. (1-4 cr. Prereq--Honors student, topic approved by [faculty supervisor or dir of undergrad studies]) Honors thesis.

Econ 4993. Directed Study. (1-4 cr. Prereq--For honors thesis.) Guided individual reading or study in areas not available in regular course offerings.

Econ 5151. Elements of Economic Analysis: Firm and Household. (2 cr. Prereq--1101, 1102 or equiv; Math 1271 or equiv; Math 2243 or grad or #) Decision-making by households and firms under conditions of perfect competition, monopoly, and monopolistic competition.

Econ 5152. Elements of Economic Analysis: Income and Employment. (2 cr. Prereq--3101, 3102 or equiv; Math 1271 or equiv; Math 2243 or grad or #) Determinants of national income, employment, and price level; aggregate consumption, investment, and asset holding.

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Course Descriptions

Econ 5312. Growth, Technology, and Development. (3 cr; Prereq–3101, 3102 or equiv or #)
Economics of research and development; technical change and productivity growth; impact of technology on institutions; science and technology policy.

Econ 5890. Economics of the Health-Care System. (3 cr; A-F only. Prereq–3101, 3102 or #)
Economic analysis of U.S. health-care sector. Emphasizes problems of pricing, production, distribution. Health-care services as one factor contributing to nation’s health.

Education and Human Development (EdHD)

College of Education and Human Development

EdHD 1901. Freshman Seminar, Environment. (1-3 cr [max 6 cr]. Prereq–Fr)
Interdisciplinary seminar. Topics specified in Class Schedule.

EdHD 1902. Freshman Seminar, Cultural Diversity. (1-3 cr [max 6 cr]. Prereq–Fr)
Interdisciplinary seminar. Topics specified in Class Schedule.

EdHD 1903. Freshman Seminar, Citizenship/Public Ethics. (1-3 cr [max 6 cr]. Prereq–Fr)
Interdisciplinary seminar. Topics specified in Class Schedule.

EdHD 1904. Freshman Seminar, International Perspectives. (1-3 cr [max 6 cr]. Prereq–Fr)
Interdisciplinary seminar. Topics specified in Class Schedule.

EdHD 1905. Freshman Seminar. (1-3 cr [max 6 cr]. Prereq–Fr)
Interdisciplinary seminar. Topics specified in Class Schedule.

EdHD 1906W. Freshman Seminar, Environment and Writing Intensive. (1-3 cr [max 6 cr]. Prereq–Fr)
Interdisciplinary seminar. Topics specified in Class Schedule.

EdHD 1907W. Freshman Seminar, Cultural Diversity and Writing Intensive. (1-3 cr [max 6 cr]. Prereq–Fr)
Interdisciplinary seminar. Topics specified in Class Schedule.

EdHD 1908W. Freshman Seminar, Citizenship/Public Ethics and Writing Intensive. (1-3 cr [max 6 cr]. Prereq–Fr)
Interdisciplinary seminar. Topics specified in Class Schedule.

EdHD 1909W. Freshman Seminar, International Perspectives and Writing Intensive. (1-3 cr [max 6 cr]. Prereq–Fr)
Interdisciplinary seminar. Topics specified in Class Schedule.

EdHD 1910W. Freshman Seminar, Writing Intensive. (1-3 cr [max 6 cr]. Prereq–Fr)
Interdisciplinary seminar. Topics specified in Class Schedule.

EdHD 3001. Exploring the Teaching Profession. (1 cr [max 4 cr]; S-N only. Prereq–Early admit for init lic/MEd program)
Self as teacher, the culture of teaching, students as learners, learning contexts, societal influences on teaching/schools.

EdHD 5001. Learning, Cognition, and Assessment in the Schools. (3 cr; A-F only. Prereq–MED/init lic student or CLA music ed or preteaching major or #)
Principles of learning, cognition, cognitive development, classroom management, motivation, instruction, assessment. Approaches include behaviorism, cognitive and social constructivism, human information processing theory. Topics include intelligence, knowledge acquisition, reasoning skills, scholastic achievement, standardized testing, reliability, validity, student evaluation, performance assessment, portfolios, demonstrations. Applications to instruction and organization of curricular materials.

EdHD 5003. Developmental and Individual Differences in Educational Contexts. (3 cr; A-F only. Prereq–MED/init lic or CLA music ed or preteaching major or #)
Overview of developmental and individual differences of children and adolescents in educational contexts; emphasis on a dynamic systems perspective; developmental transitions in childhood and adolescence; interactions between the student, environment, and task; and accommodations for adaptations for students in special education.

EdHD 5005. School and Society. (2 cr; A-F only. §EDPA 5090. Prereq–MED/init lic student or CLA music ed major or preteaching major or #)
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 only. §SCI 5300. Prereq–MED/init lic or CLA music ed major or preteaching major or #)
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 5009. Human Relations: Applied Skills for School and Society. (1.5 cr; A-F only. Prereq–MED/init lic or CLA music ed or preteaching major or #)
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.

Educational Policy and Administration (EdPA)

Department of Educational Policy and Administration

College of Education and Human Development

EdPA 1080. Special Topics in Leadership. (1-3 cr [max 6 cr]; A-F only)
For topic, see Class Schedule.

EdPA 1301W. Personal Leadership in the University. (3 cr; §PA 1961)
Introduces leadership using a personal leadership framework. Students examine their own views on leadership. Differences between personal/positional leadership, characteristics of leaders within the University, importance of personal development.

EdPA 3010. Special Topics for Undergraduates. (1-3 cr [max 6 cr]. Prereq–MED/init lic student or CLA music ed or preteaching major or #)
Inquiry into educational policy and administration problems and issues.

EdPA 3201. Introduction to Historical Foundations of Modern Education. (3 cr)
Analysis/interpretation of important elements in modern education derived from pre-classical sources: Greeks, Romans, Middle Ages, Renaissance, Reformation, Enlightenment, Industrial Revolution.

EdPA 3202. Introduction to History of Western Educational Thought. (3 cr)
Great educational classics of Western civilization: Plato, Aristotle, Quintillian, Montaigne, Milton, Locke, Rousseau, others.

EdPA 3302W. Leadership in the Community. (3 cr; A-F only. §PA–3101W or PA 1961W [or or #])
Leadership and leadership capacities from multicultural/multidimensional perspectives. Students examine their own views on leadership. Leadership theory/practice, group dynamics, behavior, applying knowledge.

EdPA 3402. Leadership Minor Field Experience. (2 cr; A-F only. Prereq–3302W or PA 3961W) with grade of at least C, #)
Students integrate lessons learned from core leadership courses, choose from a variety of settings (e.g., community organizations, corporations, University student organizations, education).

EdPA 4303W. Leadership in the World. (3 cr; A-F only. Prereq–3302W or PA 3961W, completed field experience, undergrad leadership minor)
Leadership theories, 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.

EdPA 5001. Formal Organizations in Education. (3 cr)
Classical/current theories of organizations. Applications to education and related fields.

EdPA 5021. Historical Foundations of Modern Education. (3 cr)
Analysis and interpretation of important elements in modern education derived from pre-classical sources: Greeks, Romans, Middle Ages, Renaissance, Reformation, Enlightenment, and Industrial Revolution.

EdPA 5023. History of Western Educational Thought. (3 cr)
Great educational classics of Western civilization: Plato, Aristotle, Quintilian, Montaigne, Milton, Locke, Rousseau, and others.

EdPA 5024. History of Ideas in American Education. (3 cr)

EdPA 5028. Education Imagery in Europe and America. (3 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.

EdPA 5032. Comparative Philosophies of Education. (3 cr)
Exploration of the principal philosophies in educational thought today, e.g., realism, idealism, pragmatism, and postmodernism. Practice in philosophical critique.

EdPA 5036. Ethics, Morality, and Values in Education. (3 cr)
Application to key issues of professional practice. Moral education, virtues, principles.

EdPA 5041. Sociology of Education. (3 cr)
Structures and processes within educational institutions; linkages between educational organizations and their social contexts, particularly related to educational change.

EdPA 5044. Introduction to the Economics of Education. (3 cr)
Costs and economic benefits of education, with a focus on K-12: educational markets, prices, and production relationships; investment and cost-benefit analysis.

EdPA 5048. Cross-Cultural Perspectives on Leadership. (2 cr)
Introduction to cultural variables of leadership that influence functioning of cross-cultural groups. Lectures, case studies, discussion, problem-solving, simulations. Intensive workshop.

EdPA 5056. Case Studies for Policy Research. (3 cr; A-F only) Qualitative case study research methods and their applications to international policy and practice. Emphasis on designing studies that employ open-ended interviewing as primary data collection technique.

EdPA 5061. Ethnographic Research Methods. (3 cr) 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.

EdPA 5064. Divergent Perspectives in Educational Policy and Practice. (3 cr) Examines fundamental and current issues in the field of education. Participants learn how to approach an issue from multiple perspectives, develop skills to identify and analyze its component parts, and examine personal belief systems to place a given issue within a personal context.

EdPA 5080. Special Topics: Educational Policy and Administration. (1-3 cr; max 24 cr) Topical issues in educational policy/administration.

EdPA 5087. Seminar: Educational Policy and Administration. (1-3 cr; max 24 cr) Shared responsibility of students/instructor in presentation of topics.

EdPA 5095. Problems: Educational Policy and Administration. (1-3 cr; max 24 cr) Course or independent study on specific topic within department program emphasis.

EdPA 5096. Internship: Educational Policy and Administration. (1-9 cr; max 24 cr) Internship in elementary, secondary, general, or postsecondary administration, or other approved field related setting.

EdPA 5101. International Education and Development. (3 cr) Introduction to comparative and international development education, contemporary theories regarding the role of education in the economic, political, and sociocultural development of nations; examination of central topics and critical issues in the field.

EdPA 5102. Knowledge Formats and Applications: International Development Education Contexts. (3 cr) Analyzes the interrelationships of “knowledge capital” (metonic symbolic resources) and culture through intrinsic, cross-, and multicultural perspectives. Distinguishes knowledge from information and data, focusing on national and international developments occurring along basic and applied knowledge paths.

EdPA 5103. Comparative Education. (3 cr) 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.

EdPA 5104. Strategies for International Development of Education Systems. (3 cr; A-F only. 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.

EdPA 5121. Educational Reform in International Context. (3 cr) Critical 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.

EdPA 5124. Critical Issues in International Education and Educational Exchange. (3 cr) 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.

EdPA 5128. Anthropology of Learning. (3 cr) Cross-cultural perspectives in examining educational patterns; the implicit and explicit cultural assumptions underlying them. Methods and approaches to cross-cultural studies in education.

EdPA 5132. Intercultural Education and Training: Theory and Application. (3 cr) 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.

EdPA 5301. Contexts of Learning: Historical, Contemporary, and Projected. (3 cr; A-F only) Historical understanding of education as a social institution. Examines the instructional role of the institution among the several that constitute its dynamic context.

EdPA 5302. Educational Policy Context, Inquiry, and Issues. (3 cr) 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.

EdPA 5303. Managing the Learning Organization. (3 cr; A-F only) Examines schools, colleges, and other human service organizations centered on learning. Focuses on perspectives and skills needed to manage organizations effectively.

EdPA 5304. Educational Leadership for Equity, Opportunity, and Outcome. (3 cr) Implications of multiple contexts in which leadership occurs. Role of followers. Complexities of collaborative structures and of shared governance.

EdPA 5321. The Principalship. (3 cr) Role of the principal: qualifications, duties, and problems.

EdPA 5322. School Superintendency. (3 cr) Role/responsibility of superintendent in school district. Emphasizes real life experiences, leadership potential as CEO. Purposes, power, politics, practices of position. Interplay of internal school forces, external community forces analyzed in multiple contexts. Manifestations of leadership in public, high-profile appointment.

EdPA 5324. Financial Management for Elementary-Secondary Education. (3 cr) Provides an overview of state-local school finance systems, budgeting, governmental fund accounting, and interpretation of financial information. For graduate students pursuing licensure as elementary-secondary principals and superintendents.

EdPA 5328. Introduction to Educational Planning. (3 cr) Principles, tools, comparative practices, and emerging issues in K-12 and higher education settings; decision making models; strategic and project planning: barriers to effectiveness; and change management processes.

EdPA 5332. Leadership Development Seminar. (3 cr) Assessment and development of skills required of the educator in planning, decision making, and human relations. Introduction to contemporary issues in educational administration.

EdPA 5336. Laboratory in Decision Making. (3 cr) Contributions of recent research and theory to effective administrative. Analysis of administrative behavior in realistic settings; relations of administration to human behavior.

EdPA 5341. The American Middle School. (3 cr) Focus on the uniqueness of the early adolescent and appropriate learning situations. For educators working with middle-level students.

EdPA 5346. Legal Aspects of Elementary and Secondary Education. (3 cr) Overview of legal foundations of elementary/secondary education. Statutory themes, relevant case law, emergent policy issues. Implications for educational organizations and for administrative practice.

EdPA 5346. Politics of Education. (3 cr; A-F only. Prereq—Postbac, MED, or grad student) 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.

EdPA 5348. Public School Personnel Programs. (3 cr) Management concepts, functions, and practices of the personnel subsystem in education; selection, assignment, evaluation, and development of school personnel; collective bargaining and the grievance process.

EdPA 5352. Projective Leadership for Strategic Learning Communities. (3 cr) Explores many trends and changes facing society, culture, and education from a strategic learning community perspective; helps students “futureize the present.”

EdPA 5356. Contemporary Services for Persons With Disabilities. (3 cr) 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, local perspectives.

EdPA 5361. Project in Teacher Leadership. (3-6 cr; S-N only. Prereq—MEd student in Teacher Leadership Program) 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.

EdPA 5364. Leadership for School Improvement. (3 cr; A-F only. Prereq—MEd student or #) Current research/practice on educational leadership focused on creating school cultures conducive to continuous improvement/change. Strategies for personal/organizational leadership in PK-12 settings.

EdPA 5366. Special Services Policy and Administration. (3 cr) Legislative, procedural, executive, and judicial actions that affect services, families, and children with special needs at all levels of government: federal, state, and local. For administrators, supervisors, and other professionals responsible for managing general, special, and alternative education programs.

EdPA 5372. Youth in Modern Society. (3 cr) Youth in advanced societies and as a social entity; functions and roles in industrial society, family, education, politics and government, economy and work, welfare and religion; organizations, social movements, and subcultures; empirical research and cross-cultural perspectives.

Course Descriptions

EdPA 5376. Organizational Approaches to Youth Development, (3 cr) Defining youth development within framework of formal and informal organizations; organizational systems responsible for youth development in the community; policy issues surrounding these systems.


EdPA 5381. The Search for Children and Youth Policy in the U.S., (3 cr) 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.

EdPA 5384. Collaboration in Heterogeneous Classrooms and Schools, (3 cr; A-F only) Policy, research, practice base for addressing range of student abilities/backgrounds in diverse schools. Collaborative approaches to curricular, instructional, social support.

EdPA 5396. Field Experience in PK-12 Educational Administration, (3 cr [max 6 cr]; S-N only; Prereq--#) Field experience or internship arranged for students seeking licensure as PK-12 principal/superintendent. Content/credit depends on course requirements specific to individual school experience agreement.

EdPA 5501. Principles and Methods of Evaluation, (3 cr) Introduction to program evaluation. Planning an evaluation study, collecting and analyzing information, reporting results; evaluation strategies; overview of the field of program evaluation.

EdPA 5521. Cost and Economic Analysis in Educational Evaluation, (3 cr; S-N only) Use and application of cost-effectiveness, cost-benefit, cost-utility, and cost-feasibility in evaluation of educational problems and programs.

EdPA 5524. Evaluation Colloquium, (1 cr [max 24 cr]; S-N only. Prereq--# or EPsy 5243) Informal seminar of faculty and advanced students interested in the issues and problems of program evaluation.


EdPA 5704. Student and Faculty Issues in Higher Education, (3 cr) College student development, curricular/extracurricular activities, faculty work/development, student-faculty interaction.

EdPA 5721. Racial and Ethnic Diversity in Higher Education, (3 cr) Review of research. Theoretical frameworks, methodological perspectives, and research strategies used to study students, staff, and faculty; historical perspectives.

EdPA 5724. Leadership and Administration of Student Affairs, (3 cr) Scope, administration, coordination, and evaluation of programs in college and university student affairs.


EdPA 5728. Two-Year Postsecondary Institutions, (3 cr) Present status, development, functions, organization, curriculum, and trends in postsecondary, but nonbaccalaureate, institutions.

EdPA 5732. The Law and Postsecondary Institutions, (3 cr) Analysis of court opinions and federal regulations affecting postsecondary institutions.

EdPA 5734. Institutional Research in Postsecondary Education, (3 cr; A-F only, Prereq--#) Scope, role, administration, research strategies, and evaluation of institutional research in postsecondary institutions. Overview of research methodologies, disciplinary foundations of institutional research. Use of institutional, state, and national databases in addressing full range of institutional missions/functions.

Educational Psychology (EPsy)

Department of Educational Psychology

College of Education and Human Development

EPsy 1600. Special Topics: Developing Special Educational and Human Service Programs, (1-4 cr; max 15 cr; Prereq--#) Explores the concepts, issues, and practices in developing special education and human services for persons with disabilities. Appropriate for persons in paraprofessional positions.

EPsy 3119. Learning, Cognition, and Assessment, (3 cr; A-F only) Principles of learning, cognition, cognitive development, classroom management, motivation, instruction, and assessment. Topics: behaviorism, 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 cr; A-F only) Course critically examines social and cultural diversity in the United States, confronting social issues of poverty, handicapism, homophobia, racism, sexism, victim-blaming, violence, and so on, and presenting models for change. Students examine how and why prejudices develop.

EPsy 3133. The Psychology of Ethics, (3 cr) An examination of morality from the perspective of psychology. Exploration of major research traditions and their ethical and educational implications.

EPsy 3264. Basic and Applied Statistics, (3 cr) Introductory statistics with emphasis on understanding and applying statistical concepts and procedures. Topics include visual and quantitative methods for presenting and analyzing data, common descriptive indices for univariate and bivariate data, and introduction to inferential techniques.

EPsy 3300. Special Topics in Educational Psychology, (1-4 cr [max 9 cr]) Current issues in educational psychology or related coursework in areas not normally available through regular curriculum offerings.

EPsy 4300. Special Topics in Educational Psychology, (1-3 cr [max 9 cr]) Current issues in educational psychology or related coursework in areas not normally available through regular curriculum offerings.


EPsy 5101. Intelligence and Creativity, (3 cr; A-F only) 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 cr; A-F only) 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 cr) 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 cr; A-F only) 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 cr) Survey of adult learning/instruction. Emphasizes instructional design, learning theories, experience, individual differences, evaluation, tests/measurements, technology. Implications for curricular/instructional design in higher education, continuing education, professional/business related training.

EPsy 5117. Problem Solving and Decision Making, (3 cr; A-F only) Strategies, rules, methods, and other cognitive components involved in problem solving and decision making, implications for educational practices, and applied domains.

EPsy 5125. Psychology of Building Character, Values, and Behavior, (3 cr; A-F only) New approaches to motivation, building prosocial values and behavior; how to alter values and behavior of anti-social individuals; strengths and weaknesses of traditional approaches to character education; instilling prosocial values as a way to alter negative behaviors.

EPsy 5135. Human Relations Workshop, (4 cr) 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 cr) 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 5152. Psychology of Conflict Resolution, (3 cr) Overview of the field of conflict resolution. Major theories, research, major figures in the field, factors influencing quality of conflict resolution are covered. The nature of conflict, the history of field, and intrapersonal, interpersonal, intergroup conflict, negotiation, mediation and conflict intervention.

EPsy 5154. Organization Development and Change, (3 cr) Overview of organizational development and change. Normative models of effective organizations, entry and contracting skills, diagnosis procedures and intervention procedures (data collection, skills training, continuous improvement, mediation).

For definitions of course numbers, symbols, and abbreviations, see page 296.
EPsy 5155. Group Dynamics and Social Influence. (3 cr)
Overview of the field of group dynamics with emphasis on social influence. Major theories, research, and figures in the field are covered. Group goals, communication, leadership, decision making, problem solving, conflicts, power, uniqueness theory, deindividuation, and minority influence will be covered.

EPsy 5156. Social and Personality Influences on Education. (4 cr; A-F only)
Survey of social psychology and personality applied to education. Application of major theories and research to classroom and school practices and educational issues are emphasized. Class sessions include lectures, discussions, simulations, experiential exercises. Intrapersonal, interpersonal, and group dynamics are discussed.

EPsy 5157. Social Psychology of Education. (3 cr; A-F only)
Overview of social psychology and its application to education. Participants study the major theories, research, and major figures in the field. Class sessions include lectures, discussions, simulations, role-plays, and experiential exercises.

EPsy 5191. Education of the Gifted and Talented. (3 cr; A-F only)
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. (1-4 cr [max 30 cr])
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. (3 cr; A-F only; Prereq--5261 or Intro statistics course) Introduction to educational research, leading students through the basic steps involved in designing and conducting a research study. Topics include reviewing literature, formulating research problem, using different approaches to gather data, managing and analyzing data, and reporting results.

EPsy 5221. Principles of Educational and Psychological Measurement. (4 cr; Prereq--5261 or equiv)
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 5231. Introductory Statistics and Measurement in Education. (4 cr; Prereq--5261, 5263) Students develop an understanding of basic statistics and measurement concepts and tools and apply them to the collection, analysis, and interpretation of data.

EPsy 5243. Principles and Methods of Evaluation. (3 cr)
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 cr; Prereq--5221 or 5231 or 5261 or equiv), [CCHD grad student or MEd student] Survey methods, including mail, phone, and Web-based/email surveys. Principles of measurement, constructing questions and forms, pilot testing, sampling, data analysis, and reporting. Students develop a survey and a draft survey, pilot the survey, and develop sampling/data analysis plans.

EPsy 5246. Evaluation Colloquium: Psychological Foundations. (1 cr; max 8 cr); S-N only. Prereq--5243/EdPA 5501 Informal seminar of faculty and advanced students interested in the issues and problems of program evaluation.


EPsy 5271. Becoming a Teacher of Statistics. (3 cr; Prereq--5261 or equiv) 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 5281. Introduction to Computer Operations and Data Analysis in Education and Related Fields. (3 cr; S-N only) Introductory computer literacy course to familiarize students with personal computers and computing resources at the University. Applications include electronic communications, spreadsheets, graphical presentation, and data analysis.

EPsy 5300. Special Topics in Educational Psychology. (1-9 cr [max 9 cr]) Current issues in educational psychology or related areas not normally available through regular curriculum offerings.

EPsy 5400. Special Topics in Counseling Psychology. (1-8 cr [max 8 cr]) Theory, research, and practice in counseling and student personnel psychology. Topics vary.

EPsy 5401. Counseling Procedures. (3 cr; Prereq--Upper div student) 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 5412. Introduction to Developmental Counseling and Guidance. (3 cr; Prereq--#) Contemporary models of counselors as advocates for all students. Emphasizes prevention and systems intervention with counselors involved in the developmental guidance curriculum, school change, staff and community collaboration, individual student planning, and learning success with diverse populations.

EPsy 5421. Leadership and Administration of Student Affairs. (3 cr; A-F only) Theoretical approaches to the administrative structure, and evaluation methods used in college/university student affairs.

EPsy 5422. Principles of Group Work: Theory and Procedures. (3 cr; Prereq--Advanced undergrad or grad student in the helping professions) Principles and practices of group work for educators and the helping professions. Discussion of various types of groups (e.g., counseling support, task, psychoeducational). Applications to various settings and populations (e.g., schools and community agencies).

EPsy 5432. Foundations of Individual/Organizational Career Development. (3 cr; A-F only) Introduction to individual and organizational career development theory and practice. Examines critical issues in work patterns, 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 5433. Counseling Women Over the Life Span. (3 cr; Prereq--Counseling or career development course) Counseling skills and interventions to facilitate career development of girls and women of different life stages and backgrounds (school girls to older women); developmental issues from a systematic integrative life planning framework; facts, myths, and trends regarding women's changing roles.

EPsy 5434. Counseling Adults in Transition. (3 cr. Prereq--Advanced undergrad or grad student in the helping professions) Psychological, physical, and social dimensions of adult transitions (e.g., family and personal relationships, career). Adult development theories, stress and coping, and helping skills and strategies as they relate to adult transition.

EPsy 5451. The College Student. (3 cr) The psychology and sociology of college students, including research concerning diversity of populations, vocational development of students, student society, culture, mental health, underachievement, dropouts, values and attitudes, and relevant research methods.

EPsy 5461. Cross-Cultural Counseling. (2 cr; A-F only) Emphasis on the effect of cultural and cross-national psychological differences in human traits and characteristics. These theoretical differences provide a framework for the development and implementation of effective cross-cultural counseling interventions.

EPsy 5601. Survey of Special Education. (2 cr) Introduction to programs and services provided to people with disabilities in school and community settings. Emphasis on the needs of families, to the roles and responsibilities of teachers, and to related service providers.

EPsy 5602. Computer Technology in Special Education. (2 cr; A-F only) Develop skills, understand processes, and identify resources needed to utilize technology to benefit persons with disabilities. Emphasis on learning theory, principles of effective instruction, instructional and assistive technology integration.

EPsy 5603. Childhood Language Development: Classroom Implications. (3 cr) Recent trends and findings in the study of language acquisition and communication; classroom implications, including education of exceptional children and implications of diversity on instruction.


Course Descriptions

EPsy 5612. Understanding of Academic Disabilities. (3 cr; A-F only) Introduction to issues related to the education of students with academic disabilities (learning disabilities, mild mental intellectual disabilities, and emotional/behavioral disabilities) including assessment, diagnosis, intervention, and prevention approaches.

EPsy 5613. Foundations of Special Education I. (3 cr; A-F only. Prereq—Child development course, 5601 or equiv) Emphasis on the organization of educational programs and services for people with disabilities and their families. First course for students seeking to become licensed teachers in special education.

EPsy 5614. Foundations of Special Education II. (3 cr; A-F only. Prereq—5613) Emphasis on assessment, planning, and implementing educational programs for people with disabilities. Second course for students seeking to become licensed teachers in special education.

EPsy 5615. Advanced Academic Interventions. (3 cr; A-F only. Prereq—5612) Develop knowledge and skills in designing, implementing, and evaluating Individual Educational Plans (IEPs) for students eligible for special education service in learning disabilities, emotional/behavioral disorders, and mild mental intellectual disabilities.

EPsy 5616. Behavior Analysis and Classroom Management. (3 cr) Introduction to assumptions, principles, and procedures of behavioral analysis to the design and implement instruction for children and youth with disabilities. Emphasis is given to the development of appropriate classroom management techniques.

EPsy 5622. Programs and Curricula for Learners With Severe Disabilities. (3 cr. Prereq—5616) Emphasis on developing curricula and programs for students with moderate, severe, and profound disabilities. Emphasis is given to meet the needs of students with severe handicapping conditions. Special consideration given to preparing children and youth for integrated community environments.


EPsy 5626. Seminar: Developmental Disabilities and Instructional Management. (3 cr. Prereq—[5621], 5622) or #) 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 contexts, corrections, and consequences.

EPsy 5635. Education of Students With Physical and Health Disabilities. (3 cr; A-F only. Prereq—5601 or #) Introduction to students with physical and health disabilities and their characteristics; the educational implications of physical disabilities; assessment procedures and appropriate educational interventions for learners with physical and health disabilities.

EPsy 5636. Education of Multidisabled Learners With Sensory Impairments. (2 cr. Prereq—5635) Characteristics of learners with visual and auditory impairments; design of instructional programs to remediate or circumvent disabilities, including use of prosthetic devices; related areas of performance affected by sensory impairments.

EPsy 5641. Foundations of Education for Individuals Who Are Deaf/Hard of Hearing. (3 cr) Historical and current issues related to education of individuals who are deaf or hard of hearing. Implications of causes of hearing loss, social and cultural relationships, philosophies of education, characteristics and legislative guidelines and their applicability to education of individuals who are deaf or hard of hearing.


EPsy 5646. Reading and Writing Practices With Deaf/Hard of Hearing Children. (3 cr. Prereq—5644 or general educ methods in tchg reading and writing) Gain knowledge and skills to assess, plan, and implement instruction for children and youth with hearing loss. Emphasis is placed on research, theoretical, and programmatic issues in developing reading and writing skills, curricular adaptations, and effective instructional approaches.

EPsy 5647. Aural and Speech Programming for Persons Who Are Deaf/Hard of Hearing. (3 cr) 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 5649. Models of Instructional Programming With Deaf and Hard of Hearing Students. (3 cr. Prereq—[5641], 5644) or #) 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 5655. Social and Interpersonal Characteristics of Students With Disabilities. (3 cr; A-F only) Emphasis on children and youth of school age and on the ways in which their emotional, social, and behavioral disorders affect their functioning in the school and how their behaviors disturb others.

EPsy 5657. Interventions for Social and Emotional Disabilities. (3 cr; A-F only. Prereq—5616, 5656) Developing comprehensive behavioral programs for students with social and emotional disabilities. Introducing students with social and emotional disabilities.

EPsy 5671. Literacy Braille. (3 cr; A-F only) Mastery of literary braille code including all contractions and short forms used in Grade 2 English Braille: American Usage. Use of specialized braille writing equipment including, braille writer, slate and stylus, and computer programs with six-key input.

EPsy 5672. Advanced Braille Codes. (2 cr; A-F only. Prereq—5671 or #) Mastery of the Nemeth code for braille mathematics transcription including elementary math computation, algebra, geometry, trigonometry, and symbolic logic notation. Introduction to foreign languages, computer notation, music, and raised line drawing techniques.

EPsy 5673. Reading and Writing for Children With Visual Disabilities. (2 cr; A-F only. Prereq—5671, CI 5414 or equiv, or #) Principles of preparation, selection, and use of instructional materials and adaptive technology for children with visual disabilities, including use of braille, large print, auditory tapes, and computer files to access and electronically convert information between these different media.

EPsy 5674. Techniques of Orientation, Mobility, and Independence for Students With Visual Disabilities. (3 cr; A-F only. Prereq—5673 or #) Introduction to basic techniques to gain skills in pre- cane techniques, orientation to learning environments, and adaptations for activities of daily living and independence. Introduction to mobility maps, consideration of cane, guide dog, and telescopic aids to mobility.


EPsy 5676. Case Management for Children With Visual Disabilities. (3 cr; A-F only. Prereq—5671, 5673, 5675) Advanced course evaluating and managing cognitive, psychosocial, physical, and academic needs of students. Consideration of parent, teacher, and student in counseling and educational program management.

EPsy 5681. Education of Infants, Toddlers, and Preschool Children With Disabilities: Methods and Materials. (3 cr; A-F only. Prereq—5623) Overview of the methods and materials available to maximize the developmental and educational outcomes for young children, birth to age 5, with disabilities and their families in home, community, and school based-settings.

EPsy 5701. Practicum: Field Experience in Special Education. (1-6 cr; max 12 cr; A-F only. Prereq—5614, [FOE or SpEd grad or licensure student] or #) Observations and supervised support of teaching practice in schools or agencies serving children with disabilities in integrated programs.

EPsy 5720. Special Topics: Special Education. (1-4 cr; max 12 cr. Prereq—5720) Lab and fieldwork approach, often assuming a practicum orientation, e.g., generation of action plan, creating set of observation field notes, collecting data in some form. Provides opportunities for educational personnel to study specific problems and possibilities related to special education.

EPsy 5740. Special Topics: Interventions and Practices in Educational and Human Service Programs. (1-4 cr; max 8 cr. Prereq—#) Concepts, issues, and practices related to the community inclusion of children, youth, and adults with developmental disabilities through weekly seminar and extensive supervised experience working with individuals within the community.
EEPsy 5751. Student Teaching: Deaf/Hard of Hearing. (1-6 cr [max 10 cr]. Prereq—#). Supervised experience in educational programming for infants, children, and youth who are deaf or hard of hearing, as well as in on-site, directed experiences under the supervision of master teachers of deaf and hard of hearing students.

EEPsy 5752. Student Teaching: Learning Disabilities. (1-6 cr [max 10 cr]; S-N only. Prereq—#). Supervised experience in teaching or related work in schools or other agencies serving children and adolescents with learning disabilities.

EEPsy 5753. Student Teaching: Early Childhood Special Education. (1-6 cr [max 8 cr]; S-N only. Prereq—Completion of all course requirements for license in ECSE) Supervised experience in teaching or related work in schools, agencies, or home settings with infants, toddlers, and preschoolers with disabilities and their families.

EEPsy 5754. Student Teaching: Social and Emotional Disabilities. (1-6 cr [max 8 cr]; A-F only. Prereq—Completion of license courses for social and emotional disorders; #) Teach students with social and emotional disorders at public schools and other appropriate sites. Attend a weekly seminar on teaching competencies.

EEPsy 5755. Student Teaching: Developmental Disabilities, Mild/Moderate. (1-6 cr [max 6 cr]; A-F only. Prereq—Completion of all licensure coursework; #) 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.

EEPsy 5756. Student Teaching: Developmental Disabilities, Moderate/Severe. (1-6 cr [max 6 cr]; A-F only. Prereq—Completion of all licensure coursework; #) Supervised student teaching, or special practicum project, in schools or other agencies serving students at elementary/secondary levels who have moderate to severe developmental disabilities.

EEPsy 5757. Student Teaching: Physical and Health Related Disabilities. (1-6 cr [max 8 cr]; A-F only. Prereq—#) Supervised student teaching and related work (direct instruction and consultation) in schools or other agencies serving children and adolescents who have physical disabilities.

EEPsy 5758. Student Teaching: Visual Impairments. (1-6 cr [max 8 cr]; A-F only. Prereq—#) Supervised student teaching, or special practicum projects, in schools or other agencies serving students with visual impairments.

EEPsy 5800. Special Topics in School Psychology. (1-9 cr [max 9 cr]) Current issues in school psychology or areas not normally available through regular curriculum offerings.

EEPsy 5801. Assessment and Decision Making in School and Community Settings. (3 cr; A-F only) Introduction to psychological and educational assessment for individuals who work with children, especially those experiencing academic and behavior problems. Study of standardized group and individual tests of intelligence, achievement, socio-emotional functioning, perception, reading, mathematics, adaptive behavior, and language.

EEPsy 5849. Observation and Assessment of the Preschool Child. (3 cr) 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.

EEPsy 5851. Collaborative Family-School Relationships. (2-3 cr. Prereq—Honors senior class or grad student) Theoretical and empirical bases for creating collaborative family-school relationships for students’ development and educational success in school. Emphasis on model programs for K-12 and practical strategies for educational personnel to address National Educational goal 8.

EEPsy 5852. Prevention and Early Intervention. (3 cr) Theory/research-based primary/secondary programs to promote academic/social competence of children/youth (birth to grade 12).

EEPsy 5871. Interdisciplinary Practice and Interagency Coordination in Education and Human Services. (3 cr) Principles and procedures of interdisciplinary practice and interagency coordination. Examine the relative strengths of interdisciplinary approaches, develop skills for collaborating with others, and examine different approaches to interagency coordination.

EEPsy 5991. Independent Study in Educational Psychology. (1-8 cr [max 20 cr]; A-F only. Prereq—#) Self-directed study in areas not covered by regular courses. Specific program of study is jointly determined by student and advising faculty member.

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**Electrical Engineering (EE)**

**Department of Electrical and Computer Engineering**

**Institute of Technology**

**EE 0001. Refresher Course for Electrical Engineers.** (0 cr; A-F only. Prereq—#) 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 0301. Introduction to Digital System Design: Discussion.** (0 cr; S-N only. Prereq—#) Discussion section to go with 2301.

**EE 0361. Introduction to Microcontrollers: Discussion.** (0 cr; S-N only. Prereq—#) Discussion section to go with 2361.

**EE 1001. Introduction to Electrical and Computer Engineering.** (1 cr; S-N only. Prereq—Lower div IT or §) Introduction to electrical and computer engineering in particular. Exploration of techniques and technologies developed by electrical and computer engineers.

**EE 1301. Introduction to Computing Systems.** (4 cr. Prereq—High school algebra) Fundamental concepts of computing systems, from machine level to high-level programming.

**EE 1701W. Energy, Environment, and Society.** (3 cr) 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.


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**EE 2006. Introductory Circuits Laboratory.** (5 cr) In combination with #2001, completes the 2002 requirement.


**EE 2103. Introduction to Electronics II.** (1 cr. #2001) Active and passive analog filters, high frequency diode and transistor models, amplifier frequency response, multistage amplifiers. Covers electronics content of 2001 in half a semester.

**EE 2301. Introduction to Digital System Design.** (4 cr. Prereq—Math 1272 or 1372 or 1572, #3031) 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 cr. Prereq—#3001, 2301, CSci [1113 or 1901], #3061) Computer organization, assembly language programming, arithmetic/logical operations, parallel and serial output/input. Microprocessor/microcontroller interfacing: memory design, exception handling, interrupts, using special-purpose features such as A/D converters, fuzzy logic, DSP operations. Integral lab.


**EE 3006. Fundamentals of Electrical Engineering Laboratory.** (1 cr. Prereq—#3005) Lab to accompany 3005.


**EE 3019. Signals and Systems Review.** (1 cr. Prereq—Math 2243 or #2373) Linear systems, Laplace transforms. Discrete-time systems, z-transform and its inverse, unilateral z-transform. Transfer function time, frequency analysis.


**EE 3101. Circuits and Electronics Laboratory I.** (2 cr. Prereq—#3115 or #3115) Experiments in circuits/electronics.
EE 3102. Circuits and Electronics Laboratory II. (2 cr. Prereq–3101) Experiments in circuits and electronics; team project design.

EE 3105. Circuits and Electronics Transition Laboratory. (7.5 cr; A-F only. Prereq–3015) Together with 3400, completes the 3101 requirement.


EE 3165. Introduction to Microelectronic Devices With Applications. (3 cr. Prereq–[2001, 3005 or Mat 3011] or #) Basic properties of semiconductors, junction diodes. Applications to emitters, MOSFETs, detectors, optical devices, magnetic devices. Micromechanical systems. Nonlinear devices.

EE 3601. Transmission Lines. (3 cr. Prereq–[Math 2243 or Math 2373 or Math 2573]; Phys 1302 or Phys 1402) Transmission line circuit interconnections. Time/ frequency domain behavior of infinite/terminated transmission line with series and/or shunt circuits. Calculating transmission line parameters using electrostatics/magnetostatics.

EE 3961. Industrial Assignment I. (1 cr; S-N only. Prereq–Admission to ECE co-op) Industrial work assignment in Electrical and Computer Engineering co-op program. Grade based on student’s written report of semester’s assignment, but deferred until completion of 4961.


EE 4231. Linear Control Systems: Designed by Input/Output Methods. (3 cr. Prereq–[3015, upper div IT or grad student in IT major] or #; no EE or CompE grad cr) Modeling, characteristics, and performance of feedback control systems. Stability, root locus, and frequency response methods. Digital implementation, hardware considerations.


EE 4235. Linear Control Systems Laboratory. (1 cr. Prereq–4231 or #4231; no EE or CompE grad cr) Lab to accompany 4231.

EE 4237. Space State Control Laboratory. (1 cr. Prereq–4233 or #4233; no EE or CompE grad students) Lab to accompany 4233.


EE 4505. Communications Systems Laboratory. (1 cr. Prereq–4501 or #4501; no EE or CompE grad cr) Experiments in analysis/design of wired/wireless communication systems. Lab to accompany 4501.


EE 4601. Electromagnetics for RF Engineering and Optics. (4 cr. A-F only. Prereq–3601 or equiv; no EE grad cr, no CompE grad cr) Electromagnetics, magnetostatics, electromagnetic induction, Maxwell’s equations, wave propagation in free space, guides, reflections from perfect conducting and from dielectric interfaces, resonators/antennas. Foundations of microwave engineering.

EE 4701. Electric Drives. (3 cr. Prereq–3015) 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 4721. Introduction to Power System Analysis. (4 cr. Prereq–2011) AC power systems; analysis of large power system networks; mathematics and techniques of power flow analysis, short circuit analysis, and transient stability analysis; use of a power system simulation program for design. Integral lab.


EE 4951W. Senior Design Project. (2 cr. Prereq–3015, 3115; 3016; attendance first day of class required) Team participation in formulating/solving open-ended design projects. Oral/written presentations.

EE 4961. Industrial Assignment II. (2 cr; S-N only. Prereq–3961, ECE co-op; no grad cr) Industrial work assignment in ECE co-op program. Grade based on student’s formal written report covering semester’s work.

EE 4962. Industrial Assignment III. (1 cr; S-N only. Prereq–4961, ECE co-op; A; no grad cr) Industrial work assignment in ECE co-op program. Formal written report covering semester’s work.

EE 4970. Directed Study. (1 cr. Prereq–EE-Cr or [may be repeated for cr] A) Studies of approved projects, either theoretical or experimental.

EE 4981H. Senior Honors Project I. (2 cr. Prereq–EE-Cr; honors, Sr, #) Experience in research/design for electrical/computer engineering. Oral/written reports.

EE 4982V. Senior Honors Project II. (2 cr. Prereq–4981H) Experience in research/design for electrical/computer engineering. Oral/written reports.

EE 5121. Transistor Device Modeling for Circuit Simulation. (3 cr. Prereq–[3115, 3161] or #) Basics of MOS, bipolar theory. Evolution of popular device models from early SPICE models to current industry standards.


EE 5171. Microelectronic Fabrication. (4 cr. Prereq–IT or grad) 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 cr. Prereq–5171 or #5171) 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 cr. Prereq–IT grad, 3015 or #) Properties and modeling of linear systems; linear quadratic and linear-quadratic-Gaussian regulators; maximum principle.

EE 5235. Robust Control System Design. (3 cr. Prereq–IT grad, 3015, 5231 or #) Development of control system design ideas; frequency response techniques in design of single-input/single-output (or MI/MO) systems. Robust control concepts. CAD tools.


EE 5324. VLSI Design II. (2 cr. Prereq–5323 or #) CMOS arithmetic logic units, high-speed carry chains, fast CMOS multipliers. High-speed performance parallel shifter. 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 cr. Prereq–[4301, 5322] or #5321) Complete design of an integrated circuit. Designs evaluated by computer simulation.

EE 5333. Analog Integrated Circuit Design. (3 cr. Prereq—[3115, grad student or #]) Fundamental circuits for analog signal processing. Design issues associated with MOS/BJT devices. Design techniques. Selected topics (e.g., modeling of basic IC components, design of operational amplifier or comparator or sampled-data-signal circuit filter).

EE 5361. Computer Architecture and Machine Organization. (3 cr. CSci 5201. Prereq—2301, 2361) Introduction to computer architecture. Aspects of computer systems, such as pipelining, memory hierarchy, and input/output systems. Performance metrics. Examination of each component of a computer and computer systems.


EE 5381. Telecommunications Networks. (3 cr. Prereq—[4501, 5331] or #) Fundamental concepts of modern telecommunications networks, mathematical tools required for their performance analysis. Layered network architecture, point-to-point protocols/links, delay models, multimedia communication/routing.

EE 5391. Computing With Neural Networks. (3 cr. Prereq—3025 or Stat 3091 or #) Neural networks as a computational model: connections to AI, statistics and model-based computation; associative memory and matrix computation; Hopfield networks; supervised networks for classification and prediction; unsupervised networks for data reduction; associative recognition and retrieval, optimization, time series prediction and knowledge extraction.

EE 5501. Digital Communication. (3 cr. Prereq—4501, 3025, sr or grad in It major or #) Theory and techniques of modern digital communications. Communication limits; modulation and detection; data transmission over channels with integrated intercellular and suboptimal sequence detection; equalization. Error correction coding; trellis-coded modulation; multiple access.


EE 5545. Real-Time Digital Signal Processing Laboratory. (2 cr. Prereq—4541) Lab Real-time implementation of digital signal processing (DSP) functions, including filtering, sample-rate change, and differential pulse code modulation; implementation on a current DSP chip. DSP chip architecture, assembly language, arithmetic; real-time processing issues; processor limitations; I/O handling.

EE 5549. Digital Signal Processing Structures for VLSI. (3 cr. Prereq—4541) Pipelining; parallel processing; fast convolution; FIR, rank-order, IIR, lattice, adaptive digital filters; scaling and roundoff noise; DCT; Viterbi coders; lossless coders, video compression.

EE 5551. Multiscalar and Multirate Signal Processing. (3 cr. Prereq—4541, 5531, grad in It major or #) Multirate discrete-time systems. Bases, frames; continuous wavelet transform; scaling equations; discrete wavelet transform; applications in signal and image processing.

EE 5551. Information Theory and Coding. (3 cr. Prereq—5531 or #) Source and channel models, codes for sources and channels. Entropy, mutual information, capacity, rate-distortion functions. Coding theorems.

EE 5558. Data Compression. (3 cr. Prereq—IT sr or grad or #) Source coding in digital communications and recording; codes for lossless compression; universal lossless codes; lossless compression; scalar and vector quantizer design; loss source coding theory; differential coding, trellis codes, transform and subband coding; analysis/synthesis schemes.


EE 5602. RF/Microwave Circuit Design. (3 cr. Prereq—5601 or equiv) 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, mixers/doubler).

EE 5611. Plasma-Aided Manufacturing. (4 cr. SME 5361. Prereq—Grad or upper div IT, ME 3321, ME 3322 or equiv) Manufacturing using plasma processes; plasma processes as a property processing medium; plasma spraying, welding and microelectronics processing; process control and system design; industrial speakers; a cross-disciplinary approach between heat transfer design issues and manufacturing technology.

EE 5613. RF/Microwave Circuit Design Laboratory. (2 cr. Prereq—5601) Scattering parameters, planar lumped circuits, transmission lines, RF/microwave substrate materials, matching networks/shaping elements, resonators, filters, combiners/dividers, couplers. Integral lab.

EE 5616. Antenna Theory and Design. (3 cr. Prereq—5601 or concurrent registration in 5601) Antenna performance parameters, vector potential/ radiation integral, wire antenna structures, broadband antenna structures, microstrip/aperture theory, antenna measurements.

EE 5621. Physical Optics. (3 cr. Prereq—3015 or #) Physical optics principles, including Fourier analysis of optical systems and images, scalar diffraction theory, interferometry, and coherence theory. Applications discussed include diffractions optical elements, holography, astronomical imaging, optical information processing, and microoptics.


EE 5624. Optical Electronics. (4 cr. Prereq—3601 or Phy 3002 or #) Fundamentals of lasers, including propagation of Gaussian beams, optical resonators, and theory of laser oscillation. Polarization optics, electro-optic, acousto-optic modulation, nonlinear optics, and phase conjugation.


EE 5632. Photonic Communication Devices and Systems. (3 cr. Prereq—5163 or 5624 or equiv or #) Primary solid-state components using optical communication systems. Semiconductor lasers, detectors, and optical fibers. Basic optoelectronic properties of III-V semiconductors: band structure, optical transitions, heterostructures, LEDs, semiconductor lasers, detectors. Optical network components/systems: fibers, amplifiers, power, system architectures.

EE 5653. Physical Principles of Magnetic Materials. (3 cr. Prereq—IT grad or #) Physics of diamagnetism, paramagnetism, ferromagnetism, antiferromagnetism, ferrimagnetism; ferromagnetic phenomena; static and dynamic theory of micromagnetics, magneto-optics, and magnetization dynamics; magnetic material applications.

EE 5655. Magnetic Recording. (3 cr. Prereq—IT grad or #) 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 5721. Power Generation Operation and Control. (3 cr. Prereq—4721) Engineering aspects of power system operation; economic analysis of generation plants and scheduling to minimize total cost of operation; scheduling of hydro resources and thermal plants with limited fuel supplies; loss analysis and secure operation; state estimation and optimal power flow; power system organizations.

EE 5725. Power Systems Engineering. (3 cr. Prereq—4721) Reliability analysis of large power generation and transmission systems; writing programs for state-by-state analysis and Monte Carlo analysis; power system protection systems, circuit current calculations, short circuit detection, isolating faulted components; characteristics of protection components.
Critical thinking skills in emergency settings. Patient EHS 4112. First Responder for Coaches and Athletic scenario planning. delivery models, contract negotiations, budgeting, management as related to emergency medical issues, disaster management.

communications/transportation, rural vs. urban oversight, accountability, scope of practice, across systems. Comprehensive review of aspects of U.S. culture. Basic practices generalized (3 cr; A-F only)

EHS 4999. Practicum. (3 cr; A-F only. Prereq–EHS Project in student’s employing organization or project in providing internship or integration of projects from previous coursework or development of program-related project.

EHS 5031. Basic Principles of Research. (3 cr; A-F only) Basic principles of research in emergency health services.

English as a Second Language (ESL)

Institute of Linguistics, ESL, and Slavic Languages and Literatures

College of Liberal Arts

ESL 0010. TOEFL Preparation. (0 cr [max 8 cr]; S-N only. Prereq–Non-native English speaker; see Minnesota English Center for override) Describes the format of the TOEFL test. Focuses on strategies for improving skills for each section of the test.

ESL 0020. Pronunciation Workshop. (0 cr [max 8 cr]; S-N only. Prereq–Non-native English speaker; see Minnesota English Center for override) Focuses on pronunciation in English as a Second Language.

ESL 0040. Skills Enhancement. (0 cr [max 8 cr]; S-N only. Prereq–Non-native English speaker; see Minnesota English Center for override) Focuses on pronunciation in English as a Second Language.

ESL 0080. English Through Literature. (0 cr [max 8 cr]; S-N only. Prereq–Non-native English speaker; see Minnesota English Center for override) Focuses on pronunciation in English as a Second Language.

ESL 0090. English Through Music. (0 cr [max 8 cr]; S-N only. Prereq–Non-native English speaker; see Minnesota English Center for override) Focuses on pronunciation in English as a Second Language.

ESL 0100. Topics in American Culture. (0 cr [max 6 cr]; S-N only. Prereq–Non-native English speaker; see Minnesota English Center for override) Focuses on pronunciation in English as a Second Language.

ESL 0111. Beginning Grammar. (0 cr [max 8 cr]; S-N only. Prereq–Non-native English speaker; see Minnesota English Center for override) Focuses on pronunciation in English as a Second Language.

ESL 0121. Beginning Reading/Composition. (0 cr [max 16 cr]; S-N only. Prereq–Non-native English speaker; see Minnesota English Center for override) Focuses on pronunciation in English as a Second Language.

ESL 0131. Beginning Oral Skills. (0 cr [max 16 cr]; S-N only. Prereq–Non-native English speaker; see Minnesota English Center for override) Focuses on pronunciation in English as a Second Language.

ESL 0200. Understanding American Universitie. (0 cr [max 2 cr]; S-N only. Prereq–Non-native English speaker; see Minnesota English Center for override) Focuses on pronunciation in English as a Second Language.

ESL 0211. High Beginning Grammar. (0 cr [max 8 cr]; S-N only. Prereq–Non-native English speaker; see Minnesota English Center for override) Focuses on pronunciation in English as a Second Language.

ESL 0221. High Beginning Reading/Composition. (0 cr [max 8 cr]; S-N only. Prereq–Non-native English speaker; see Minnesota English Center for override) Focuses on pronunciation in English as a Second Language.

ESL 0300. Computer Lab: Intro to Computer Basics. (0 cr [max 8 cr]; S-N only. Prereq–Non-native English speaker; see Minnesota English Center for override) Focuses on pronunciation in English as a Second Language.

ESL 0310. Computer Lab: Using the Internet for Language Learning. (0 cr [max 8 cr]; S-N only. Prereq–Non-native English speaker; see Minnesota English Center for override) Focuses on pronunciation in English as a Second Language.

ESL 0321. Low Intermediate Oral Skills. (0 cr [max 8 cr]; S-N only. Prereq–Non-native English speaker; see Minnesota English Center for override) Focuses on pronunciation in English as a Second Language.

ESL 0400. Library and Research Skills. (0 cr [max 8 cr]; S-N only. Prereq–Non-native English speaker; see Minnesota English Center for override) Focuses on pronunciation in English as a Second Language.

ESL 0411. Intermediate Grammar. (0 cr [max 8 cr]; S-N only. Prereq–Non-native English speaker; see Minnesota English Center for override) Focuses on pronunciation in English as a Second Language.
ESL 0421. Intermediate Reading/Composition. (0 cr [max 16 cr]; S-N only. Prereq–Nonnative English speaker; see Minnesota English Center for override.) Reading for main ideas and supporting ideas with increased speed; vocabulary development through study of word formation and use of dictionary. Writing fundamentals; organization and writing as a process.

ESL 0431. Intermediate Oral Skills. (0 cr [max 16 cr]; S-N only. Prereq–Nonnative English speaker; see Minnesota English Center for override.) Develop fluency and accuracy; language for specific functions; communication strategies; standard forms of organization for academic lectures; understanding natural conversational speech.

ESL 0500. Community Service Learning. (0 cr [max 8 cr]; S-N only, Prereq–Nonnative English speaker; see Minnesota English Center for override) Students will learn about and participate in community service projects.

ESL 0511. High Intermediate Grammar. (0 cr [max 8 cr]; S-N only. Prereq–Nonnative English speaker; see Minnesota English Center for override) Reviews and adds to repertoire of structures with attention to meaning, use and form; emphasizes verb phrase and control of grammar in writing.

ESL 0521. High Intermediate Reading/Composition. (0 cr [max 16 cr]; S-N only) Reading adapted as well as adapted passages; efficiency, vocabulary, drawing inferences, identifying point of view, using knowledge of organization to aid understanding, writing process, academic-style assignments.

ESL 0531. High Intermediate Oral Skills. (0 cr [max 16 cr]; S-N only, Prereq–Nonnative English speaker; see Minnesota English Center for override) Develop fluency and accuracy in everyday situations and in academic situations; special attention to communication strategies; prepares students for academic work by producing standard forms of organization and note-taking skills. Students also work on understanding natural conversational speech using a variety of authentic materials.

ESL 0600. International Business Communication. (0 cr [max 4 cr]; S-N only. Prereq–Nonnative speaker of English; see Minnesota English Center for override) How to write business letters in English. E-mail, voice mail for business.

ESL 0611. Advanced Grammar. (0 cr [max 4 cr]; S-N only. Prereq–Nonnative English speaker; see Minnesota English Center for override) Focuses on difficulties of grammar and on providing students with resources to work on them. Meaning, use and form are emphasized with increased emphasis on complex sentence patterns.

ESL 0621. Advanced Reading/Composition: The Written Word. (0 cr [max 16 cr]; S-N only. Prereq–Nonnative English speaker; see Minnesota English Center for override) Focuses on improving reading efficiency, including strategy development, as well as vocabulary skill building. Some focus on using reading to support academic writing.

ESL 0622. Advanced Reading/Composition: The Written Word. (0 cr [max 16 cr]; S-N only. Prereq–Nonnative English speaker; see Minnesota English Center for override) Continuation of ESL 0621.


ESL 0641. Advanced Listening Comprehension. (0 cr [max 8 cr]; S-N only. Prereq–Nonnative English speaker; see Minnesota English Center for override) Lecture comprehension with attention to note taking, recognizing main ideas and support, and determining the attitude of the speaker toward the subject; comprehension of complex information presented in a nonlecture format, as in television documentaries.

ESL 0651. Advanced Speaking/Pronunciation. (0 cr [max 8 cr]; S-N only. Prereq–Nonnative English speaker; see Minnesota English Center for override) Emphasizes the use of spoken English in academic settings as well as in conversation. Pronunciation focuses on individual needs.

ESL 0661. Advanced Reading. (0 cr [max 8 cr]; S-N only. Prereq–Nonnative English speaker; see Minnesota English Center for override) Students will work on comprehending authentic texts of significant lengths. Develop strategies to apply in academic reading.

ESL 0671. Advanced Composition. (0 cr [max 8 cr]; S-N only. Prereq–Nonnative English speaker; see Minnesota English Center for override) Skills needed at every stage of the writing process: finding a topic, determining an approach to the topic, planning and drafting a composition, revising, and editing. Suiting one’s writing to audience and topic, and looking at one’s own writing critically.

ESL 0700. Topics in the Media. (0 cr [max 8 cr]; S-N only. Prereq–Nonnative English speaker; see Minnesota English Center for override) Focuses on production of grammatically sophisticated structures in writing. Students edit their assignments.

ESL 0712. Grammar Through Writing. (0 cr [max 8 cr]; S-N only. Prereq–Nonnative English speaker; see Minnesota English Center for override) Production of grammatically sophisticated structures in writing. Students edit their assignments.

ESL 0713. Grammar Through Writing. (0 cr [max 8 cr]; S-N only. Prereq–Nonnative English speaker; see Minnesota English Center for override) Production of grammatically sophisticated structures in writing. Students edit their assignments.

ESL 0721. High Advanced Reading/Composition. (0 cr [max 16 cr]; S-N only. Prereq–Nonnative English speaker; see Minnesota English Center for override) Focuses on difficult vocabulary, grammar, and on providing students with resources to work on them. Meaning, use and form are emphasized with increased emphasis on complex sentence patterns.

ESL 0732. High Advanced Oral Skills. (0 cr [max 16 cr]; S-N only. Prereq–Nonnative English speaker; see Minnesota English Center for override) Listening/speaking skills in addition to understanding of U.S. culture through interaction with American students. Attend a weekly seminar with American university students and visit local schools to make presentations about your home country. Pronunciation instruction will focus on individual needs.

ESL 0741. High Advanced Listening Comprehension. (0 cr [max 8 cr]; S-N only. Prereq–Nonnative English speaker; see Minnesota English Center for override) Lecture comprehension with special attention to note taking, recognizing main ideas and support, and understanding relationship of ideas, implied information, structure of speech; comprehension of information presented in a wide variety of authentic materials.

ESL 0751. High Advanced Speaking/Pronunciation. (0 cr [max 8 cr]; S-N only. Prereq–Nonnative English speaker; see Minnesota English Center for override) Emphasizes the use of spoken English in academic settings, including presentation skills and discussion skills; pronunciation focuses on individual needs of students.

ESL 0761. High Advanced Reading. (0 cr [max 8 cr]; S-N only. Prereq–Nonnative English speaker; see Minnesota English Center for override) Continued development of strategies to increase reading efficiency and comprehension; paraphrasing/summarizing text; quoting and citing sources; understanding writer’s perspective.

ESL 0771. High Advanced Composition. (0 cr [max 8 cr]; S-N only. Prereq–Nonnative English speaker; see Minnesota English Center for override) Refining of skills needed in the writing process; refinement of use of complex grammatical structures; research to support writing.

ESL 0800. English for Science and Technology. (0 cr [max 2 cr]; S-N only. Prereq–Nonnative English speaker; see Minnesota English Center for override) English for formulating hypotheses, describing experiments, and presenting results; includes reading, writing, listening, and speaking activities based on scientific and technical English.

ESL 0810. SIELOP: Grammar. (0 cr [max 5 cr]; S-N only. Prereq–Nonnative speaker of English; see Minnesota English Center for override) Form, function, meaning of English grammar.

ESL 0820. SIELOP: Reading. (0 cr [max 3 cr]; S-N only. Prereq–Nonnative speaker of English; see Minnesota English Center for override) English language reading skills.

ESL 0830. SIELOP: Composition. (0 cr [max 5 cr]; S-N only. Prereq–Nonnative speaker of English; see Minnesota English Center for override) English writing skills.

ESL 0840. SIELOP: Speaking/Pronunciation. (0 cr [max 3 cr]; S-N only. Prereq–Nonnative speaker of English; see Minnesota English Center for override) English speaking, pronunciation skills.

ESL 0850. SIELOP: Listening. (0 cr [max 5 cr]; S-N only. Prereq–Nonnative speaker of English; see Minnesota English Center for override) English listening skills.

ESL 0911. Fundamentals in English as a Second Language. (0 cr [max 12 cr]; S-N only. Prereq–Dept consent, satisfactory score on [EPT or MNBatt or TOEFL]) Basic knowledge/skills needed for daily communication in spoken English. Grammatical structures explained with reference to their uses in social situations. Pronunciation.

ESL 0912. Fundamentals in English as a Second Language. (0 cr [max 12 cr]; S-N only. Prereq–Dept consent, satisfactory score on [EPT or MNBatt or TOEFL]) Basic knowledge/skills needed for daily communication in spoken English. Grammatical structures explained with reference to their uses in social situations. Pronunciation.

ESL 0931. Developing Fluency in English as a Second Language. (0 cr [max 12 cr]; S-N only. Prereq–Dept consent, satisfactory score on [EPT or MNBatt or TOEFL]) Communication skills for social, academic, and professional purposes. Emphasizes listening/ speaking. Content drawn from mass media.

ESL 0932. Developing Fluency in English as a Second Language. (0 cr [max 12 cr]; S-N only. Prereq–Dept consent, satisfactory score on [EPT or MNBatt or TOEFL]) Communication skills for social, academic, and professional purposes. Emphasizes listening/ speaking. Content drawn from mass media.

ESL 0933. Developing Fluency in English as a Second Language. (0 cr [max 12 cr]; S-N only. Prereq–Dept consent, satisfactory score on [EPT or MNBatt or TOEFL]) Communication skills for social, academic, and professional purposes. Emphasizes listening/ speaking. Content drawn from mass media.

ESL 0937. International Business Communication. (0 cr [max 16 cr]; S-N only. Prereq–Nonnative speaker of English; see Minnesota English Center for override) Oral communication in a business setting. English as used in international trade, finance, and marketing. Listening/speaking skills for business materials. E-mail, voice mail. Writing business letters.
Course Descriptions

**English: Creative and Professional Writing (EngW)**

**Department of English Language and Literature College of Liberal Arts**

**EngW 1101W. Introduction to Creative Writing.**
(4 cr)
Writing poetry and prose. Small group workshops and lecture presentations by visiting writers. For those who want to try creative writing, improve reading skills, and learn more about the creative process.

**EngW 1102. Introduction to Fiction Writing.**
(3 cr)
Beginning instruction in the art of fiction: characterization, plot, dialogue, and style. Writing exercises to help students generate ideas. Students read and discuss published fiction as well as their own writing.

**EngW 1103. Introduction to Poetry Writing.**
(3 cr)
Beginning instruction in the art of poetry. Discussion of student poems and contemporary poetry, ideas for generating material, and writing exercises both in and out of class.

**EngW 1104. Introduction to Literary Nonfiction Writing.**
(3 cr)
Beginning instruction in the art of literary nonfiction, including the memoir. Discussion of student work and contemporary creative nonfiction, ideas for generating material, and writing exercises.

**EngW 3101. Intermediate Creative Writing.**
(3 cr; Prereq—EngW 1101 or A)
For students with experience in creative writing. Exercises, experiments, assigned readings, and discussion of students’ work.

**EngW 3102. Intermediate Fiction Writing.**
(3 cr; Prereq—EngW 1101 or 1102 or A)
Exercises, experiments, assigned readings, discussion of student work.

**EngW 3103. Advanced Fiction Writing.**
(4 cr; Prereq—3102 or A)
Advanced workshop.

**EngW 3104. Intermediate Poetry Writing.**
(3 cr; Prereq—EngW 1101 or 1103 or A)
Exercises, experiments, assigned readings, discussion of student work.

**EngW 3105. Advanced Poetry Writing.**
(4 cr; Prereq—3104 or A)
Opportunity to explore new poetic possibilities and read widely in contemporary poetry/poetics. Advanced workshop.

**EngW 3106. Intermediate Literary Nonfiction Writing.**
(3 cr; Prereq—1104 or A)
Exercises, experiments, assigned readings, and discussion of students’ work.

**EngW 3107. Advanced Nonfiction Writing.**
(4 cr; Prereq—3106 or A)
Advanced workshop.

**EngW 3110. Topics in Creative Writing.**
(3 cr; Max 9 cr.; Prereq—1101 or 1102 or 1103 or 1104 or A; honors; Topics specified in Class Schedule)

**EngW 3110H. Topics in Creative Writing.**
(3 cr; Max 9 cr.; Prereq—1101 or 1102 or 1103 or 1104; honors; Topics specified in Class Schedule)

**EngW 3960. Writing Workshop for Majors.**
(4 cr; A-F only; Prereq—EngW 3000 or equivalent [workshop genre]; [ir or sr], major advisor approval; A)
Topics specified in Class Schedule.

**EngW 3960W. Writing Workshop for Majors.**
(4 cr; A-F only; Prereq—EngW 3000 or equivalent [workshop genre]; [ir or sr], major advisor approval, writing portfolio; A)
Topics specified in Class Schedule.

**EngW 5102. Advanced Fiction Writing.**
(4 cr; Max 8 cr.; Prereq—A)
Advanced workshop for graduate students with considerable experience in writing fiction.

**EngW 5103. Advanced Fiction Writing.**
(4 cr; Max 8 cr.; Prereq—A)
Advanced workshop for students with considerable experience in writing fiction.

**EngW 5104. Advanced Poetry Writing.**
(4 cr; Max 8 cr.; Prereq—A)
Advanced workshop for graduate students with considerable experience in writing poetry. An opportunity to explore new poetic possibilities and to read widely in contemporary poetry and poetics.

**EngW 5105. Advanced Poetry Writing.**
(4 cr; Max 8 cr.; Prereq—A)
Advanced workshop for students with considerable experience in writing poetry. An opportunity to explore new poetic possibilities and to read widely in contemporary poetry and poetics.

**EngW 5106. Advanced Literary Nonfiction Writing.**
(4 cr; Max 8 cr.; Prereq—A)
Advanced workshop for graduate students with considerable experience in writing literary nonfiction.

**EngW 5107. Advanced Nonfiction Writing.**
(4 cr; Max 16 cr.; Prereq—A)
Advanced workshop for students with considerable experience in writing literary nonfiction.

**EngW 5110. Topics in Advanced Fiction Writing.**
(4 cr; Max 16 cr.; Prereq—A)
Special topics in fiction writing. Topics specified in Class Schedule.

**EngW 5120. Topics in Advanced Poetry.**
(4 cr; Max 16 cr.; Prereq—A)
Special topics in poetry writing. Topics specified in Class Schedule.

**EngW 5130. Topics in Advanced Creative Writing.**
(4 cr; Max 16 cr.; Prereq—A)
Workshop. Might include work in more than one genre.

**EngW 5201. Journal and Memoir Writing.**
(3 cr)
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 5202. Journal and Memoir Writing.**
(3 cr)
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 5204. Playwriting.**
(4 cr; Max 8 cr.; Prereq—A)
Advanced workshop. Contact creative writing program for specific description.

**EngW 5205. Screenwriting.**
(4 cr; Prereq—A)
Advanced workshop. Contact creative writing program for specific description.

**EngW 5210. Topics in Advanced Literary Nonfiction.**
(4 cr; Max 16 cr.; Prereq—A)
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 cr; Max 8 cr.; Prereq—Grad student; A)
Special topics in reading fiction, literary nonfiction, poetry. Topics specified in Class Schedule.

**EngW 5501. Minnesota Writing Project Selective Institute.**
(1-3 cr; Max 3 cr.; Prereq—Competitive selection for 20 educators [K-college]; Emphasizes participants’ teaching other best practices in writing instruction. Participants attend a retreat before beginning.

**EngW 5502. Minnesota Writing Project Open Institute.**
(2 cr; Prereq—Teacher [K-college]. [School district sponsorship or MWP approval]) Summer workshop to refine skills in writing instruction.

**EngW 5570. Minnesota Writing Project Directed Studies.**
(1-3 cr; Max 3 cr; A-F only)
Current theories of writing and writing pedagogy. Topics vary. Workshop.

**EngW 5606. Literary Aspects of Journalism.**
(3 cr; A-F only; §4, §5 5606)
Literary aspects of journalism as exemplified in and influenced by works of English/American writers past/present. Lectures, discussions, weekly papers.

**EngW 5993. Directed Study in Writing.**
(1-4 cr; Max 18 cr.; Prereq—A; A)
Projects in writing poetry, fiction, drama, and nonfiction, or study of ways to improve writing.

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**English: Literature (EngL)**

**Department of English Language and Literature College of Liberal Arts**

**EngL 1001V. Honors: Introduction to Literature: Poetry, Drama, Narrative.**
(4 cr; A-F only; §1001)
Prereq—Honors
Basic techniques for analyzing/understanding literature. Readings of novels, short stories, poems, plays.

**EngL 1001W. Introduction to Literature: Poetry, Drama, Narrative.**
(4 cr; §1002)
Prereq—EngW 1011 or equiv)
Basic techniques for analyzing/understanding literature. Readings of novels, short stories, poems, plays.

**EngL 1181V. Honors: Introduction to Shakespeare.**
(4 cr; A-F only §1181)
Prereq—Honors
Survey of Shakespeare’s work, treating approximately 10 plays. Lecture.

**EngL 1181W. Introduction to Shakespeare.**
(4 cr; §1182)
Survey of Shakespeare’s work, treating approximately 10 plays. Lecture.

**EngL 1201V. Honors: Introduction to American Literature.**
(4 cr; A-F only; §1201)
Prereq—Honors
Chronologically/thematically based readings from American literature. Approaches to literary analysis/ criticism. Social/historical contexts of authorship/ reading, literary artistry/conventions. Discussion, writing.

**EngL 1201W. Introduction to American Literature.**
(4 cr; §1202)
Chronologically/thematically based readings from American literature. Approaches to literary analysis/ criticism. Social/historical contexts of authorship/ reading, literary artistry/conventions. Discussion, writing.

**EngL 1301V. Honors: Introduction to Multicultural American Literature.**
(4 cr; A-F only; §1301)
Prereq—Honors
Representative works by African American, American Indian, Asian American, and Chicano/Chicana writers, chiefly from twentieth century. Social/cultural factors in America’s literary past/present.

**EngL 1301W. Introduction to Multicultural American Literature.**
(4 cr; §1302)
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.

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For definitions of course numbers, symbols, and abbreviations, see page 296.
EngL 1401V. Honors: Introduction to World Literatures in English. (4 cr; A-F only) §1401.

Prereq.: Freshman Seminar. Introduction to diverse works 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 World Literatures in English. (4 cr; A-F only)

Diverse works produced in English outside the United States and Britain. Works represent different cultures, but treat concerns derived from a common post-colonial legacy.

EngL 1501. Literature of Public Life. (4 cr; A-F only)

Exploration of the practice of citizenship. Historical themes, contemporary issues in American public life: access of citizenship, tensions between social duties and individual freedoms, role of moral values in public life. Diverse literary materials.

EngL 1601W. English Language and Society. (4 cr)

Nonetheoretical survey of systematic, dynamic, creative nature of human language. Emphasizes English language.

EngL 1701. Modern Fiction. (4 cr)

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 1905. Topics: Freshman Seminar. (3 cr; A-F only) §1905.

Topics: Freshman Seminar. (3 cr; A-F only) Prereq.–FR yr or max 36 cr) Topics specified in Class Schedule.

EngL 3001V. Honors: Textual Interpretation, Analysis, and Investigation. (4 cr; A-F only) §3001.

Prereq.–Honors) 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 Interpretation, Analysis, and Investigation. (4 cr; §3001V, §3801) §3001.

Prereq.–CLA honors) Training/practice in analyzing various literary forms. Emphasizes poetry. Use of argument, evidence, and documentation in literary papers. Introduction to major developments in contemporary criticism.

EngL 3002. Modern Literary Criticism and Theory. (3 cr; §3802, Prereq.–[3001, 12 cr in other literature courses) or §#)

Problems of interpretation/criticism. Questions of meaning, form, authority, literary history, social significance.

EngL 3002H. Honors: Modern Literary Criticism and Theory. (3 cr; §3002, Prereq.–CLA honors) §3002.

Prereq.–CLA honors) Problems of interpretation/criticism. Questions of meaning, form, authority, literary history, social significance.

EngL 3003W. Historical Survey of British Literatures I. (4 cr)

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 cr)

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 Brontës, Austen, Dickens, Wilde, Yeats, Woolf, and Thomas.

EngL 3005W. Survey of American Literatures and Cultures I. (4 cr)

Readings in American literature from first European contact through colonial times, and to the mid-19th century. Readings in several genres will include world-famous classics as well as the work of people of color and women. Attention to historical contexts.

EngL 3006W. Survey of American Literatures and Cultures II. (4 cr)

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 cr; §3807) §3007.

Prereq.–CLA honors) 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 cr; §3007, Prereq–CLA honors) §3007.

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 3101. Studies In Poetry. (3 cr [max 9 cr]) §3101.

Special topics related to reading poetry in various interpretive contexts.

EngL 3101H. Studies In Poetry. (3 cr [max 9 cr]) §3101.

Special topics related to reading poetry in various interpretive contexts.

EngL 3102. Studies In Narrative. (1-4 cr [max 9 cr]) §3102.

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 Class Schedule.

EngL 3102H. Honors: Studies In Narrative. (3 cr; A-F only) §3102H.

Prereq.–Honors) 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 3103. Studies In Drama. (3 cr [max 9 cr]) §3103.

Topics may include English Renaissance tragedy, English Restoration and 18th century, or American drama by writers of color; single-author courses focused on writers such as Tennessee Williams and Eugene O’Neill, or issues and themes, such as gender and performance.

Prereq.–Honors) Topics may include English Renaissance tragedy; and 18th century; American drama by writers of color; single-author courses focused on writers such as Tennessee Williams and Eugene O’Neill; issues/themes such as gender and performance.

EngL 3104. Studies In Film. (2-3 cr [max 9 cr]) §3104.

Topics related to the art of moving pictures, film as a form of literature, history of the medium, and the cultural contexts in which it developed. Emphasis on the American film industry.

EngL 3110. Medieval Literatures and Cultures. (3 cr [max 9 cr]) §3110.

Major and representative works of the Middle Ages. Topics specified in Class Schedule.

EngL 3111. Survey of English Literature I. Transition. (3 cr; A-F only) §3111.

Historical survey of major figures, movements, and trends in English literature. Chaucer to Marvell, including Spenser, Shakespeare, and Donne.

EngL 3112. Survey of English Literature II. Transition. (3 cr; A-F only) §3112.

Historical survey of major figures, movements, and trends in English literature. Blake to Yeats, including Wordsworth, Coleridge, Keats, Tennyson, and the Browning.

EngL 3131. Advanced Shakespeare. (3 cr) §3131.

Prereq.–3007 or #) Intensive study of two to four plays, exploration of less familiar plays or of other works including the Sonnets, performance as interpretation with comparative analysis of multiple performances of a play or plays, critical study of multiple-text plays.

EngL 3132. Early Modern Literatures and Cultures I. (3 cr)


EngL 3132H. Honors: Early Modern Literatures and Cultures I. (3 cr; §3132) §3132.


EngL 3133. Early Modern Literatures and Cultures II. (3 cr)

Major and representative works of the Restoration and 18th century (1660–1798). Typical authors: Dryden, Pope, Swift, Johnson, Boswell, Fielding.

EngL 3151. Romantic Literatures and Cultures. (3 cr) §3151.

British literature written between 1780 and 1830. Examine the concept of Romanticism, the effects of the French Revolution on literary production, and the role of the romantic artist.

EngL 3161. Victorian Literatures and Cultures. (3 cr) §3161.

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 Bronet.

EngL 3161H. Victorian Literatures and Cultures. (3 cr) §3161H.

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 Bronet.

EngL 3171. Modern British Literatures and Cultures. (3 cr) §3171.

Survey of principal writers, intellectual currents, conventions, genres and themes in Britain from 1950 to the present. Typically included are Beckett, Golding, Kingsley and Martin Amis, Murdoch, Larkin, Hughes, Heaney, Lessing, Shaffer, Stoppard, Fowles, and Drabble.

EngL 3180. Contemporary Literatures and Cultures. (3 cr) §3180.

Examine issues related to the reading and understanding of British, American, and Anglophone fiction and poetry in a variety of interpretive contexts.

EngL 3211. American Poetry Before 1900. (3 cr) §3211.

Poems from the Puritans to the end of the 19th century. The course attends to the intellectual and cultural background of the poets, poetic theory, and form.

EngL 3212. American Poetry from 1900. (3 cr) §3212.

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 background of the poets, poetic theory and form.
Explore literature and culture produced by and about gay, lesbian, bisexual, and transgendered people. Emphasis on the importance of examining materials usually falsified or ignored in earlier literary and cultural studies and how traditional accounts need to be revised in light of significant contributions of GLBTQ people to literature and culture.

EngL 3350. Topics in Multicultural American Literature. (3 cr [max 9 cr])

The writings of specific ethnic groups with an emphasis on historical or cultural context. Topics may include American minority drama, the Harlem Renaissance, Asian-American literature and film, African-American women writers. Topics specified in Class Schedule.

EngL 3330. Gay, Lesbian, Bisexual, and Transgender Literature. (3 cr [max 9 cr])

Explore literature and culture produced by and about gay, lesbian, bisexual, and transgendered people. Emphasis on the importance of examining materials usually falsified or ignored in earlier literary and cultural studies and how traditional accounts need to be revised in light of significant contributions of GLBTQ people to literature and culture.

EngL 3350. Women Writers. (3 cr [max 9 cr])

Groups of writers in the 19th and/or 20th centuries. Will focus either on writers from a single country or be comparative in nature. The course will be organized thematically or according to topics of contemporary and theoretical interest.

EngL 3350H. Honors: Women Writers. (3 cr. §3350).

Prereq–CLA honors or A

Groups of writers in 19th or 20th century. Either focuses on writers from a single country or is comparative, or organized thematically or according to topics of contemporary/theoretical interest.

EngL 3400. Post-Colonial Literatures. (3 cr [max 9 cr])

Varied topics in post-colonial literatures. Typical novelists include Chinua Achebe, Tsitsi Dangarembga, Fadia Faqiir, Salman Rushdie; filmmaker Kidlat Tahimik, and “dub” poets Mutabaruka and Jean Binta Breeze.

EngL 3501. Public Discourse: Reading Between and Beyond the Lines. (3 cr)

Public discourse in various geographic regions and historical periods. See Course Guide for specific course description.

EngL 3581. Folklore. (3 cr)

Folklore genres such as proverbs, prose narratives (tales and legends), foodways, and games. Outline of the history of folklore.

EngL 3591. Introduction to African American Literature. (3 cr)

Afro-American autobiography, fiction, essay, poetry, drama, and folklore from the late 18th century to the present.

EngL 3591W. Introduction to African American Literature. (3 cr)

Afro-American autobiography, fiction, essay, poetry, drama, and folklore from the late 18th century to the present.

EngL 3592. Introduction to Black Women Writers in the United States. (3 cr)

Literature of African American women writers explored in novels, short stories, essays, poetry, autobiographies, drama from 18th to late-20th century.

EngL 3601W. Analysis of English Language and Culture. (4 cr. §EngC 3601W)


EngL 3602. Gender and the English Language. (4 cr)

Connections between gender and other social factors that influence history/future of English language. Race, ethnicity, class, regional/national variation, religion, technology. Gender theories as they relate to social issues, texts, and discourse practices.

EngL 3602W. Gender and the English Language. (4 cr)

Connections between gender and other social factors that influence history/future of English language. Race, ethnicity, class, regional/national variation, religion, technology. Gender theories as they relate to social issues, texts, and discourse practices.

EngL 3603W. World Englishes. (4 cr)

Historical background, psychosocial significance, and linguistic characteristics of diverging varieties of English spoken around world, especially in postcolonial contexts (Caribbean, Africa, Asia). Development of local standards/vernaculars. Sociolinguistic aspects of ethnolects.

EngL 3604. Public Discourse. (3 cr)

Popular culture and media as important modes of cultural discourse: their histories/rhetorics, their systems of production/circulation, their work in constructing us and our work in constructing them.

EngL 3660. Literacy and American Cultural Diversity. (4 cr)

Academic study of nature, acquisition, institutionalization, and state of literacy in the United States. Focuses on issues of culturally diverse and disadvantaged members of society. Service-learning component requires tutoring of children/adults in community service agencies.

EngL 3607. Introduction to Academic Literacy. (4 cr)

Theories of literacy in academic disciplines. Different rhetorical conventions across disciplines. Emphasizes improving academic writing using one-to-one tutoring sessions. Service learning as peer tutor, this semester and next.

EngL 3611. History of the English Language. (4 cr)

Development of English language from Old English (mid 5th century) to Middle English (around 1100) to Early Modern English (about 1500).

EngL 3612. Old English I. (3 cr)

Introduction to the language through 1150 A.D. Culture of Anglo-Saxons. Selected readings in prose/poetry.

EngL 3613. Old English II. (3 cr. §5613).

Prereq–3612

Critical reading of texts. Introduction to versification. Readings of portions of Beowulf.

EngL 3621W. Writing Beyond the Academy. (4 cr.

Prereq–Completion of fr writing requirement, 60 cr, approved site arranged by (CCLC, director of undergrad studies in English department)

Internship. Analyses of writing styles, genres, and rhetorical contexts outside the academy.

EngL 3632. Electronic Text. (3 

§5632)

Status/function of text, related questions as framed by electronic text.

EngL 3633. History of Writing Technologies. (4 cr)


EngL 3641. Editing for Publication. (4 cr)

Practice professional editing of various kinds of texts (e.g., scientific/technical writing). Introduction to editing levels, from substantive revision to copyediting. Computer-mediated editorial practices.

EngL 3870. Figures in English and North American Literature. (3 cr [max 9 cr])

Topics specified in the Class Schedule.

EngL 3880. General Topics. (3 cr [max 9 cr])

Topics specified in the Class Schedule.
EngL 5200. Early Modern Literature and Culture. (3 cr. [max 9 cr])
Topical readings in early modern poetry, prose, fiction, and drama. Attention to relevant scholarship or criticism. Prepares graduate students for work in other courses or seminars.
EngL 5205. 19th-Century Literature and Culture. (3 cr. [max 9 cr])
19th-century British, American, and post-Colonial literatures. Topics may include British Romantic or Victorian literatures, 19th-century American literature, important writers from a particular literary school, a genre (e.g., the novel). Readings.
EngL 5270. 20th-Century Literature and Culture. (3 cr. [max 9 cr])
Prereq—Grad student or #)
20th-century British, Irish, or American literatures, or topics involving literatures of two nations. Focus either on a few important writers from a particular literary school or on a genre (e.g., drama). Topics specified in Class Schedule.
EngL 5291. Contemporary Literature and Culture. (3 cr)
EngL 5330. Topics in Drama. (3 cr. [max 9 cr])
Prereq—Grad student or #)
Wide reading in literature of a given period or subject. Prepares students for work in other courses/ seminars. Relevant scholarship/criticism. Topics specified in Class Schedule.
EngL 5401. Introduction to Editing. (4 cr)
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 5402. Advanced Editing. (4 cr. Prereq—5401, Α, Λ)
Editing long text. Fiction, children’s literature, translations, indexes. Workshops/seminar.
EngL 5581. Folklore I. (3 cr. Prereq—Grad student or #)
Folklore genres such as proverbs, oral prose narratives (tales/legends), foodways, and games. Manner in which folklore is transmitted/changed. Focus on how folklore functions in literature, the mass media, and everyday life.
EngL 5582. Folklore II. (3 cr. Prereq—[5581, grad student] or #)
Training in collection of folklore materials.
EngL 5593. The Afro-American Novel. (3 cr. §Afro 5593)
Contextual readings of 19th-/20th-century black novelists, including Chesnut, Hurston, Wright, Baldwin, Petry, Morrison, and Reed.
EngL 5602. Gender and the English Language. (3 cr. Prereq—Grad student or #)
Introduction to features of English that are gender-marked or gender-biased. Connections between language theory and social structures, including class and ethnicity. Patterns of women’s/men’s speech in specific social contexts. Gender and writing. Sociolinguistics and sexual orientation.
EngL 5603. Varieties of World English. (3 cr. Prereq—Grad student or #)
Historical background, psychosocial significance, and linguistic characteristics of diverging varieties of English spoken around the world, especially in postcolonial contexts (Caribbean, Africa, Asia). Development of local standards/vernaculars. Sociolinguistic methods of analysis.
EngL 5605. Social Variation in American English. (3 cr. Prereq—Grad student or #)
Describing and analyzing linguistic variation from sociolinguistic perspective in the United States and the Caribbean. Social history of voluntary/ enforced migrations leading to development of regional dialects, pidgins, creoles, and urban varieties.
EngL 5611. History of the English Language. (3 cr. Prereq—Grad student or #)
Development of English language from Old English (mid-5th century) to Middle English (around 1100) to Early Modern English (about 1500).
EngL 5612. Old English I. (3 cr. §5612. Prereq—Grad student or #)
Introduction to the language through A.D. 1150. Anglo–Saxon culture. Selected readings in prose/poetry.
EngL 5613. Old English II. (3 cr. §5613. Prereq—[5612 or 5612i, grad student] or #)
Critical reading of texts, introduction to versification. Reading of Beowulf.
EngL 5621. Irish Language I. (5 cr. Prereq—Undergrad English major or #)
EngL 5622. Irish Language II. (5 cr. Prereq—5621)
EngL 5630. Theories of Writing and Instruction. (3 cr. Prereq—Grad student or #)
Assumptions of classical/contemporary rhetorical theory, especially as they influence interdisciplinary field of composition studies.
EngL 5632. Electronic Text. (3 cr. §5632)
Prereq—Grad student or #)
Status/function of text in electronic networking. Related questions as reframed by electronic text.
EngL 5640. Research Methods in Rhetoric, Composition, and Language. (3 cr. Prereq—Grad student or #)
Research paradigms, methodologies, and procedures (e.g., ethnographic, case-study, historical, critical, quantitative, text-analytical, survey-based). Emphasizes reading/analyzing existing research studies and preparing original research. Topics specified in Class Schedule.
EngL 5650. Topics in Rhetoric, Composition, and Language. (3 cr. Prereq—Grad student or #)
Topics specified in Class Schedule.
EngL 5690. Minnesota Writing Project: Directed Studies. (1-3 cr [max 30 cr])
Workshops. Theories of writing and writing pedagogy. Writing for publication. Research topics in applied literacy.
EngL 5800. Practicum in the Teaching of English. (2 cr [max 9 cr]; 5-N only. Prereq—Grad student, #)
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 5992. Directed Readings/Study/Research. (1-15 cr [max 15 cr])
Prereq—Grad student or [P, Α, Κ] Guided individual reading.

English: Writing, Rhetoric, and Language (EngC)
Department of English Language and Literature
College of Liberal Arts
EngC 1001. Preparation for University Writing. (4 cr. Prereq—Category 4 placement; some sections may be limited to ESL students)
Guided writing practice in prewriting, drafting, and revising as well as grammar, sentence structure, and paragraphing. For students who are not fully prepared for academic writing. Weekly meetings with a tutor in the Student Writing Center required.
EngC 1011. University Writing and Critical Reading. (4 cr. §1012, §1013, §1014, §1015, §1011H, §GC 1422, §GC 1423, §GC 1424. Prereq—Placement in category 2 or 3; some sections limited to ESL)
Critical reading/interpretation of selected texts. Research in various types of resources. Writing through several drafting steps. Finished writing is revised/edited to meet university-level standards of persuasiveness, precision, and correctness.
EngC 1011H. Honors: University Writing and Critical Reading. (4 cr. §1011H, §1012, §1013, §1014, §1015, §1011H, §GC 1422, §GC 1423, §GC 1424. Prereq—Honors, [placement in category 2 or 3])
Critical reading/interpretation of texts, research in various resources, writing through several drafting steps. Finished writing is revised/edited to meet university-level standards of persuasiveness, precision, and correctness.
EngC 1012. University Writing and Critical Reading: Perspectives on Multiculturalism. (4 cr. §1011, §1013, §1014, §1015, §1012H, §GC 1422, §GC 1423, §GC 1424. Prereq—Placement in category 2 or 3; some sections limited to ESL)
Extended practice in writing on topics concerning cultural diversity. Projects involving critical reading/interpretation of selected texts, research on various types of resources, and writing that moves through several drafting steps. Finished writing is revised/edited to meet university-level standards of persuasiveness, precision, and correctness.
EngC 1012H. University Writing and Critical Reading: Perspectives on Multiculturalism. (4 cr. §1011H, §1012, §1013, §1014, §1015, §1012H, §GC 1422, §GC 1423, §GC 1424. Prereq—Honors, [placement in category 2 or 3])
Extended practice in writing on topics concerning cultural diversity. Critical reading/interpretation of texts, research in various resources, writing through several drafting steps. Finished writing is revised/edited to meet university-level standards of persuasiveness, precision, and correctness.
EngC 1013. University Writing and Critical Reading: Nature and the Environment. (4 cr. §1011, §1012, §1014, §1015, §1013H, §GC 1422, §GC 1423, §GC 1424. Prereq—[placement in category 2 or 3; some sections limited to ESL]
Writing on topics concerning the environment. Critical reading/interpretation of selected texts. Research in various types of resources. Writing through several drafting steps. Finished writing is revised/edited to meet university-level standards of persuasiveness, precision, and correctness.
EngC 1013H. University Writing and Critical Reading: Nature and the Environment. (4 cr. §1011H, §1012, §1014, §1015, §1013H, §GC 1422, §GC 1423, §GC 1424. Prereq—Honors, [placement in category 2 or 3])
Writing on topics concerning the environment. Critical reading/interpretation of texts, research in various resources, writing through several drafting steps. Finished writing is revised/edited to meet university-level standards of persuasiveness, precision, and correctness.
Course Descriptions

EngC 1014. University Writing and Critical Reading: Contemporary Public Issues. (4 cr.)  
Prereq—Completion of freshman writing requirement. Writing on topics concerning citizenship and public ethics. Projects involve critical reading/interpretation of selected texts, research in various types of resources, and writing through several drafting steps. Final writing is revised/edited to meet university-level standards of persuasiveness, precision, and correctness.

EngC 1015. University Writing and Critical Reading: Perspectives on Globalization. (4 cr.)  
Prereq—Placement in category 2 or 3; some sections limited to ESL  
Prereq—Completion of freshman writing requirement. Writing on topics concerning citizenship, public ethics. Critical reading/interpretation of texts, research in various resources, writing through several drafting steps. Final writing is revised/edited to meet university-level standards of persuasiveness, precision, and correctness.

EngC 1021. Intermediate Expository Writing. (4 cr.)  
Prereq—EngC 1011 or 1012 or 1013 or 1014  
Focuses on the range of choices writers make based on audience, purpose, and context. Relies on critical reading and a variety of writing assignments to improve control over writing and the effect it will have on intended audiences.

EngC 1021W. Intermediate Expository Writing. (4 cr.)  
Prereq—EngC 1011 or 1012 or 1013 or 1014  
Focuses on the range of choices writers make based on audience, purpose, and context. Relies on critical reading and a variety of writing assignments to improve control over writing and the effect it will have on intended audiences.

EngC 1601W. English Language and Society. (4 cr.)  
Provides a general, non-technical understanding of the systematic, dynamic and creative nature of human language, with special application to the English language.

EngC 3027W. Advanced Expository Writing. (4 cr.)  
Prereq—Completion of freshman writing requirement. Incorporating narrative, descriptive, analytical, persuasive techniques into writing on general topics. Effectively communicating through critical reading, interpretation of library resources, awareness of context/audience.

EngC 3603W. World Englishes. (3 cr.)  
Historical background, psychosocial significance, and linguistic characteristics of diverging varieties of English spoken around the world, especially in postcolonial contexts (Caribbean, Africa, Asia). Development of local standards/vernaculars. Sociolinguistic methods of analysis.

EngC 3605W. Social Variation in American English. (4 cr.)  
Description and analysis of English language variation from a sociolinguistic perspective in the United States and the Caribbean. Social history of migrations (voluntary and enforced) leading to the development of new varieties of rural dialects, pidgins, creoles and urban varieties.

EngC 3606. Literacy and American Cultural Diversity. (4 cr.)  
Academic study of the nature, acquisition, institutionalization, and present state of literacy in the United States. Special focus on issues of culturally diverse and disadvantaged members of society. Service-learning component requires tutoring (min. 2 hours per week) of children and adults in community service agencies.

EngC 3621W. Writing Beyond the Academy. (4 cr.)  
Prereq—Completion of freshman writing requirement, 60 cr.  
Analyses of writing styles, genres, and rhetorical contexts outside the academy in a semester-long internship. Students must have an approved site arranged by the OSLO office and the Director of Undergraduate Studies of the English Department.

EngC 3650. Topics in Rhetoric, Composition, and Language. (3 cr.)  
Topics specified in Class Schedule.

EngC 5051. Graduate Research Writing Practice for Non-native Speakers of English. (3 cr.)  
Prereq—Grad Student  
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.

EngC 5690. Minnesota Writing Project: Directed Studies. (1-3 cr; max 30 cr)  
Workshops in which writing teachers investigate current theories of writing and writing pedagogy, write for publication, and explore research topics in applied literacy.

Entomology (Ent)

Department of Entomology

College of Agricultural, Food and Environmental Sciences

Ent 3001. Insects and Insect Management. (1 cr.)  
Prereq—Biol 1009 or equiv  
Principal orders of insects/archaizans. Introduction to structure, physiology, population dynamics, and management. Lecture/lab. Meets in weeks 1-4.

Ent 3005. Insect Biology. (3 cr.)  
Survey of diversity/biology of insects. Insect behavior (including social insects), pollination, herbivory, insects as disease vectors, beneficial insects, insect population dynamics/ecology. Emphasizes insects’ role in agricultural, urban, natural systems. Lecture/lab. Required Saturday field trip on second weekend of semester.

Ent 4005. Economic Entomology. (3 cr; A-F only)  

Ent 4015. Ornamentals and Turf Entomology. (3 cr.)  
Prereq—1xxx course in bio. or hort or forest resources)  
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 cr.)  
Prereq—Biol 1009 or equiv  
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 cr.)  
Prereq—Ent 4021 recommended, Biol 1009 or #  
Field course for students interested in honey bee management. Field management of beekeeping colonies, pollen, nectar, and beekeeping and beekeeping. Correlation of beekeeping with beekeeping and beekeeping. Correlation of beekeeping with beekeeping.

Ent 4030. Entomological Science. (3 cr; A-F only)  
Prereq—Biol 1009 or #; offered 1998 and alt yrs  
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 5104. Insect Taxonomy and Phylogeny. (4 cr.)  
Prereq—Ent 4005 or equiv  
Identification of families of adult insects; evolution and classification of insects; techniques of collecting and curating insects; principles of phylogeny reconstruction.

Ent 5301. Insect Physiology. (2 cr; A-F only)  

Ent 5404. Insect Ecology. (3 cr.)  
Prereq—Biol 5041 or EBE 5122 or #; offered fall 1998 and alt yrs  

Ent 4251. Forest and Shade Tree Entomology. (3 cr)  
Biology, ecology, population management of forest/shade tree insects. Emphasizes predispersing factors/integrated management. Lecture/lab. Required Saturday field trip on second weekend of semester.

Ent 4281. Veterinary Entomology. (3 cr; A-F only)  
Biology/management of insects, mites, ticks that affect livestock, poultry, companion animals. Emphasizes problem identification/solving. Lecture, lab.

Ent 5011. Insect Structure and Function. (4 cr; A-F only)  
Prereq—Ent 3005 or #  
Comparative study of insect structures/functions from evolutionary perspective. Introduction to physiology of digestion, respiration, other organ systems.

Ent 5021. Insect Taxonomy and Phylogeny. (4 cr.)  
Prereq—Ent 4005 or equiv  
Identification of families of adult insects; evolution and classification of insects; techniques of collecting and curating insects; principles of phylogeny reconstruction.

Ent 5031. Insect Physiology. (2 cr; A-F only)  

Ent 5401. Insect Ecology. (3 cr.)  
Prereq—Biol—5041 or EBE 5122 or #; offered fall 1998 and alt yrs  
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 5204. Insect Management. (3 cr.)  
Prereq—Ent 3005 or #  
Prevention or suppression of injurious insects by integrating multiple control tactics, e.g., chemical, biological, cultural. Strategies to optimize the dynamic integration of control methodologies in context of their economic, environmental, and social consequences.

Ent 5241. Ecological Risk Assessment. (3 cr.)  
Prereq—Ent 5041  
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 cr.)  
Prereq—Ent—3005 or #; offered 1998 and alt yrs  
Biology of arthropod vectors of human disease. Emphasis on disease transmission and host, vector, and pathogen interactions.

Ent 5311. Sampling Biological Populations. (3 cr.)  
Prereq—Stat 5021 or equiv  
Sampling plans for study of field/lab populations. Statistical distributions/techniques for detecting/coping with aggregation. Randomization, required sample size, optimal allocation for common probability design. Sequential plans for making decisions.

Ent 5321. Ecology of Agricultural Systems. (3 cr; A-F only)  
Prereq—Stat 5021 or equiv  
Sampling plans for study of field/lab populations. Statistical distributions/techniques for detecting/coping with aggregation. Randomization, required sample size, optimal allocation for common probability design. Sequential plans for making decisions.

For definitions of course numbers, symbols, and abbreviations, see page 296.
Family Education (FE)

Department of Work, Community, and Family Education

College of Education and Human Development

FE 5001. Family Education Perspectives. (3 cr; A-F only)
Origins, evolution, and critique of alternative perspectives on family education. Implications for clients, programs, and educators.

FE 5003. Contemporary Family Education. (3 cr; A-F only)
Transitions in family life examined, with emphasis on preparing educators and educational programs.

FE 5200. Special Topics in Family Education. (1-4 cr; max 20 cr)
Topics either not covered in available courses or not covered in sufficient breadth/depth to meet student needs/interests. Topics vary.

FE 5201. Family and Work Relationships. (3 cr; A-F only)
Examination of the interactions of work and family to prepare professionals for improving work and family relationships.

FE 5202. Sexuality Education. (3 cr; A-F only, Prereq–Human sexual behavior course, family ed course) Preparation to develop, deliver, and evaluate sexuality education. Strategies to help children and adults acquire information, form values, develop interpersonal skills, and exercise personal responsibility in the sexual dimensions of individual and family life.

FE 5203. Family Communication Education. (3 cr; A-F only)
Knowledge and skills needed to develop, deliver, and evaluate educational programs about family communications. Examination of family communication principles and issues. Development of appropriate teaching methods and materials.

FE 5301. Program Planning in Family Education. (3 cr; A-F only)
Exploration of curriculum research and theory; examination and critique of alternative perspectives and their concomitant implications for families; development and evaluation of family education curriculum and programs.

FE 5302. Family Education Curriculum in Secondary Schools. (3 cr; A-F only, Prereq–STEPP student) Examination, development, and implementation of family and consumer science curriculum in secondary schools. Emphasizes curricular perspectives from social reconstruction and cognitive processes.

FE 5303. Instructional Strategies in Family Education. (3 cr; A-F only, Prereq–STEPP student) Theory/research relevant to methods of teaching. Emphasizes methods that support families taking technical, communicative, and emancipatory action.

FE 5701. Practice of Parent Education I. (3 cr; A-F only)
Examination of parent education in community settings; consideration of parents as adult learners with diverse backgrounds; development of group facilitation skills; observation and interviewing in community settings; reflection on and critique of the practice of parent education.

FE 5702. Practice of Parent Education II. (3 cr; A-F only, Prereq–5701 or A) Development of curriculum for parent education; consideration of teaching groups and individuals; consideration of ethics in parent education; evaluation of parent education programs; development of curriculum and teaching portfolio; reflection on and critique of the practice of parent education.

FE 5703. Advanced Practice of Parent Education. (3 cr; Prereq–5702 or A) Evolving perspectives of parent education. Emphasis on psycho-dynamic, conceptual-change approaches. Reflective and dialogic approaches for working with parents in understanding beliefs and examining their origins and consequences. Examination of issues related to diversity, self-awareness, ethics, and evaluation.

FE 5796. Parent Education Practicum. (1-4 cr [max 4 cr], Prereq–5702 or A) Supervised parent education field assignments designed according to licensure requirements and individual student needs, interests, and prior competencies.

FE 5993. Directed Study in Family Education. (1-3 cr; max 9 cr; A-F only, Prereq–A) Self-directed study in areas not covered by regular courses. Specific program of study is jointly determined by student and advising faculty member.

FE 5996. Internship in Family Education. (1-6 cr [max 6 cr], Prereq–A) Planned work experience focusing on educational competencies in family education settings. Nature and extent of responsibilities are defined by the position student assumes.

Environmental Science (ES)

College of Agricultural, Food and Environmental Sciences

ES 1011. Issues in the Environment. (3 cr)
Insight and analysis of environmentally stressed situations. Methods of reducing and controlling pollution in the context of cultural and social systems and customs. Review current environmental issues through various media presentations by faculty and invited speakers.

ES 1051. Introduction to Environmental Science. (3 cr, Prereq–5805 or 1051)
Current environmental issues including air and water pollution, human population, toxic and hazardous wastes, urbanization, land use, biological diversity, energy, attitudes toward nature, environmental politics, and ethics.

ES 4096. Professional Experience Program: Internship. (1-3 cr; max 6 cr, Prereq–COAFES undergrad, #, complete internship contract available in COAFES Career Services before registering) Both an oral and written report is done based on a paid or volunteered work position, or other field experience.

Family Social Science (FSoS)

Department of Family Social Science
College of Human Ecology

FSoS 1100. Intimate Relationships. (3 cr)
Focuses on couple dynamics and gives an overview of how to develop, maintain, and terminate an intimate relationship. Relationship skills and issues including communication, conflict resolution, power, and roles. Programs for marriage preparation, marriage enrichment, and marital therapy are described.

FSoS 2101. Preparation for Working With Families. (2 cr; A-F only)
Systematic preparation for upper division education, research/field internships, and career possibilities in family social science.

FSoS 2191. Independent Study in Family Social Science. (1-4 cr [max 12 cr]; Prereq–Soph, #) Independent reading or writing or research under faculty supervision.

FSoS 3101. Personal and Family Finances. (3 cr; Prereq–Soph or #)
Analysis of personal and family financial management principles. Financial planning of savings, investments, credit, mortgages, and taxation; life, disability, health, and property insurance; public/private pensions. Estate planning.

FSoS 3102. Family Systems and Diversity. (3 cr; Prereq–Soph or #) 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 3150. Special Topics in Family Social Science. (1-4 cr [max 4 cr]; Prereq–[varies by topic], at least soph)
Review of research/scholarly thought. Topics specified in class schedule.

FSoS 3191. Independent Study in Family Social Science. (1-5 cr [max 12 cr]; Prereq–Jr, #) Independent reading or writing or research under faculty supervision.

FSoS 3426. Alcohol and Drugs: Families and Culture. (3 cr, 5526)
Psychology/sociology of drug use/abuse. Life-span, epidemiological, familial, cultural data regarding use. Fundamentals of licit/illicit drug use behavior. Variables of gender, ethnicity, social class, sexuality, sexual orientation, disability,
Course Descriptions

FSoS 4155. Parent-Child Relationships. (3 cr; A-F only. Prereq—3102 or #) 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 cr. §3432) 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 4191. Independent Study in Family Social Science. (1-4 cr [max 12 cr], Prereq—Sr, #) Independent reading or writing or research under faculty supervision.

FSoS 4294. Research Internship. (1-4 cr [max 4 cr], Prereq—FSoS major, #) 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. (4-12 cr [max 12 cr]; S-N only, Prereq—2101, #) Directed paraprofessional work experience related to student’s area of study.

FSoS 5101. Family Systems. (3 cr; §3102, Prereq—Grad student) Family systems and other family theories focusing on the dynamics and processes relevant to family life. Diversity issues related to gender, ethnicity, sexual orientation, and disability. Issues related to divorce, single parenthood, and remarriage are covered. Family strengths and family problems are integrated.

FSoS 5193. Directed Study in Family Social Science. (1-6 cr [max 6 cr], Prereq—FSoS or grad student in related field)

FSoS 5246. Alcohol and Drugs: Families and Culture. (3 cr; §3102) 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 5249. Counseling Skills Practicum I. (3 cr. §3429) 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 5310. Global and Diverse Families. (3 cr; Prereq—3102 or #) 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 5313. Family Financial Counseling. (3 cr; A-F only. Prereq—3102, 3101, 3249 or #) Introduction to family financial management applications through different stages in family financial life cycle. Case studies.

FSoS 5315. Family Financial Counseling. (3 cr; A-F only. Prereq—3101, 3102, 3249 or #) Introduction to family financial management applications through different stages in family financial life cycle. Case studies.

FSoS 5429. Chemical Abuse and Families: an Overview. (3 cr; §3102) Relationships of family systems with particular application to families in which alcohol or drug use is a problem. Family types, family of origin, models of family therapy, family systems theory, alcoholism. Review of literature.


Fina 3102. Global and Diverse Economies. (4 cr; A-F only. Prereq—4241) Introduction to international dimensions of corporate financing, investment, risk management decisions. Foreign exchange markets, international financial systems, foreign exchange rate determination, measuring/managing currency risk, multinational capital budgeting, cost of capital in emerging economies.

Fina 3103. Fixed Income Securities. (3 cr; A-F only. Prereq—4241 or #) Theoretical/practical understanding of corporate financial decisions. Efficient markets, financial decision-making, capital management. Public policy issues in banking.

Fina 4121. Financial Markets and Interest Rates. (2 cr; A-F only. Prereq—4241) Basic framework for valuing fixed income securities. Term structure on interest rates, forward rates, principles of fixed-income valuation. Surveys treasury, corporate, municipal, securitization markets.


Fina 4221. Portfolio Management and Performance Evaluation. (3 cr; A-F only. Prereq—4241) Introduces investment environment and concepts used to manage security portfolios. Portfolio/security risk/return tradeoffs, portfolio diversification, asset allocation, active portfolio management versus indexed portfolios, portfolio performance evaluation.


Fina 4541. Futures, Options, and Other Derivative Securities. (4 cr; A-F only. Prereq—4121, 4241, 4321) Foundations of stochastic cash flow representations, construction portfolios of futures/options, basic methods for valuing real/financial futures, swaps, options.


Finnish (Fin)

Department of German, Scandinavian, and Dutch

College of Liberal Arts

Fin 1001. Beginning Finnish. (5 cr) Emphasis on working toward novice-intermediate low proficiency in all four language modalities (listening, reading, speaking, writing). Topics include everyday life subjects, cultures, food, housing, etc.).

Fin 1002. Beginning Finnish. (5 cr; Prereq—1001) Continues the presentation of all four language modalities (listening, reading, speaking, writing). With proficiency emphasis. Topics include free-time activities, careers, and the Finnish culture.

Fin 1003. Intermediate Finnish. (5 cr; Preq—1002) 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 cr; Prereq—1003) 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. (4 cr; Prereq—Passing score on GPT) Designed to help students achieve advanced proficiency in Finnish. Discussion of fiction, film, journalistic, and professional prose is complemented by grammar and vocabulary building exercises and a systematic review of oral and written modes of communication.


Fin 4001. Beginning Finnish. (2 cr; §1001. Prereq—Passing score on GPT in another language or grad) Meets concurrently with Fin 1001; see Fin 1001 for description. This option is designed for students who have satisfied the GPT requirements in another language or are graduate students or are otherwise exempt.

Fin 4002. Beginning Finnish. (2 cr; §1002. Prereq—Passing score on GPT in another language or grad) Meets concurrently with Fin 1002; see Fin 1002 for description. This option is designed for students who have satisfied the GPT requirements in another language or are graduate students or are otherwise exempt.

Fin 4003. Intermediate Finnish. (2 cr; §1003. Prereq—Passing score on GPT in another language or grad) Meets concurrently with Fin 1003; see Fin 1003 for description. This option is designed for students who have satisfied the GPT requirements in another language or are graduate students or are otherwise exempt.

Fin 4004. Intermediate Finnish. (2 cr; §1004. Prereq—Passing score on GPT in another language or grad) Meets with Fin 1004; see Fin 1004 for description. This option is for students who have satisfied the GPT requirements in another language or are graduate students or otherwise exempt.

**Fisheries and Wildlife (FW)**

**Department of Fisheries, Wildlife, and Conservation Biology**

**College of Natural Resources**


FW 1002. Wildlife: Ecology, Values, and Human Impact. (3 cr; Prereq—Recommended for students with natural science background) Controversial issues involving specific wildlife management principles/techniques.


FW 4001. Biometry. (4 cr; A-F only, Prereq—Math 1031) 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 4106. Important Plants in Fisheries and Wildlife Habitats. (1 cr; A-F only, Prereq—FW 4108) Field identification of important plants in fisheries and wildlife habitats.


FW 4129. Mammmalogy. (4 cr; A-F only, Prereq—Biol 2012 or #) Evolutionary and biogeographic history of mammalia. 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.

FW 4136. Ichthyology. (4 cr; Prereq—Biol 2012) Fish biology, adaptations to different environments and modes of living, and evolutionary relationships. Laboratory emphasizes anatomy and identification of Minnesota fishes.

FW 4200H. Honors Seminar. (1 cr; A-F only. Prereq—FW upper div honors, #) Current topics presented by faculty/students. Lecture/discussion.

FW 4291. Independent Study: Fisheries. (1-5 cr. Prereq—FW upper div honors, #) Individual field, library, and lab research in fisheries.

FW 4292. Special Lectures: Fisheries. (1-5 cr. Prereq—FW upper div honors, #) Lectures in special fields of fisheries given by visiting scholar or regular staff member.


FW 4392. Special Lectures: Wildlife. (1-5 cr. Prereq—FW upper div honors, #) Lectures on special topics of wildlife given by visiting scholar or staff member.

FW 4401W. Introduction to Fish Physiology and Behavior. (4 cr; Prereq—Biol 1001 or Biol 1009) How life in aquatic environment has influenced fish biology. Ionic/osmotic balance, sensory systems, gas exchange, endocrinology, growth, foraging, locomotion, reproduction, orientation/migration, toxicology.

FW 4565. Fisheries and Wildlife Ecology and Management: Field Trip. (1 cr; S-N only, Prereq—FW 4401W) Ten-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 4701. Fisheries and Wildlife Problem Solving. (2 cr; Prereq—FW 3003 or grad student or #) Management problem identification/analysis, information gathering/analysis, oral-written reporting. Selected management issues.

FW 4801H. Honors Research. (2 cr; A-F only. Prereq—FW upper div honors, #) Independent research project supervised by faculty member.


FW 5051. Analysis of Populations. (3-4 cr. Prereq—[Biol 1001 or Biol 1009, [FW 4001 or Stat 3011 or Stat 5021] or #) Factors involved in regulation, growth, general dynamics of populations. Data needed to describe populations, population growth, population models, regulatory mechanisms.

FW 5411. Aquatic Toxicology. (3 cr; Prereq—Intro chem, intro ecol, #) Pollution assessment approaches, biological effects, fate/flow of contaminants in aquatic systems, major types of pollutants.


FW 5571. Avian Conservation and Management. (3 cr; Prereq—EEB 4134 or grad or #) Current problems in avian conservation management. Nongame, wetland, game birds.


FW 5603W. Habitats and Regulation of Wildlife. (3 cr; A-F only, Prereq—Biol 3407) Environmental interactions of wildlife at population/community levels. Environmental threats from human activities. Habitat management practices. Objectives, polices, regulations in population management.


FW 5625. Wildlife Handling and Immobilization for Research and Management. (2 cr; S-N only. Prereq—General biology, grad student or vet med student or FW sr, #) 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.
Course Descriptions

Food Science and Nutrition (FScN)
Department of Food Science and Nutrition
College of Agricultural, Food and Environmental Sciences
FScN 1012. Sports Nutrition. (2 cr)
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/regressive athletic performance. Web-based course.

FScN 1013. Dietary Supplements: scientific, regulatory, and cultural aspects. (3 cr)

FScN 1021. Introductory Microbiology. (4 cr)
Broad introduction to the diverse world of microbes and how they impact our world in both deadly and life-saving ways.

FScN 1102. Food: Safety, Risks, and Technology. (3 cr)
Ethical use of public policy and food technology to reduce or control risks in our food supply. Survey of microbiological, chemical, and environmental risks, and government and industry controls used to ensure food safety.

FScN 1112. Principles of Nutrition. (3 cr. Prereq—High school [biology, chemistry])
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 1511. Food Animal Products for Consumers. (3 cr. AnAcSc 1511)
The compositional variation, processing, selection, storage, cookery, palatability, nutritional value, and safety of red meat, poultry, fish, and dairy products.

FScN 3102. Introduction to Food Science. (3 cr. Prereq—Chem 1022)
Introduction to composition of and chemical/physical properties of foods. Evaluating interaction/reactor of foods due to formulation, processing, and preparation.

FScN 3612. Life Cycle Nutrition. (3 cr. Prereq—1112, Chem 1022)
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 cr. Prereq—1112)
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 cr. Prereq—1112)
Sociocultural aspects of regional and cultural diversity in food preferences and food behavior, food habits, demography, lifestyles, food consumption, and expenditures. Effect of socioeconomic status, religious beliefs, age, and cultural meaning of food on food choices.

FScN 3662. Introduction to Dietetic Practice. (2 cr. A-F only. Prereq—1112, admitted to Coordinated Program in Dietetics)
Introduction to the practice of dietetics in medical centers, residential care centers, ambulatory care clinics, and community service agencies.

FScN 3731. Food Service Operations Management Laboratory. (2 cr. A-F only. Prereq—3102 or 3132)
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 cr. A-F only. Prereq—3102 or 3132)
Planning, preparing, delivering, managing foods served away from home.

FScN 3796. Field Experience in Food Service Management. (3 cr. A-F only. Prereq—3732 or 3733, admitted to Coordinated Dietetics Program)
Supervised food service production/management experience in a community or health care facility.

FScN 4096. Professional Experience Program: Internship. (1-3 cr [max 6 cr]; A-F only. Prereq—FScN undergrads)
Supervised practical and professional experience in food industry firms or government agencies; evaluative reports submitted with faculty advisors and employees. Registration information in COAFES Career Services.

FScN 4103. World Food Problems. (3 cr. AgroSc 4103, AgroSc 4103, 5CAPS 4103. Prereq—Jr or sr or grad)
A multidisciplinary look at problems and possible solutions in food production, storage, and utilization in developing countries. Presentations and discussions introduce conflicting views of population, use of technology, and ethical and cultural values of people in various parts of the world.

FScN 4111. Food Chemistry. (3 cr. Prereq—3102, BioIC 3021)
Study of chemical structures and functional properties of food components in relation to their roles as parts of complex biochemical systems and as modified by environmental and processing factors.

FScN 4121. Food Microbiology and Fermentations. (3 cr. Prereq—1102, VPB 2032 or MicB 3301 or MicB 2032, BioIC 3021)
Relationship of environment to occurrence, growth, and survival of microorganisms in foods, methods of evaluation, genera and species of importance, control of food-borne pathogens and spoilage organisms in foods, and use of microorganisms in food fermentations.

FScN 4122. Laboratory Methods in Food Microbiology and Fermentations. (2 cr. A-F only. Prereq—4121)
Microbiological methods for analysis of foods. Use of microorganisms for production of foods.

FScN 4131. Food Quality. (3 cr. Prereq—4111, 4121)
Management systems in the processing and distribution of foods that insure food quality and compliance with food laws and regulations. Quality management, HACCP audits, plant/equipment design for sanitation, specifications, recalls, and control systems.

FScN 4210. Topics in Food Science and Nutrition. (1-4 cr [max 8 cr. Prereq—#])
In-depth investigation of a specific topic in nutrition and food science not covered by other courses. Topic announced in advance.

FScN 4291. Independent Study. (1-4 cr [max 4 cr.; Prereq—Undergrads, #])
Individual lab or library research in an area related to food science or nutrition.

FScN 4312W. Food Analysis. (4 cr. Prereq—4111, Stat 3011)
Examination of components in foods with analytical measurement as the primary focus. Chemical, physical, and sensory techniques are used to identify and characterize major and minor components in food systems.

FScN 4331. Food Process Engineering I. (3 cr; A-F only. Prereq—3102, Math 1272, [Phys 1102 or Phys 1302])
Specific applications of engineering principles (e.g., heat/mass transfer, kinetics, thermodynamics) to unit operations in food production.

FScN 4332. Food Process Engineering II. (4 cr; A-F only. Prereq—4331)
Application/integration of engineering principles to unit operations used in food production. Equipment design. Effects of processing on food quality (chemical, microbiological).

FScN 4342. Properties of Water in Foods. (4 cr. Prereq—4331)
Principles involved in processing, handling, and storage of frozen, dry and intermediate moisture biological materials (foods, drugs, biologics) with emphasis on the physio-chemical properties of water in food.

FScN 4343. Processing of Dairy Products. (4 cr. Prereq—4111, 4122, 4331)
Demonstration/application of basic concepts of food engineering/processing, food chemistry, and food microbiology to production of fluid, fermented, concentrated, and dehydrated dairy products.

FScN 4344. Technology of Fermented Dairy Products. (4 cr. Prereq—4111, 4122, 4331)
Integration of chemical, microbiological, and physical principles involved in the manufacture and storage of cheeses and fermented milks.

FScN 4345. Flavor Technology. (3 cr. Prereq—4111, 4131, 4142)
Flavor/after-flavor development in foods. Industrial production of food flavorings, their proper application to food systems.

FScN 4346. Functional Foods: Regulations and Technology. (3 cr; A-F only. Prereq—[4111, 4121] or [4113, 4131] or [4121, 4131])
Overview of application of regulatory principles, food science, nutritional science to development of nutraceuticals, functional foods, dietary supplements. Scientific basis, technologies, legal requirements, animal/canine evaluation, consumer usage versus need. Review of products available in world market, with focus on the United States.

FScN 4596. Field Experience: Community Nutrition. (3 cr; A-F only. Prereq—Admitted to first year Coordinated Program in Dietetics)
Application of nutrition knowledge in the solution of problems related to health promotion. Assigned readings, discussion, and experiences in community agencies.

FScN 4612. Human Nutrition. (3 cr. Prereq—1112, Chem 1022, Phil 3051)

FScN 4613. Experimental Nutrition. (2 cr. Prereq—4612, BioIC 3021, Stat 3011)
Lab in cellular/chemical methods of analysis of nutritional status.

FScN 4614. Community Nutrition. (3 cr. Prereq—1112)
Community-based nutrition issues are explored including nutrition risks associated with different age, sex, ethnic, and socioeconomic groups; community needs assessment; program planning and evaluation, and programs that address the needs and interests of people in different stages of the lifecycle, ethnic/cultural backgrounds, and literacy levels.

FScN 4665. Medical Nutrition Therapy I. (3 cr; A-F only. Prereq—4612, Phil 3051, BioIC 3021)
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 cr; A-F only. Prereq—4665)
Pathology, management, and nutrition therapy for disorders of the cardiovascular, endocrine, urinary, and neuromuscular and skeletal systems. Nutrition intervention for inborn errors of metabolism, and eating disorders and obesity.

For definitions of course numbers, symbols, and abbreviations, see page 296.
Coordinated Program in Dietetics or #) research project.

Group and methods used in studying sensory qualities of foods. Current issues in sensory evaluation. Group

Fundamentals of sensory perception. Test designs (2 cr; A-F only. Prereq–3102, Stat 3011)

Chemical reactions taking place in formation, bulk and institutional foods and ingredients. consumer products, but the principles also apply to food products. Emphasis is on application to health/disease, clinical management problems related to disease and injury; assigned readings, discussions, and experience in medical centers and long-term care facilities. Emphasis on nutrition support, gastrointestinal, immune and respiratory disorders, and cancer.

Financial and human resource management applied to a variety of business and institutional settings. Field trips may be required.

Application of principles of food service management to problems in community, commercial, or health care facilities.

Application of nutrition knowledge to problems related to health/disease, experience in medical centers. Emphasizes cardiovascular, endocrine, urinary tract, energy imbalance; eating disorders.

Application of nutrition knowledge to problems related to health/disease, clinical management experience in medical centers. Emphasizes pediatrics, home health care, staff relief.

Geneic tools as applied to food biotechnology. Improvement of microbes used in food production by modern biotechnological approaches. Discuss need for strict regulation of modern biotechnology as well as ethical and legal issues.

Analysis of the federal legal requirements affecting the production processing, packaging, marketing, and distribution of food and food products using case law studies and regulatory history.

Surface phenomena, colloidal interactions, liquid dispersions, gels, emulsions and foams, and functionality of food macromolecules in these systems.

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.

Introduction to law, tree/shrub distribution, and common/important forest trees/shrubs. Emphasizes concept of plant communities, soil site relationships, and wildlife values. Taught at Cloquet Forestry Center.

Field identification of common north woods trees, shrubs, and nonwoody vascular plants. Emphasizes concept of plant communities, soil site relationships, and wildlife values. Taught at Cloquet Forestry Center.

Field examination of natural history of northern/boreal forests with respect to soils, ecological characteristics of trees, community-environment relationships, succession, and regeneration ecology. Taught at Cloquet Forestry Center.

Introduction to forest law. Taught at Cloquet Forestry Center.

Introduction to GIS. Focuses natural resources. Data structures, sources, collection, and quality. Lab exercises introduce geographic projections, spatial analyses, and cartographic modeling.

Ecology, history, management, and control of fire, wind, insect infestation, browsing, and other disturbances in forests. Use of regulations for sustainable forest management, and stand/landscape dynamics. Guest speakers on fire organization, training, and operations. Two-day field trip.


Introduction to management of forest stands, habitats, and ecosystems in a landscape context. Philosophical approaches, silvicultural systems, methods/tools for reforestation, restoration techniques. Intermediate stand treatments. Ramifications of management choices on quality, production, wildlife habitat, disturbance potential, aesthetics, old-growth development, and forest health. Lab. Weekend field trip required.

Introduction to forest operations. Terminology, basic engineering, equipment and harvesting system options, productivity/costs. Relationship to forest
FR 3480. Topics in Natural Resources. (1-3 cr. [max 12 cr.]; Prereq–[#])
Lectures in special fields of natural resources given by visiting scholars or regular faculty members. Topics specified in Class Schedule.

FR 3501. Arboriculture: Selection and Maintenance of Trees. (3 cr. Prereq–[1101 or Hort 1012]; Biol 2022)
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 disease, pests, pollution, development, and climate change.

FR 3550. Off-Campus Study. (0 cr [max 30 cr]; S-N only. Prereq–[#])

FR 4118. Physiological Ecology of Woody Plants. (3 cr; A-F only. Prereq–One chemistry course, one biology course, one ecology course)
Plant-water relations. Relations of biology to ecology/management. How physiological factors affect ecological processes and management decisions.

FR 4200H. Honors Seminar. (1 cr; A-F only. Prereq–FR upper div honors, #)
Current topics presented by faculty/students. Lectures. Discussions.

FR 4293. Directed Study. (1-5 cr [max 15 cr]; Prereq–[#])
Study/project on topic of personal interest in consultation with faculty member. Initial proposal, reports of accomplishments.

FR 4501. Urban Forest Management: Managing Greenspaces for People. (3 cr; Prereq–[1101, 3501; Ent 4251, Pippa 3003, UF major] or #)
Management concepts for green infrastructure of cities, towns, and communities. Urban forest as a social/biological resource. Emphasizes management of urban forests, silviculture 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.

FR 4801H. Honors Research. (2 cr; A-F only. Prereq–FR upper div honors, #)
First semester of independent research project supervised by faculty member.

FR 4802H. Honors Research. (2 cr; A-F only. Prereq–FR upper div honors, #)

FR 5104. Forest Ecology. (4 cr; A-F only. Prereq–Knowledge of basic [botany, plant biology, grad student] or #)
Form/function of forests as ecological systems. Characteristics/dynamics of species, populations, communities, forests, and ecosystems. General examples applying ecology to forest management. Weekly discussions on research topics, exercises, current issues in forest resource management. Required weekend field trip.

FR 5114. Hydrology and Watershed Management. (3 cr; Prereq–Grad student or #)

FR 5118. Physiological Ecology of Woody Plants. (3 cr; A-F only. Prereq–Grad student or #)
Plant-water relations. Relations of biology to ecology and management. How physiological factors affect ecological processes and management decisions.

FR 5131. Geographical Information Systems for Natural Resources. (4 cr; A-F only. Prereq–Grad student or #)
Introduction to GIS. Focuses on natural resources. Data structures, sources, collection, and quality. Lab exercises introduce geodesy, map projections, spatial analyses, and cartographic modeling.

FR 5142. Tropical Forest Ecology. (3 cr. Prereq–3xxx ecology course)
Ecological principles related to form, function, and development of wet/dry tropical forests at organismal, community, and ecosystem scales. Ecophysiology, succession, productivity, biodiversity, sustainability, agroforestry, social forestry, and management alternatives. Natural distribution of forest types. Causes, consequences, and extent of deforestation.

FR 5146. Biological Implications of Global Change. (3 cr. Prereq–3xxx ecology course)
Implications of global change for wild/cultivated vegetation. Forests, grasslands, agricultural ecosystems. Responses at scales from immediate organismal physiological responses through changes in communities to ecosystem shifts on a geologic times scale. Potential for climate change. Atmospheric concentrations of carbon dioxide, ozone, and other trace gases. Impacts of acid deposition and other pollutant issues.

FR 5153. Forest and Wetland Hydrology. (3 cr. Prereq–Basic hydrology course)
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.

FR 5161. Northern Forest Field Course. (2 cr; A-F only. Prereq–[#])
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.

FR 5203. Forest Fire and Disturbance Ecology. (3 cr. A-F only. Prereq–[#])
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.

FR 5218. Measuring and Modeling Forests. (3 cr; A-F only. Prereq–Grad student or #)

FR 5228. Advanced Assessment and Modeling. (3 cr; A-F only. Prereq–[#])
Application of recently developed mathematics, computer science, and statistics methodologies to natural resource functioning, management, and use problems. Specific topics, software, and methodologies vary.

FR 5232. Managing Recreational Lands. (4 cr; A-F only. Prereq–Grad student or #)
Recreation management tools from a public agency perspective. Social carrying capacity, recreation opportunity spectrum, social and economic costs, limits of acceptable change, benefits based management, visitor experience/ resource protection. Group project to develop a management plan.

FR 5251. Natural Resources in Sustainable International Development. (3 cr; A-F only. Prereq–Grad student or #)
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.

FR 5262. Remote Sensing of Natural Resources and Environment. (4 cr. Prereq–Grad student or #)
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. Land use/global change analysis. Lab provides hands-on experience working with aerial photography and digital sensing imagery.

FR 5264. Advanced Forest Management Planning. (3 cr. Prereq–[#])
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.

FR 5403. Teaching About Natural Resources. (1-2 cr. Prereq–NRES major or elementary teacher or #)
Forest community, tools used by natural resource managers, management practices. Natural-resource-related indoor/outdoor activities that can be translated for classroom use. One intensive weekend required.

FR 5411. Silviculture: Managing Forest Ecosystems. (4 cr. Prereq–Grad student or #)
Management of forest stands, habitats, and ecosystems in a landscape context. Philosophical approaches, silvicultural systems, methods for reforestation, restoration technologies, intermediate stand treatments. Ramifications of management choices on quality, production, wildlife habitat, disturbance potential, aesthetics, old-growth development, and forest health. Lab. Weekend field trip required.

FR 5412. Digital Remote Sensing. (3 cr. Prereq–[#])
Physical basis and practical applications of digital remote sensing. Energy/matter interactions, measurement, and sensing data, image processing, and models.

FR 5431. Timber Harvesting and Road Planning. (2 cr. Prereq–Grad student or #)

FR 5471. Forest Planning and Management. (3 cr; A-F only. Prereq–Grad student or #)
Processes/techniques for scheduling forest management. Goals of landowners, industry, government, and society. Issues/policies/regulations.
that influence management. Predicting outcomes, financial analysis, regulation, mathematical models, linear programming, economic analysis, landscape-level management, historical range of variability, wildlife management, carbon sequestration, resource monitoring, certification, adaptive management.

FR 5480. Topics in Natural Resources. (1-3 cr. [max 12 cr.], Prereq—#) Lectures in special fields of natural resources given by visiting scholar or regular staff member. Topics specified in Class Schedule.

FR 5501. Urban Forest Management: Managing Greenspaces for People. (3 cr. Prereq—Grad student or #) Management concepts for green infrastructure of cities, towns, and communities. Urban forest as social/biological resource. Emphasizes management of urban forest ecosystem to maximize benefits. Tree selection, risk assessment, cost-benefit analysis, landscape planning, values, perceptions. How urban forestry can be a tool to improve community infrastructure.


FR 5615. Field Remote Sensing and Resource Survey. (2 cr. A-F only, Prereq—3218, 3262) Field applications of remote sensing, sampling/measurement methods to inventory/mapping of forest and other natural resources. Offered at Cloquet Forestry Center.


FR 5700. Colloquium in Natural Resources. (1-3 cr. Prereq—#) Colloquium in specialized topics in natural resources.

Fren (Fren)

Department of French and Italian
College of Liberal Arts

Fren 0001. Reading French in the Arts and Sciences. (0 cr; S-N only) Basic reading knowledge of French language; intensive reading and translation of texts from a wide variety of disciplines. Students successfully completing the course obtain Language Certification in French which satisfies a Graduate School requirement.

Fren 1001. Beginning French. (5 cr) Basic listening, speaking, reading, and writing skills. Emphasis on communicative competence. Some cultural readings.

Fren 1002. Beginning French. (5 cr. Prereq—1001 or equiv) Basic listening, speaking, reading, and writing skills. Emphasis on communicative competence. Some cultural readings.


Fren 1022. Accelerated Beginning French. (5 cr. Prereq—2 or more yrs high school French) For students already enrolled in 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 3010. French Expression. (3 cr [max 6 cr]) Intensive work in oral/written communication.


Fren 3105. Advanced French Grammar and Communication. (4 cr. Prereq—1004 or equiv or #) Advanced study of French with particular emphasis on grammar review, vocabulary building, oral communication skills, and language usage in cultural contexts.

Fren 3106. Advanced French Composition and Communication. (4 cr. Prereq—3015 or equiv or #) Advanced study of French with particular emphasis on writing for varied communicative purposes, reading for style and content, translation.


Fren 3109. French Diction and Speaking. (2 cr. Prereq—3014) The relationship between the written and the spoken word in French. Learn to read prose and poetry aloud from a text using appropriate French pronunciation, etc. Leads to play readings and possible performance.

Fren 3202. The Language and Culture of Business in France. (3 cr. Prereq—3015; completion of 3016 recommended) Examines French business language as well as business practices and culture in France. Includes cross-cultural analysis.

Fren 3101W. Introduction to French Literature. (4 cr. Prereq—3015 or equiv) Close critical analysis of poetry, prose fiction, and plays. Introduction to literature and methods of literary analysis.


Fren 3112. Literature and the Making of Modern France: 20th-Century Perspectives. (3 cr [max 9 cr.], Prereq—3101) Focuses on the novel as a form and on its role in collective memory. Works of all genres will be read. The actual works read will differ according to instructor preference. Taught in French.

Fren 3113. Literature of Revolution and Upheaval. (3 cr [max 9 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 3310. Literature of Revolution and Upheaval. (3 cr [max 9 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 3320. Dramas of Culture: 20th-Century French and Francophone Theater. (3 cr [max 9 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 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 3330. Literature of Revolution and Upheaval. (3 cr [max 9 cr.], Prereq—3101) Focuses on the period, period, author, or topic of interest. Specific content posted in department and listed in Course Guide.

Fren 3350. Topics in Modern French Literature. (3 cr [max 9 cr.], Prereq—3101) Focuses on the period, period, author, or topic of interest. Specific content posted in department and listed in Course Guide.

Fren 3360. Coming of Age. (3 cr [max 9 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 3370. Legal Issues in French Novels Since the Revolution. (3 cr [max 9 cr.], Prereq—3101) The importance of legal issues in modern French novels. Analyze the impact of lawyers, judges, witnesses, the police, etc. on individuals and interpersonal relationships. Examine how novelists short-circuit the legal system and create alternative ways of settling disputes.
Fren 3371. Writing Crisis in (Post) Modern Times. (3 cr. Prereq–3101) Examines the meaning and purpose of the notion of crisis in French novels. How crises, be they personal, social or political, prompt writers to create new modes of (dis)connecting with other persons, institutions, and society.

Fren 3380. Modern Times: Literature of the 19th and 20th Centuries. (3 cr. [max 9 cr.]; Prereq–3101) Variously emphasizing the two centuries. Sample topics include: esthetic currents (Realism and the novel); cultural considerations (gendered representations); philosophical concerns (the relation of individuals to the social body in civil society).

Fren 3410. Québécois Literature. (3 cr [max 9 cr.]; Prereq–3101) 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 3479. Francophone Writers of the African Diaspora. (3 cr. Prereq–3101) Literature from Francophone North Africa, Africa, the Caribbean of the colonial and/or post-colonial eras, examined in its historical, cultural, or ideological contexts. Reading selections may include texts by immigrant or exiled writers in France.

Fren 3501. Structure of French: Phonology. (3 cr. §3501. Prereq–3014; 3101, Ling 3001 or #) Advanced study of the sound system of contemporary French.

Fren 3502. Structure of French: Morphology and Syntax. (3 cr. §3502. Prereq–3015, Ling 3001 or #) Linguistic study of contemporary French word forms (inflectional and derivational morphology); introduction to French syntax (linguistic study of grammar) and characteristic syntactic constructions.


Fren 3531. Sociolinguistics of French. (3 cr. §5531. Prereq–3015, Ling 3001 or #) Explores variations in the use of French associated with factors such as medium (oral/written), style (formal/informal), region, social and economic groups.


Fren 3602. French Civilization and Culture II. (3 cr. Prereq–3015) 1705 to present.

Fren 3650. Topics in French/Francophone Cultures. (3 cr [max 9 cr.]; Prereq–3015) Focuses on aspects of French and/or francophone cultures in various historical, social, political, and geographical contexts.


Fren 3706. Quebec: Literature and Film in Translation. (3 cr. Prereq–Not for major) A survey of Quebec literature and film in English or with subtitles. Particular attention paid to cultural tensions as well as to the impact of women writers and filmmakers on each genre.

Fren 3710. Reading Libertine: Dangerous Lessons in Translation. (3 cr [max 9 cr.]; Prereq–Not for majors) Designed for non-majors; this course examines libertinage and the libertine in French literature of the 17th and 18th centuries. Literary forms will be examined as ways to produce and question desire. Taught in English; all readings in English.

Fren 3750. Topics in French/Francophone Literature and Culture. (3 cr [max 9 cr.]; Prereq–Non-French major; knowledge of specific era/period required) Theme, problem, period, or topic of interest in French or Francophone culture or literature. Course Schedule. Taught in English.

Fren 3995. Directed Teaching. (1-5 cr. [max 25 cr.]; S–N only; Prereq–Δ) Directed teaching.

Fren 4101W. Seminar in French Studies. (3 cr. Prereq–Completion of all pre-elective requirements for major or permission of DUS) Reading and discussion of contemporary issues in French studies and workshop on senior projects.

Fren 4510. Topics in French Linguistics. (3 cr (max 9 cr.); Prereq–3015 or equivalent) Selected topics from French syntax, pragmatics, discourse analysis, or sociolinguistics.

Fren 4970. Directed Readings. (1-4 cr. [max 9 cr.]; Prereq–#) 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 cr (max 9 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 5260. The Returns of Tragedy. (3 cr (max 9 cr.); Prereq–3111 or above) Tragedy as dramatic form in relation to social order, myth and history, and theatre.

Fren 5270. “To Change or not to Change?”: Speculations on (Post) Modern French Texts. (3 cr (max 9 cr.); Prereq–3111) The meaning and purpose of the notion of “change” in French novels. Explore how a multiplicity of causes produces major changes in individuals personal and public life. The notion of change as it relates to financial and intellectual speculation.

Fren 5301. Critical Issues in French Studies. (3 cr. Prereq–# for undergrads) 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 cr (max 12 cr.); Prereq–3101 or equiv) Theme, problem, period, author, or topic of interest. See Class Schedule.

Fren 5470. Post/Colonial Francophone Literatures. (3 cr (max 9 cr.); Prereq–3111 or above) Francophone literature from North Africa, Africa, and the Caribbean of the colonial and/or post-colonial eras in the light of relevant literary and cultural theories.

Fren 5501. Structure of French: Phonology. (3 cr. §5501. Prereq–Ling 3001 or Ling 5001, grad student) Advanced study of sound system of contemporary French.

Fren 5502. Structure of French: Morphology and Syntax. (3 cr. §5502. Prereq–5501 or #) Linguistic study of contemporary French word forms (inflectional and derivational morphology); introduction to French syntax (linguistic study of grammar) and characteristic syntactic constructions.

Fren 5531. Sociolinguistics of French. (3 cr. §5331. Prereq–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 5995. Directed Teaching. (1.6 cr. [max 24 cr.]; S–N only; Prereq–#) Directed teaching.

Course Descriptions

French and Italian (Frt)

Department of French and Italian College of Liberal Arts


Frt 3803. New Wave Cinemas: Love, Alienation and Landscape in Post-War Italian and French Film. (3 cr) 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.

Frt 3804. Cinema and Culture: The City of Paris. (3 cr) How French cinema, from the silent era to the present, reflects and constructs the pleasures and anxieties of urbanization, new modes of entertainment, and new cultural roles for men and women. Taught in English. Knowledge of Italian and French helpful but not necessary.

Frt 3850. Topics in French and Italian Cinema. (3 cr (max 9 cr.); Prereq–Knowledge of [French or Italian] helpful but not required) Theme, period, genre, filmmaker, or topic of interest in French/Italian cinema. See Class Schedule. Taught in English.

Frt 5257. Passionate Beings: Literary and Medical Problematics in Italy and France from 1800 to the Present. (4 cr) Literary and medical representations of the passions in France and 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.

Frt 5850. Topics in French and Italian Cinema. (3 cr [max 9 cr.]; Prereq–Knowledge of [French or Italian] helpful but not required) Focuses on a theme, period, filmmaker, or other topic of interest in French or Italian cinema. See Class Schedule. Taught in English.


General College (GC)

General College

GC 0623. Geometry: Programmed Study. (0 cr. Prereq–4 cr equiv; 0721 or GC math placement, #) Basic geometric concepts/logic, Measurement, angles, polygons, plane geometric figures, three-dimensional figures, relationships among angles, constructions. Programmed study: students complete required courses in time frame established by instructor.

GC 0643. Mathematics: Programmed Study. (0 cr. Prereq–4 cr equiv, #) Basic mathematics, elementary algebra, or intermediate algebra for students who need to learn math at their own pace. Instructor assigns topics for each student based on first-day pretest.
GC 0712. Introductory Algebra, Part I (0 cr [0616, 0621, 0716, 0721, 0722, §1435. Prereq—[4 cr equiv]; GC math placement])

Traditional lecture/discussion course with group work. Covers first half of content of a first course in algebra at level of difficulty geared for students at a research university. Arithmetic review, real number operations, expressions, equations, inequalities, rectangular (x-y) graphs.

GC 0713. Introductory Algebra, Part II (0 cr [0616, 0617, 0621, 0717, 0721, 0722, §1435. Prereq—[4 cr equiv]; 0712, 0716, #) Traditional lecture/discussion course with group work. Covers second half of content of a first course in algebra at level of difficulty geared for students at a research university. Graphing review, linear systems, word problems, exponents, polynomials, factoring.

GC 0716. Introductory Algebra, Part I: Computer. (0 cr [0616, 0621, 0712, 0721, 0722, §1435. Prereq—[4 cr equiv]; GC math placement) Students learn via multimedia software. Instructor helps students individually during class. No lectures. Covers first half of content of a first course in algebra at level of difficulty geared for students at a research university. Arithmetic review, real number operations, expressions, equations, inequalities, rectangular (x-y) graphs.

GC 0717. Introductory Algebra, Part II (Computer). (0 cr [0616, 0617, 0621, 0713, 0721, 0722, §1435. Prereq—[4 cr equiv]; 0712, 0716, #) Students learn via multimedia software. Instructor helps students individually during class. No lectures. Covers second half of content of a first course in algebra at level of difficulty geared for students at a research university. Graphing review, linear systems, word problems, exponents, polynomials, factoring.

GC 0721. Introductory Algebra. (0 cr [0616, 0617, 0621, 0716, 0717, 0721, 0722, §1435. Prereq—[4 cr equiv]; GC math placement) Traditional lecture/discussion course with group work. Covers content of a first course in algebra at level of difficulty geared for students at a research university. Real number operations, expressions, equations, inequalities, rectangular (x-y) graphs, linear systems, word problems, exponents, polynomials, factoring.

GC 0722. Introductory Algebra (Computer). (0 cr [0616, 0617, 0621, 0713, 0716, 0717, 0721, 0722, §1435. Prereq—[4 cr equiv]; GC math placement) Students learn via multimedia software. Instructor helps students individually during class. No lectures. Covers content of a first course in algebra at level of difficulty geared for students at a research university. Arithmetic review, real number operations, expressions, equations, inequalities, rectangular (x-y) graphs, systems, word problems, exponents, polynomials, factoring.

GC 0731. Intermediate Algebra. (0 cr [0618, 0625, 0626, 0718, 0721, 0722, §1445, §1446. Prereq—[4 cr equiv]; grade of at least C in 0713 or 0717 or 0721 or 0722) Traditional lecture/discussion course. Covers content of a second course in algebra at level of difficulty geared for students at a research university. Rational expressions, absolute value, roots, radicals, quadratic, exponential, and logarithmic functions, complex numbers.

GC 0732. Intermediate Algebra (Computer). (0 cr [0618, 0625, 0626, 0631, 0717, 0718, 0721, 0722, §1445, §1446. Prereq—[4 cr equiv]; grade of at least C in 0713 or 0717 or 0721 or 0722) Students learn via multimedia software. Instructor helps students individually during class. No lectures. Covers content of a second course in algebra at level of difficulty geared for students at a research university. Rational expressions, absolute value, roots, radicals, quadratic, exponential, and logarithmic functions, complex numbers.

GC 1041. Developing College Reading. (2 cr [max 6 cr]. Prereq—Non-native speaker of English, CE enrollment, #) Comprehension/study strategies for reading college-level textbooks. Previewing and making margin notes. Outlining, anticipating test questions, and interpreting technical vocabulary. Paired with a designated content course.

GC 1042. Reading in the Content Area. (2 cr [max 6 cr]. Prereq—Non-native speaker of English, CE enrollment, #) Reading skills/strategies for a content area. Previewing/predicting content/organization. Note taking, outlining, and preparing test questions, and interpreting technical/sub-technical vocabulary. Paired with designated content course.

GC 1051. Introduction to College Writing: Workshop. (2 cr §1407. Prereq—[1412 or §1422, non-native speaker of English Language editing strategies. Review of linguistic features of standard written English. Style/language in writing. Small-group activities. In-group or individual conferences.


GC 1081. Academic Development Seminar: Supplemental Instruction in Social Sciences. (1 cr; A-F only. Prereq—[0815 or 1085, §1446 content course], adviser approval) Methods of study in social sciences courses. Note taking, exam preparation, and time management. Specific writing tasks, critical thinking, research methods, essay/presentation styles associated with disciplinary content.

GC 1082. Academic Development Seminar: Supplemental Instruction in the Sciences. (1 cr; A-F only. Prereq—[1081 or 1085], §1446 content course), adviser approval) Methods of study in science courses. Note taking, exam preparation, time management. Specific problem solving techniques, augmented problem sets, writing tasks/presentation styles associated with disciplinary content.

GC 1083. Academic Development Seminar: Supplemental Instruction in the Humanities. (1 cr; A-F only. Prereq—[1081 or 1085], §1446 content course), adviser approval) Methods of study in humanities courses. Note taking, exam preparation, time management. Specific writing tasks, critical thinking skills, research methods, essay/presentation styles associated with disciplinary content.

GC 1084. Academic Development Seminar: Supplemental Instruction in Mathematics. (1 cr; A-F only. Prereq—[1081 or 1085], §1446 content course), adviser approval) Methods of study in mathematics courses. Note taking, exam preparation, time management. Necessary math background, specific problem-solving techniques, application of mathematical concepts associated with disciplinary content.

GC 1085. Academic Development Seminar: Supplemental Instruction in Composition. (1 cr; A-F only. Prereq—[1081 or 1085], §1446 content course), adviser approval) Methods of study in composition courses. Note taking, exam preparation, time management. Specific writing tasks, critical thinking skills, research methods, essay/presentation styles associated with disciplinary content.

GC 1086. Freshman Seminar. (2 cr; A-F only) 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.


GC 1112W. Ecological Evaluation of Environmental Problems. (3 cr) Relating ecological concepts (energy flow, material cycling) to causes/effects of environmental problems (world hunger, toxic waste, global warming, acid rain). Methods of evaluating cultural practices’ impact on the environment. Critical evaluation of potential interventions.


GC 1132. Essentials of Human Anatomy and Physiology. (3 cr) Health/disease examined by organ system (e.g., urinary, reproductive). Access to lecture material/activities via the Internet. Lab.

GC 1133. Nature Study. (3 cr) Natural history for students with little or no training in biology. Minnesota plants/animals examined in field from viewpoint of informed amateur naturalist. Life cycles and natural habitat associations. Field observation and identification techniques. Popular scientific literature.

GC 1135. Human Anatomy and Physiology. (4 cr) Health/disease examined by organ systems (e.g., urinary, reproductive). Access to instructional material/activities via Internet. Lecture/lab.

GC 1161. Solar System Astronomy. (4 cr) Planets, satellites, asteroids, comets, and meteors. The celestial sphere, coordinate systems, time intervals, motions, and physical attributes of planets and their satellites. Instruments used by astronomers and by space probes.


GC 1166. Principles of Chemistry. (3 cr. Prereq—0713 or 0721 or equiv) Problem-solving. Classification of matter, elements, atomic/molecular structure, compounds, mole calculations, chemical bonding, empirical formulas, chemical reactions, stoichiometry, bond energy, enthalpy, gases/gas laws, solutions, solution concentrations, acids, bases, qualitative equilibrium.

GC 1171. Physical Geology. (4 cr) Development of common land features (valleys, mountains, rivers, lakes) and processes responsible for their origin/change. Types of surface materials. Movements inside Earth and their effects on its surface. Lecture, lab: mineral/rock analysis, topographic map reading, landform identification, landscape interpretation.


Course Descriptions

GC 1204. International Perspectives in the Social Sciences. (4 cr. A-F only) Multidisciplinary, formal exploration of world problems. Basic perspectives of four social sciences (anthropology, geography, political science, and economics) as applied to specific global problems such as terrorism, environmental degradation, and trade.

GC 1211. People and Problems. (4 cr) Social problems that arise in a diverse society. Sociology as source of concepts/theories used to analyze problems such as unemployment, social inequality, violence, and environmental crisis. Fifteen hours in community involvement/service.

GC 1221. Minnesota History. (4 cr) Minnesota geography, resources, exploration, settlement, ethnicity, economics, and politics related to the Upper Midwest, the United States, and Canada. Research/writing family or local history as part of larger history of region and nation.


GC 1251. World History: Since 1500. (4 cr) Political, economic, social, diplomatic, and intellectual aspects of major world cultures. Awareness of growing interdependence of peoples. International perspective on events that affect students’ lives. Classroom simulations, lecture, discussion.


GC 1281. General Psychology. (4 cr. §Psy 1001) Individual instruction and computer technology are used to survey major psychological theories, concepts, and methods.


GC 1294. Economics in Contemporary Society. (4 cr) Economic concepts used to understand current events and government policies. Supply/demand, GDP, federal budget, fiscal/money policies, taxation, poverty, inflation, economic growth, unemployment, international trade.

GC 1311. Art: General Art. (3 cr. §3311) Visual/performing arts produced in diverse American/international cultures. Slides, videos, galleries, performances, and music show how/why art is created. Students discuss various artworks, formulate/evaluate ideas/attitudes about art.

GC 1312. Identity, Community, and Culture: Connections in the Arts and Humanities. (4 cr. A-F only) How multicultural arts/literature deal with themes of identity/community. Students practice one of the arts in class. Informal/critical writing. Lectures, discussions, interactive exercises, audiovisual presentations. Interdisciplinary, team-taught.

GC 1364. Literature of the American Immigrant Experience. (3 cr) Literature by/about immigrants. Historical/contemporary American immigrant experiences (conditions leading to emigration, adjustments to and impact on the United States, inter-generational conflict). Readings include novels, poetry, expository prose, biographies, and oral histories.

GC 1365W. Literatures of the United States. (3 cr) Stories, poetry, essays, and drama by diverse U.S. writers (mid-19th century to present) depicting conflicts/challenges of life in various stratas of American culture. Addresses multicultural aspect of the “American story.”

GC 1366. Images of Women in Literature. (4 cr) Diversity of 20th-century American women writers. Focuses on feminist re-inventions of the literary canon. Portrayals of women across various identities based on race, class, sexuality, age, and religion. Readings include novels, short stories, poetry, essays, and plays.


GC 1371. Reading Short Stories. (3 cr) Current short story format from diverse communities within North America, Africa, the Caribbean, and Europe. Emphasizes written literature inspired by oral “storytelling,” storytelling as “theater,” and storytelling as communal endeavor.


GC 1421. Writing Laboratory: Basic Writing. (3 cr) Develop academic reading, writing, and research skills. Students write in response to a variety of assignments, receive extensive one-on-one assistance on computers. Clear/effective expression emphasized through writing/revision.

GC 1422. Writing Laboratory: Communicating in Society. (3 cr. §1423, §1424. Prereq–Grade of at least D in [1421 or equiv]) Conventions/skills of academic writing, reading, and research. How people communicate in society, perceive events/ideas, and think/write about them. Extensive use of computers for writing/research.

GC 1423. Writing Laboratory: Community Service Writing. (3 cr. §1422, §1424. Prereq–Grade of at least D in [1421 or equiv]) Writing description, research, and analysis based on work in community setting, and on readings/analysis. Students work three hours weekly at off-campus site for approximately seven weeks. Extensive research and writing practice. Requires use of microcomputer.

GC 1424. Writing Laboratory: Communicating in a Diverse Society. (3 cr. §1422, §1423. Prereq–Grade of at least D in [1421 or equiv]) Proficiency in academic writing, reading, research, multicultural understanding, and multicultural communication patterns. Extensive experience with computers as tools for writing/research.

GC 1454. Statistics. (4 cr. §55Stat 1001. Prereq–Grade of at least C in 0731 or equiv) Problem solving and decision making through collection, analysis, and interpretation of data. Organization/presentation of data, summary statistics, sampling, probability, distributions, estimation, correlation, hypothesis testing, contingency tables, chi-square. Uses groups and computers.

GC 1456. Functions and Problems of Logic. (3 cr) Formal (symbolic) techniques (e.g., Venn diagrams, truth tables, formal proofs) for constructing valid arguments. Translating English statements into symbolic system. Structure/complexity of valid reasoning.


GC 1464. Group Process and Discussion in a Multicultural Society. (3 cr) Nature of groups, how they form/function, what purpose they serve in U.S. society, and how leadership and other role behaviors emerge from their structure. Multicultural approaches to conflict management, diverse verbal/nonverbal communication patterns/strategies.

GC 1481. Creativity Art Laboratory: Experiences in the Media. (3 cr) Discussing, reading, and writing about art. Creating art that reflects personal/cultural identity. Multicultural art works explored through slides/videos. How to analyze, interpret, and evaluate artwork.

GC 1485. Creativity: Photography. (4 cr. Prereq–Own camera [35 mm w/adjustable controls preferred]; $50 lab fee) 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 written and verbal work.


GC 1571. Introduction to Microcomputer Applications. (4 cr. §1573, §1574. Prereq–0713 or 0717 or 0721 or 0722 or equiv) Hands-on lab course. Instructor helps students individually during class. No lectures. Basic concepts. Word processing (edit/format text, tables, footnotes, headers, footers, mail merge, styles). Spreadsheets (data entry, formulas, functions, graphing). Making spreadsheets, formulas, decision making using IF/THEN/ELSE, lookup tables, graphs.

GC 1573. Introduction to Word Processing. (2 cr. §1571. Prereq–0713 or 0721 or equiv) Hands-on lab course. Instructor helps students individually during class. No lectures. Basic concepts. Formatting/formatting text, tables, footnotes, headers, footers, mail merge, styles.

GC 1574. Introduction to Spreadsheets. (2 cr. §1571. Prereq–0713 or 0721 or equiv) Hands-on lab course. Instructor helps students individually during class. No lectures. Basic concepts. Entering data, formatting cells/worksheets. Formulas, decision making using IF/THEN/ELSE, lookup tables, graphs.
GC 1575. Introduction to Computers and the Internet. (4 cr. Prereq–0713 or 0721 or equiv) Hands-on training in computer literacy. Hardware (microprocessor, memory, storage), software (operating systems/applications). Internet (Web, e-mail, Telnet, FTP). Multimedia.


GC 1836. Asian-American Literature. (3 cr) Historical/prospective prose, poetry, and drama analysis to assess writers’ interpretations of their identity. Issues of gendered contest/peep pressure.


GC 1993. Directed Study. (1-8 cr) Prereq–W, X Student-initiated project in consultation with faculty advisor. Student determines topic, sets goals, designs a course of study, and finds an appropriate faculty member to work with collaboratively.


GC 2283W. Psychology of Human Development. (4 cr) $1283. Prereq–(1281 or Psy 1011), (1241 or EngC 1011) Biosocial, cognitive, psychosocial development of individuals over life span. Writing intensive. Computer assisted instruction, video, small group discussion.

GC 2357. World Religious Beliefs. (4 cr) $1357. Prereq–(1421 or equiv), at least 12 cr) Beliefs, rituals, attitudes of world’s major living religions. Parallel “little traditions” in their historical, social, cultural settings. Intensive writing/reading.

GC 2375W. Film and Society. (4 cr) $1375. Prereq–12 cr, §I Films as medium for social/cultural expression. Problems of individuals’ values or identities in conflict with societal demands/constraints (racism, sexism, urban living, family living, aging, politics, education, sexual mores, adolescence). Social issues in contemporary documentary films.

Genetics, Cell Biology, and Development (GCD)

Department of Genetics and Cell Biology College of Biological Sciences

GCD 3022. Genetics. (3 cr) $Biol 4003. Prereq–Biol 1002 or 1009; not for biology majors) Mechanisms of heredity, their implications for biological populations, and applications to practical problems.

GCD 4015. Genetics Laboratory. (2 cr. Prereq–3022 or Biol 4003 or Biol 4332) Introduction to experimental techniques used in genetic analyses. Although experiments may vary from semester to semester, genetic experiments with model systems ranging from viruses to plants and animals are performed.

GCD 4025. Cell Biology Laboratory. (2 cr. Prereq–Biol 4004 or #) Experimental approaches to cell structure, function, and replication. Microscopy, autoradiography, cell fractionation, molecular analyses.

GCD 4034. Molecular Genetics. (3 cr. Prereq–Biol 4003, Biol 4004; advanced bioscience undergrad recommended) Molecular genetics of prokaryotes/eukaryotes. Gene regulation, genome analysis. Modern techniques such as recombinant DNA, targeted mutagenesis, genome manipulation, and gene chip technology.


GCD 4134. Endocrinology. (3 cr. Prereq–Biol 3211 or Biol/BioC 3021 or Biol 4331 or #) Survey of structure and function of invertebrate and vertebrate endocrine systems.

GCD 4143. Human Genetics. (3 cr. Prereq–3022 or Biol 4003 or #) 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 cr. Prereq–Biol 3003) 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 4793W. Directed Studies: Writing Intensive. (1-7 cr [max 7 cr]; S-N only, Prereq–W, X) Individual study on selected topics or problems. Emphasizes selected readings, use of scientific literature. Written report.

GCD 4794W. Directed Research: Writing Intensive. (1-7 cr [max 7 cr]; S-N only, Prereq–W, X) Laboratory or field investigation of selected areas of research including written report.

GCD 4993. Directed Studies. (1-7 cr [max 7 cr]; S-N only, Prereq–W, X) Individual study on selected topics or problems. Emphasizes selected readings and use of scientific literature.

GCD 4994. Directed Research. (1-7 cr [max 7 cr]; S-N only, Prereq–W, X) Laboratory or field investigation of selected areas of research.

GCD 5036. Molecular Cell Biology. (3 cr. Prereq–Biol 4004 or #; (or grad student recommended) 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.

Geographic Information Science (GIS)

Department of Geography College of Liberal Arts

GIS 5571. Introduction to Arc/Info. (3 cr. Prereq–Geog 5561 or equiv; status in MGIS program, familiarity with computer operating systems or #) Introductory overview of the Arc/Info system. Topics include data capture, geometric transformations and map projections, topology, editing systems, database management, and map production.

GIS 5572. Advanced Arc/Info. (3 cr. Prereq–5571, Geog 5561 or equiv; status in MGIS program or #) Advanced course in Arc/Info providing in-depth exploration of the topics emphasized in GIS 5571 as well as advanced topics including dynamic segmentation, address matching, and macro language programming.

GIS 5573. Desktop Mapping. (1.5 cr. Prereq–Geog 5561 or equiv, Geog 3511 or equiv, status in MGIS program or #) Introduction to desktop mapping systems such as ArcView, MapInfo and MapGuide. Emphasizes the application of these systems to the display and analysis of geographical data.

GIS 5574. GIS and the Internet. (1.5 cr. Prereq–Geog 5561 or equiv, status in MGIS program or #) The role of the Internet in GIS applications. Topics include GIS data sources on the Internet, the role of the Internet in information dissemination, Internet capabilities for interactive mapping and issues surrounding the development of GIS-related Web sites.

GIS 5575. Surveying and the Global Positioning System (GPS). (2 cr. Prereq–Geog 5561 or equiv; status in MGIS program or #) Introduction to GPS (Global Positioning System) and other surveying techniques of use to GIS professionals. Topics include geodesy, data adjustment, datums, ellipsoids, coordinate systems, and transformations.