### Course Descriptions

This is A through H of the course section of the 1999-2000 Undergraduate Catalog of the University of Minnesota.

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Course Descriptions

For definitions of course numbers, symbols, and abbreviations, see the inside back cover.

Accounting (Acct)

Department of Accounting

Curtis L. Carlson School of Management

Acct 2050. Introduction to Financial Reporting. (4 cr; QP–Completion of 40 cr; SP–Completion of 26 cr; A-F only) Introduction to financial accounting for U.S. organizations. Reading and understanding U.S. financial statements.

Acct 3001. Introduction to Management Accounting. (2 cr; QP–1050; SP–2050; A-F only) Introduction to costing techniques, including activity-based costing. Application of costing methods to determining costs of products, services, and production processes. Use of costs in operating and strategic decisions. Development of budgeting and performance evaluation.

Acct 3199. Internship in Public Accounting. (2 cr; QP–5125; SP–5125, #; S-N only) Full-time work for a public accounting firm plus a written report on the work experience.

Acct 3201. Intermediate Management Accounting. (2 cr; QP–3001, acct or finance major; SP–3001, acct or finance major; A-F only) 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; QP–3201, #; SP–3201, #; S-N only) Full-time work in general accounting, cost accounting, or internal auditing in an industrial or governmental organization plus a written report analyzing the work experience.

Acct 5100. Corporate Financial Reporting. (4 cr; QP–Mgmt student, non-accounting major; SP–Mgmt student, non-accounting major; A-F only) 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. Asset Valuation and Income Determination I. (4 cr; SP–Minimum grade of B- in 1050; A-F only) Valuation, measurement, and reporting issues related to selected assets and liabilities of the firm. Students learn theory underlying accounting issues and become technically proficient in applying accounting principles.

Acct 5102. Liability Valuation and Income Determination. (4 cr; QP–3101 or 5101, mgmt or grad mgmt student; SP–5101, mgmt or grad mgmt student; A-F only) Extends understanding of the basic valuation problems encountered in financial reporting, focusing on the valuation of liabilities. Covers accounting for leases, pensions, deferred taxes. Introduces consolidated financial statements.

Acct 5125. Auditing Principles and Procedures. (4 cr; QP–3101 or 5101, acct major; SP–5101, acct major; A-F only) Auditing financial information systems. Independent audits and internal auditing. Ethics. Legal responsibilities.

Acct 5126. Internal Auditing. (2 cr; QP–3101 or 5101; SP–5101; A-F only) Financial and operational auditing. Standards. Managing the function.

Acct 5135. Fundamentals of Federal Income Tax. (4 cr; QP–OP-1050 or 8030 or 5130, mgmt or grad student; SP–2050 or 830 or 5130, mgmt or grad mgmt student; A-F only) Introduction to the U.S. federal system of taxation. Concepts of gross income, deductions, and cr. 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 authority. Introduces the various methods, tools and techniques to conduct tax research.


Acct 5160. Financial Statement Analysis. (2 cr; QP–3101 or 5100 or 5101, acct or finance major; SP–5101 or 5101, acct or finance major; A-F only) Interpretation and analysis of financial statements. Introduces basic techniques of financial statement analysis and applies them in different settings such as investment and cr decisions.

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

Acct 5200. Tax Accounting Methods and Periods. (4 cr; QP–5135; MBT student; SP–5135, MBT student; A-F only) 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; QP–5135, MBT student; SP–5135, MBT student; A-F only) 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; QP–5135, MBT student; SP–5135, MBT student; A-F only) Federal income taxation of corporations and shareholders. Organization of a corporation; 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 Entities. (2 cr; QP–5135, acct major; SP–5135, acct major; A-F only) 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)
Acct 5353. Income Taxation of Fiduciaries. (2 cr; QP–5135, MBT student; SP–5135, MBT student; A-F only) 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, medical related compensation benefits, and reporting requirements.

Acct 5356. Taxation of Compensation Arrangements. (2 cr; QP–5135, MBT student; SP–5135, MBT student; A-F only) 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, medical related compensation benefits, and reporting requirements.

Acct 5360. State and Local Taxation. (2 cr; QP–5135, MBT student; SP–5135, MBT student; A-F only) 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; QP–5135, MBT student; SP–5135, MBT student; A-F only) 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; SP–5380, MBT student; A-F only) 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; SP–5380, MBT student; A-F only) Foreign tax cr 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.

Acct 5390. Topics in Taxation. (1-4 cr; QP–MBT student; SP–MBT student) Current tax legislation and problems. Topics may vary each semester. S-N grading allowed with MBT program approval.


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


AdEd 5301. Survey of Distance Education. (3 cr) Survey of distance education concepts, theory, history, present practice, delivery systems, course design, major issues, and future directions.

AdEd 5302. Continuing Education for Professionals. (3 cr) Analysis of philosophies, issues, policies, trends, professional needs and statutory requirements in continuing professional education programs. Role of the program director and organization.

AdEd 5303. Working with Volunteers in Community Settings. (3 cr) Uses collaborative, experiential methods to address fundamental issues and practices in volunteer development. Explore personal philosophies, staffing, and key issues and trends in the administration of volunteer programs.


AdEd 5700. Special Topics in Adult Education. (1-8 cr [max 12 cr]) Exploration of issues, methods, and knowledge in areas of adult education. Content varies.

Aerospace Engineering and Mechanics (AEM)

Department of Aerospace Engineering and Mechanics


AEM 2301. Mechanics of Flight. (3 cr; QP–Math 1261, Phys 1302, IT student or A–SP–Math 1272, Phys 1301, IT student; A-F only) Standard atmospheric properties; basic aerodynamics; generation of lift and drag; airfoils and finite wings; elements of airplane performance, design and atmospheric flight mechanics; wind tunnel experiments; experimental determination of lift and drag. Introduction to MatLab.


AEM 4001. Workshop: Elementary and Secondary Teachers. (3 cr; QP–Education major, in-service teacher [documentation required]; A–limited to 30 students) Lectures, film reviews, construction and demonstration of classroom aids, involvement with the NASA spacemobile, flight experience, field trips covering such topics as satellites and probes, model rocketry including a launch, astronaut in space, principles of flight, conventional aircraft, space age education tools. Visits to local aerospace facility and to major aerospace installation (subject to availability of aircraft).

AEM 4002. Advanced Aerospace Workshop. (3 cr; QP–Education major, in-service secondary teacher in math or science or aerospace [documentation required] or 5001 or ¶A; A–SP–Education major, in-service secondary teacher in math or science or aerospace [documentation required] or 4001 or ¶A) Advanced workshop for secondary math, science, and aerospace teachers. Uses contemporary NASA design projects to provide new teaching tools to stimulate student interest in math and physics.

AEM 4201. Fluid Mechanics. (4 cr; QP–3036, Math 3252, Math 3261, IT upper div or graduate student or A; SP–2012, Math 2243, Math 2263, IT upper div or grad student; A-F only)
For definitions of course numbers, symbols, and abbreviations, see inside back cover.
AEM 5401. Intermediate Dynamics. (3 cr; QP–3036, Math 3261, IT upper div or grad student; SP–2012, Math 2243, IT upper div or grad student) Three-dimensional Newtonian mechanics, kinematics of rigid bodies, dynamics of rigid bodies, generalized coordinates, holonomic constraints, Lagrange equations, applications.

AEM 5501. Continuum Mechanics. (3 cr; QP–3016, Math 3261, IT upper div or grad student or #; SP–3631, Math 2243 or equiv, IT upper div or grad student 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; QP–5515 or equiv, Math 3252, IT upper div or grad student or #; SP–4501 or equiv, Math 2263 or equiv or #; A-F only) Introduction to the theory of elasticity, with emphasis on linear elasticity. Linear and nonlinear strain measures, boundary-value problem for linear elasticity, plane problems in linear elasticity, three-dimensional problems in linear elasticity. Topics from nonlinear elasticity, micromechanics, contact problems, fracture mechanics.

Aerospace Studies (Air)

Department of Aerospace Studies (Air Force ROTC)

Student Development & Athletics

Air 1000. Leadership Laboratory. (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 special 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 communication skills.

Air 1205. Quality Air Force, Group Leadership Problems, and Presentation Techniques. (1 cr; A-F only) Leadership and followership. Officerhood, ethics, and values; Air Force’s core values. Air Force heritage and leaders, Quality Air Force, group leadership problems, and continuing application of communicative skills.

Air 3301. Air Force Leadership, Quality, and Communication. (3 cr; A-F only) Study of leadership, quality management fundamentals, and communication skills required of an Air Force junior officer. Case studies.

Air 3302. Air Force Officerhood, Quality, and Communication. (3 cr; SP–3301 recommended; A-F only) 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.

Afro-American Studies (Afro)

Department of Afro-American and African Studies College of Liberal Arts

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 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; SP–1221 or equiv) Continuation of skill development from 1221.

Afro 3001. West African History: Early Times to 1800. (3 cr) West Africa from late prehistoric times to establishment and histories of states. Relations with North Africa, Mediterranean, Asian, and American worlds. Examination of non-centralized patriarchal authority.

Afro 3002. West African History: 1800 to Present. (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 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 roots or 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) 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) The history of South Africa from the Union to the present. Focus on such issues as African and Africaner nationalism, structures of apartheid, forced population removals, divestment and sanctions, and the post-apartheid era.

Afro 3225. Third Semester Swahili. (4 cr; SP–One 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; SP–3225 or equiv) Advanced Swahili readings, speaking, and writing practice.

Afro 3351. Sociological Perspectives on Race, Class, and Gender. (3 cr; A-F only) Race, class, and gender as aspects of social identity and features of social organization. Experiences of women of color in the United States; exploration of family life, work, violence, sexuality and reproduction, and the 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. (3 cr) Interdisciplinary study of the experience of African American women, including economic, political, and social factors, psycho-sexual development, and family roles.

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 Africans in research and practice.

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

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 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; QP–Jour must have course approved on program plan; pre-jour must not enroll; SP–Jour majors must have course approved on program plan; pre-jour should not enroll; A-F only)
Past and present depictions of majority 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 to Reconstruction. (4 cr)
Importance of the dynamics of class, gender, region, and political ideology, as well as the changing nature of race and racism.

Afro 3865. African American History Survey: 1890 to Present. (4 cr)
Discussion of internal migrations, industrialization and urbanization, the Great Depression, world wars, and large scale movements for social and political change.

Afro 3910. Topics in Afro-American and African Studies. (3 cr)
Topics specified in Class Schedule.

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

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

Afro 3993. Directed Study. (1-3 cr; SP–A,F,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 Swahil cities. Roots and issues of 20th century urban growth.

Afro 4231. The Color of Public Policy: African Americans, American Indians, and Chicanos in the U.S. (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 4302. Honors: Women’s Autobiographical Narratives. (3 cr; QP–Sr or grad student or SP–Sr or grad student or #)
Focus is on literary autobiography, journals, travel narratives, essays, slave narratives, testimonials, and ethnographies to consider the content and the methodological, theoretical, 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)
Exploration 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 creoleness, central to male and female writers in French from Africa and the Caribbean. Novels, essays, short stories, and plays.

Afro 4800. African Studies Seminar. (3 cr)
Topics vary and reflect instructor’s research interests. Topics specified in Class Schedule.

Afro 4900. Afro-American Studies Seminar. (3 cr)
Topics specified in Class Schedule.

Afro 5011. Islam in Africa. (3 cr)
Ideological, doctrinal, and ritual aspects of African Islam. Emphasis on various religious brotherhoods and Sufi orders from different African countries in the 20th century. No knowledge of Arabic required.

Afro 5072. 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 5143. Geography of West Africa. (3 cr)
West Africa from Senegal to Cameroon. Social geography of resource use, population, settlement, economic development, and international relations.

Afro 5145. Development in Africa. (3 cr)
Economic, political, and social development in Africa from independence to the present, emphasizing the reordering of colonial landscapes, bases for North-South relations, big power interventions, and participation in the world economy.

Afro 5181. Blacks in American Theater. (3 cr)
Historical survey of significant events in the development of American black theater traditions. Essays, plays, playwrights, and theaters from early colonial references to the Black Arts Movement.

Afro 5182. Contemporary Black Theater: 1960 to Present. (3 cr)
Essays, plays, playwrights, and theaters that have contributed significantly to contemporary black theater. From the beginning of the Black Arts movement to the present.

Afro 5191. Seminar: The African American Experience Past and Present. (3 cr)
Examination of issues including slavery, Reconstruction, the Great Depression, and civil rights movement using cultural and intellectual history and autobiography/biography. Focuses on dynamics of race, gender, class, region, sexuality, and religion.

Afro 5865. Proseminar: Afro-American History. (3-4 cr; SP–#)
Construction of a detailed research agenda, locating appropriate depositories of primary materials and secondary sources, and developing appropriate methodologies and frameworks.

Afro 5876. Proseminar: Approaches to African Development. (3 cr)
Study, critical analysis, and comparison of primary documents relevant to African development.

Afro 5910. Topics in Afro-American and African Studies. (3 cr)
Topics specified in Class Schedule.

Afro 5993. Directed Study. (1-3 cr; SP–#)
Guided individual reading/study for qualified seniors and graduate students.

### Agricultural Education and Extension (AgEE)

**Department of Work, Community, and Family Education**

**College of Education and Human Development**

**AgEE 1001. Introduction to Agricultural Education and Extension.** (1 cr)
Historical development of the discipline of agricultural education; orientation to career opportunities; areas and expectations of specialization; issues in the field.

**AgEE 1002. Principles of Career Planning for Agricultural Professionals.** (1 cr)
Self assessment and analysis of interests, skills, and abilities. Analyses of occupations, employment potential, employee expectations for work. Use informational interviews to examine career options and employment portfolio for career planning.

**AgEE 2051. Current Technical Competencies.** (3 cr)
Prepares agricultural education teachers and other agricultural professionals to use technology. Develop basic skills and knowledge to plan, implement, operate, and maintain agricultural structural and mechanical systems. Experiential learning principles and applied problem solving.
AgEE 2096. Professional Practicum in Agricultural Education: Early Experience. (1-3 cr; A-F only)
Observed school offices, and agricultural oriented businesses to learn about the work and workplaces in agricultural education.

AgEE 3096. Experiential Learning: Production and Business. (1-8 cr [max 12 cr]; SP–AgEd major, #)
Experiential learning in agricultural production and business. Planned, organized, monitored, and evaluated based on a per-experience diagnosis of learning prerequisite to higher level courses in technical agriculture and agricultural business.

AgEE 3112. Technical Drawing and Production Technologies. (3 cr; SP–AgEE 3112; A-F only)
Experiences in technical drawing, design technology, and production technologies related to construction and manufacturing. Develop manipulative skills and techniques; understand principles and processes of technology through hands-on work in a multiple activity laboratory.

AgEE 3121. Communication, Energy and Power, Transportation and Machinery Technologies. (3 cr; SP–AgEE 3121; A-F only)
Use of teaching resources; principles of teaching and learning; problem-solving techniques, lesson plan construction for large group, small group and individual investigations; student management; and assessment.

AgEE 3112. Agricultural Education Program Organization and Curriculum for Youth. (4 cr)
Determination of school program approach in agriculture, agribusiness, and environmental science that meet graduation outcomes and determine student needs. Use classroom, FFA, and supervised agricultural experiences to develop activities.

AgEE 3113. Adult Agricultural Education Program Development and Technology. (3 cr; A-F only)
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.

AgEE 3114. Agricultural Education Teaching Seminar. (1 cr)
Reflective learning on teacher preparation experience; identify issues and problems facing the discipline; needs for continual preparation and program adjustment.

AgEE 5200. Special Topics in Agriculture Education and Extension. (1-3 cr [max 12 cr])
Content varies by offering.

AgEE 5231. Agricultural Education Curriculum K-12. (2 cr; A-F only)
Philosophy, organization, and administration of instruction in agricultural education programs at the elementary, middle, and high school levels.

AgEE 5233. Advanced Procedures in Teaching Agricultural Education. (2 cr; A-F only)
New developments in methodology; assessment of innovations and procedures; consideration of various levels of instruction.

AgEE 5235. Advanced Supervised Agricultural Experience Programs. (2 cr)
The organization and administration of agricultural experience programs for freshmen and secondary level students: career exploration, improvement projects, experiments, placement in production/business/community settings, entrepreneurship. Current state and national programs and resource material.

AgEE 5237. Mentorship for Supervising Agricultural Education Teachers. (2 cr)
Professional development training for experienced teachers to serve as mentors for beginning and student teachers of agricultural education. Emphasis on supervision and assessment of teaching performance. Focus on critical period of induction into the teaching profession.

AgEE 5259. Program Organization and Management in Agricultural Education. (2 cr)
Analysis of organization, management, and assessment of agricultural education programs at the middle, high school, and adult levels.

AgEE 5280. Current Issues for the Beginning Agricultural Education Teacher. (1-3 cr [max 3 cr])
Reflection, analysis on current problems and issues confronting beginning teachers of agricultural education. Issues in teaching methods, classroom and program management, discipline, curriculum, FFA and SAE development, school-to-work relationships.

AgEE 5290. Seminar: Current Issues in Agricultural Education and Extension. (1-3 cr [max 6 cr])
Exploration of current issues in agriculture education and extension, strategies of response, implications of response actions, and related leadership roles.

AgEE 5296. Professional Experience Practicum in Agricultural Education and Extension. (1-4 cr)
Observation, study, and experience in agricultural business and industry; identification of educational problems observed in the agricultural industry; evaluation of personal experience.

AgEE 5311. History, Philosophy, and Systems of Extension. (3 cr; A-F only)
History and philosophy of extension; modification and adaptation to worldwide methods and approved practices; extension methodologies; innovative approaches; systems appropriate to development environments.

AgEE 5341. Global Program Delivery Techniques and Technology of Extension. (2 cr; SP–WCFE 5341; A-F only)
Educational activities, teaching, and communications methods and techniques, from outreach to extension services, with an emphasis on youth and adult education programs in different global settings.

AgEE 5351. Methods for Change in Developing Countries. (3 cr; SP–WCFE 5351; A-F only)
Examination of sociological and cultural parameters of improved practices in rural, community, and agricultural development. Project planning, implementation, and evaluation related to change in developing countries.

AgEE 5361. World Development Problems. (3 cr; A-F only)
Introduction to development problems throughout the world. Development in Third World countries. Examples of First World development problems. Interdisciplinary focus on population, health and disease, education, agriculture, industry, finance, politics, and human rights.

AgEE 5371. Farming Systems Research and Extension. (3 cr; A-F only)
Introduction to the theory and practice of linking farming systems, research, and extension. An interdisciplinary and holistic approach to rural development for individuals and communities throughout the world.

AgEE 5993. Directed Study in Agricultural Education and Extension. (1-9 cr)
Topics may be chosen to permit study of areas within education or to supplement areas of inquiry not provided in the regular course structure.

AgEE 5995. Integrating Paper—Master of Education: Agricultural and Extension Education. (1-4 cr; A-F only)
Students prepare a paper dealing with issues in agricultural education applied to professional responsibilities.

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; QP–Math 1031 or Math 1142 or equiv, 5 cr phys or chem; SP–Math 1031 or Math 1142 or equiv, 3 cr phys or chem)
Introduces a variety of engineering principles and concepts to non-engineering students. Quantitatively apply mathematical and engineering principles to solve problems from a range of areas in animal production, crop production, horticulture, and soil and water management.

AgET 5095. Special Problems in Biosystems and Agricultural Engineering. (1-5 cr; QP–M–SP–F)
Individual study project in biosystems and agricultural engineering at advanced level. Application of engineering principles to a specific problem.

AgET 5203. Environmental Impacts of Food Production. (3 cr)
Topics include crop production intensity, animal raising options, food processing waste alternatives, and pest control.

AgET 5212. Safety and Health Issues in Agricultural Work Environments. (2 cr; QP–J or J or grad student in IT or COAES or PubH or other major with interest in occupational and environmental health and safety)
Examine emerging agricultural occupational safety and health issues including injury, work-related disease, pesticide exposure, pollution, biotechnology, and social implications of changing demographics and technologies.

AgET 5999. Special Workshop in Biosystems and Agricultural Engineering. (1-4 cr; QP–M–SP–F)
Workshops on a variety of topics in Biosystems and Agricultural Engineering offered in locations other than the Twin Cities campus. Consult Class Schedule or department for current offerings.

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

Agro 1000. Honors Colloquium. (2 cr; max 8 cr; QP–Admission to COAFES honors program or #; SP–Admission to COAFES honors program or #; A-F only) Colloquia introduce a topic related to contemporary agricultural currents and are designed for all COAFES majors. Topics change each semester; contact college office for topics.

Agro 1001. Freshmen Seminar. (2 cr) Topics change each semester. Check the Class Schedule or college office for additional information.

Agro 3000. Seminar in International Agriculture. (2 cr; max 6 cr; QP–Agronomy, #; A-F only) Oral presentations and discussion of students’ research papers, literature review of selected topics, and discussions with students and staff about their experiences in international agriculture.

Agro 3101. Honors Experience. (2 cr; max 2 cr; QP–Approved proposal by COAFES honors program committee; SP–Approved proposal by COAFES honors program committee; A-F only) Developed by student in conjunction with a COAFES faculty mentor. Could include foreign study-travel, research experience, a position or policy paper, or any experience demonstrating advanced study/service/understanding.

Agronomy and Plant Genetics (Agro)

Department of Agronomy and Plant Genetics

College of Agricultural, Food, and Environmental Sciences

Agro 1093. Directed Studies. (L-4 cr; max 12 cr; QP–5 cr in agronomy; SP–4 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 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 1103. Crops, Environment, and Society. (4 cr) Plants that supply food, fiber, beverages, and medicine to humans. Topics include plant identification, plant physiology, plant breeding and biotechnology, plant ecology, and crop culture and management.

Agro 2103. Grain Grading and Crop Utilization. (1 cr; SP–AgEc 3411 recommended) Prerequisites and principles of grain grading. Determining grading factors using Federal Grain Inspection Standards (FGIS) and understanding their importance in market value and end use. Lab only.

Agro 2105. Seed Technology. (1 cr; SP–1103) Principles and practices of crop and weed seed identification, seed analysis, seed laws, seed handling, conditioning and viability testing. Appropriate for students interested in careers in the seed production or regulation industries.

Agro 2501. Weed Biology and Systematics. (2 cr; QP–Biol 1009 or equiv; SP–Biol 1009 or equiv) Identification of plant families and individual species of agricultural importance; major emphasis on characteristics of weed species, life cycles, and ecology.

Agro 3003. Introduction to Integrated Weed Management. (1 cr; max 1 cr) QP–Biol 1009 or equiv; SP–Biol 1009 or equiv, (W) 3001, (PI) 3002 required) Introduction to the principles of the biological, physical, and agricultural sciences that underlie the integrated practice of weed management.

Agro 3005. Applied Crop Physiology and Development. (2 cr; max 2 cr; QP–Biol 1009 or equiv; SP–Biol 1009 or equiv; SP–Biol or plant science, Chem 1001, Chem 1001 or equiv; (W) 3001 or equiv; (PI) 3002 required) Applications of plant physiology to growth, development, and management of field crops. Explore effects of environment, management practices, plant morphology, and physiological processes. Inquiry and group activities emphasized.

Agro 3203. Environment, Global Food Production, and the Citizen. (3 cr; QP–Biol 1009 or equiv; SP–AnSc 3203, Biol 1009 or equiv) Ecological and ethical concerns of food production systems in global agriculture—past, present and future. Examining underlying ethical positions about how agroecosystems should be configured. Interactive learning uses decision cases, discussions, videos and other media.

Agro 4093. Directed Studies for Advanced Students. (L-4 cr; max 12 cr; QP–20 cr in agronomy; SP–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; QP–COAFES undergrad, #; complete internship contract available in COAFES Career Office before registering; UC only; SP–COAFES undergrad, #; complete internship contract available in COAFES Career Services before registering; UC only; S-N only) Supervised professional experience in agribusiness firms or government agencies; evaluative reports and consultations with faculty advisors and employers.

Agro 4101. Experiment Design/PLOT Techniques. (3 cr; QP–Jr or sr; SP–Jr or sr) Principles of field plot techniques and design applied to field demonstrations and experiments. Interpretation procedures include inductive and deductive reasoning, analysis of data, tests of significance, and treatment comparisons. Computers used for data processing and statistical analysis.

Agro 4103. World Food Problems. (3 cr; QP–AgEc 5790, SCAPS 5280, SFSN 5643; Jr or sr or grad student; SP–AgEc 4103, SCAPS 4103, SFSN 4103; Jr or sr or grad student) 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 effects on natural resources in various parts of the world.

Agro 4201. Agroecosystems and Crop Production. (3 cr; QP–15 cr of biol and/or plant science; SP–10 cr of biol and/or plant science) Basic concepts in agroecosystems: organization, development, and identification of field crop communities in contrast to natural ecosystems. Means of improving designed and managed systems for the benefit of mankind while minimizing impact on the ecosystem.

Agro 4305. Crop Harvest, Storage, Processing, Utilization. (3 cr; QP–Biol 1009, Chem 1001 or Chem 1051 or equiv; SP–1103, Biol 1009; AgET 3213, PIpa 3001, Ent 2001 recommended) Crop quality traits associated with use and influence on crop harvest, product quality, storage, handling, processing, and utilization. Principles and technology used in crop storage to minimize damage from fungi and insects, and maximize crop quality. Lecture and lab.

Agro 4401. Plant Genetics and Breeding. (4 cr; QP–Biol 1009 or equiv, grad student; SP–Hort 4401, 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 sexually propagated crops. Lab experiments on hybridization, variation, and selection.

Agro 4505. Integrated Weed Management. (4 cr; QP–3202, Soil 3125, Piba 3131 or SP–3005, Piba 3002, Soil 2125) Principles of weed management and use of coordinated control tactics including chemical, biological, and cultural means. Appropriate strategies attempt to optimize control methods in terms of economic, environmental, and social impacts.

Agro 4603. Field Crop Scouting and Problem Diagnosis. (2 cr; QP–Intro courses in Agro, Ent, Piba, Soil, Jr or sr; SP–3005, Ent 3001, Piba 2002, Soil 3416, Jr or sr with 16-20 cr in major) Part of intensive summer workshop at selected Minnesota Agricultural Experiment Stations. A field based, hands-on course emphasizing problem solving and diagnostic strategies, and updates about crops and crop problems in Minnesota. Extra course fees.

Agro 4605. Management Technologies for Crop Production. (3 cr; QP–Jr or sr or grad student with program committee approval; SP–Jr or sr or grad student with program committee approval) Lectures, discussions, and problem situations address solutions to crop management needs in various climatic zones and soil types in Minnesota. Focus on corn/soybean, small grain, and forage cropping systems. Emphasis on long-term productivity, profitability, and sustainability.

Agro 4660. Senior Capstone. (2 cr; QP–5000 or ScAg 5009 or SP–4096 or ScAg 4009 completed or #) Linked to undergraduate internship and other experiential learning opportunities. Problem-based learning and decision-centered cases help students reflect on experience from an ethical, technical, societal and personal perspective.

Agro 4888. Issues in Sustainable Agriculture. (2 cr; QP–1010, Soil 3120 or Soil 3125 or equiv; SP–1103, Soil 3125 or Soil 2125 or equiv) Agroecology, sustainable practices, production economics, environmental quality, holistic resource management, healthy foods and water, and rural communities. Introduces sustainable agricultural advocates including farmers, faculty, and representatives of nonprofit sustainable agriculture organizations.

Agro 5021. Introduction to Plant Breeding. (3 cr; QP–GCB 3022 or equiv, background in plant science; SP–GCB 3022 or equiv, background in plant science) For majors not specializing in plant breeding who will benefit from a basic understanding of how genetics is applied to plant improvement. Emphasis on sustainable production scenarios.

Agro 5310. Research Methods in Crop Improvement and Production. (1 cr; QP–Agro or Hort or PIB or grad student; SP–Applied Plant Sciences grad student; S-N only) 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 5999. Special Topics/Workshop in Agronomy. (1-4 cr; QP–Jr or sr; SP–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.

Akkadik (Akka)

Department of Classical and Near Eastern Studies

College of Liberal Arts

Akka 5011. Elementary Akkadik. (1-3 cr; SP–Adv undergrad with # or grad student) Introduction to cuneiform script. Basics of Old Babylonian morphology and syntax. Written drills, readings from Hammurabi laws, foundation inscriptions, annals, religious and epic literature.
American Indian Studies (Amin)

Department of American Indian Studies
College of Liberal Arts

Amin 1001. Introduction to American Indian Studies.
(4 cr)
Concepts and topics covered include history, language, culture, literature, federal policy, images, contemporary issues, and the arts. Minnesota Indians will be emphasized where appropriate.

Amin 1101. Beginning Ojibwe I.
(4 cr)
Acquisition of speaking skills, fundamentals of grammar, and writing systems.

Amin 1102. Beginning Ojibwe II.
(4 cr; SP–1101)
Acquisition of speaking skills, fundamentals of grammar, and writing systems.

Amin 1121. Beginning Dakota I.
(4 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.

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

Amin 3103. Intermediate Ojibwe I.
(4 cr; SP–1102)
Improving speaking skills; grammatical structures; storytelling, oral history, and translation projects.

Amin 3104. Intermediate Ojibwe II.
(4 cr; SP–3103)
Improving speaking skills; grammatical structure; storytelling, oral history, and translation projects.

Amin 3123. Intermediate Dakota I.
(4 cr; SP–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.
(4 cr; SP–3123)
Further development of the listening, speaking, reading, and writing skills with oral drills and in-class participation focused on questions and answers.

Amin 3201. American Indian Literature.
(3 cr)
Comparative studies of oral traditions and modern literature from a variety of tribal cultures.

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

Amin 3401. American Indian Art.
(4 cr)
Visual arts depicting rituals, traditions, values, and worldviews of major 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 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 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 18th and early 20th centuries. Critical evaluation of social theory in addressing the problem of contemporary communities of color in the United States.

Amin 4201. Topics in American Indian Literature.
(3 cr)
Topics may be organized around issues of theme, genre, region or tribe, gender, etc. For upper division undergraduate majors, non-majors, and graduate students.

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.

Amin 4402. American Indians and the Cinema.
(4 cr)

Amin 4501. Law, Sovereignty, and Treaty Rights.
(3 cr; SP–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. Change and Development in Indian Communities.
(3 cr; QP–1771; SP–1001)
Sources, nature, and consequences of social and economic development and change in Indian communities. Precontact Indian communities; impact of European contact; social movements into the 20th century including phenomenon of urban Indian communities.

Amin 4515. Contemporary American Indian Movements.
(3 cr; SP–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 4721. 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 HoChunk experiences. How rich the world created by Great Lakes tribes was damaged, depressed, and altered but not destroyed by the arrival of Euramericans.

Amin 4990. Topics in American Indian Studies.
(3-4 cr)
Independent Study. (1-12 cr; max 18 cr; SP–#; QP–#; QP–#; QP–#; QP–#)
Amin 4994. Directed Research.
(1-12 cr [max 18 cr]; SP–#; QP–#; QP–#; QP–#)
Individually arranged research with faculty to meet student needs and interests.

Amin 4996. Field Study.
(1-12 cr [max 18 cr]; QP–#; QP–#; QP–#; QP–#)
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; SP–#)
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.

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 rules of behavior of the deaf community in the United States. Includes receptive and expressive readiness activities; sign vocabulary; grammatical structure; receptive and expressive finger spelling; and deaf culture.

ASL 1702. American Sign Language II.
(4 cr; QP–EPsy 1601 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 finger spelling and aspects of deaf culture.

ASL 3703. American Sign Language III.
(4 cr; QP–EPsy 1603 or #)
Expanded instruction of American Sign Language (ASL). Receptive and expressive activities; sign vocabulary; grammatical structure; receptive and expressive finger spelling; narrative skills; cultural behaviors; and aspects of deaf culture. Abstract and conversational approach.

ASL 3704. American Sign Language IV.
(4 cr; QP–EPsy 3601 or #)
Increases the emphasis on more abstract and challenging conversational and narrative range. Includes receptive and expressive readiness activities; sign vocabulary; grammatical structure; receptive and expressive finger spelling; various aspects of deaf culture and cultural behavior 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]; QP–Fluency in ASL or #)
ASL Sign Language (ASL) form and function, vocabulary production and other ASL grammatical features needed by professionals working with children; storytelling strategies and technical sign language for classroom teachers. Content progresses in repeated segments.
American Studies (AmSt)

Program in American Studies
College of Liberal Arts

AmSt 1001. American Cultures: Native America to Industrialization. (4 cr)
Interdisciplinary study of American society from precontact to industrialization; exploring American literature, art, music, and popular culture in historical context.

AmSt 1002. American Cultures: 20th-Century America. (4 cr)
Interdisciplinary study of American society from industrialization through the present; examination of American literature, art, music, and popular culture in historical context.

AmSt 1201. Learning Public Ethics Through Arts and the University. (3 cr; SP–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 ways ethics works in people’s participation in public life.

AmSt 3111. American Cultures and the Arts. (3 cr; A–F only)
Relationships between American cultures and artistic production through study of the works and lives of selected artists. How American societies and cultures shape, and are shaped by, artistic forms and expressions.

AmSt 3113. America’s Diverse Cultures. (3 cr; A–F only)
The study of some of the diverse cultural (racial, ethnic, class) groups in America; institutions and processes that shape their relations and create domination, resistance, hybridity, nationalism, racism, and alliance. Specific content may vary.

AmSt 3114. America in International Perspective. (3 cr; A–F only)
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 3252. American Popular Culture and Politics: 1900 to 1945. (3 cr; A–F only)
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 polity and national identity. How popular arts reinforce or alter political ideologies.

AmSt 3253. American Popular Culture and Politics: 1945 to the Present. (3 cr; A–F only)
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 polity and national identity. How popular arts reinforce or alter political ideologies.

AmSt 3259. 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 idealizing of an American past; the challenges of multiculturalism and contemporary themes in the field.

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

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

AmSt 3920. Topics in American Studies. (3 cr; SP–Jr or Sr)
Topics specified in Class Schedule.

AmSt 3993. Directed Studies. (1-9 cr; Max 9 cr; SP–#)
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)
Holidays, festivals, religious arts, organizations, spirituality, ethics, and systems of thought of “civil religion,” “women’s religion,” indigenous American religions, American versions of Christianity, Judaism, Islam, Buddhism, and other world faiths, and their interactions in the United States and worldwide.

AmSt 5920. Topics in American Studies. (3 cr; Max 9 cr; SP–#)
Topics as specified in Class Schedule.

Ancient Near Eastern (ANE)

Department of Classical and Near Eastern Studies
College of Liberal Arts

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

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

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

ANE 3001. Bible Narrative Texts. (3 cr; SP–Knowledge of Hebrew required)

ANE 3002. The Bible: Prophecy. (3 cr; SP–Knowledge of Hebrew not required)

ANE 3003. The Bible: Wisdom, Poetry, and Apocalyptic. (3 cr; SP–Knowledge of Hebrew required)

ANE 3251. Modern Study of the Old Testament. (3 cr; SP–Knowledge of Hebrew not required)
Methods used in studying the Old Testament, including textual criticism, the anthropological approach, the sociological approach, the history of religion, and the use of archeology in interpreting the text.

ANE 3501. Ancient Israel: The Origins of Israel in Biblical Traditions. (3 cr; SP–Knowledge of Hebrew 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. Period of 2nd millennium B.C.

ANE 3502. Ancient Israel: The History of Israel From Conquest to Exile. (3 cr; SP–Knowledge of Hebrew not 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; SP–Knowledge of Hebrew not required)
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; SP–ANE major, 3xxx 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 5501. Ancient Israel: The Origins of Israel in Biblical Traditions. (3 cr; SP–Knowledge of Hebrew 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.

ANE 5502. Ancient Israel: The History of Israel From Conquest to Exile. (3 cr; SP–Knowledge of Hebrew not required; 3501 recommended)
Israelite history in the context of what is known from Egyptian, Canaanite, and Mesopotamian sources. Focus on issues raised by archaeological data related to the Israelite conquest of Canaan.

ANE 5503. History and Development of Israelite Religion III. (3 cr; SP–Knowledge of Hebrew not required)
Survey of the evolution of Israelite religion. Cultic practices, law and religion, prophecy, religion and historiography. Relationship to surrounding religious systems.

ANE 5504. History and Development of Israelite Religion IV. (3 cr; SP–Knowledge of Hebrew not required)
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 5701. Studies in Semitic Linguistics and Inscriptions. (3 cr; SP–Adv Hebrew or Adv Arabic or #) Survey of comparative Semitic linguistics with emphasis on Northwest Semitic. Reading of Phoenician, Moabite, and Judean inscriptions.

ANE 5713. Introduction to Ugaritic. (3 cr; SP–Adv Hebrew, previous study of biblical texts or #) Ugaritic alphabetic cuneiform script, morphology, and syntax. Reading of representative samples of Ugaritic literature. Attention to linguistic and cultural issues and links to biblical and other Ancient Near Eastern texts.

ANE 5993. Directed Studies. (1-4 cr; SP–, A, L) Guided individual reading or study.

Animal Physiology (AnPh)

Graduate School

AnPh 4151. Research Topics in Neuroscience. (3 cr; SP–Bio 4151, SP–Bio 4151; Biol 3211, Biol 3021 or #) A-F only. Advanced discussion of selected neuroscience topics, primarily for undergraduates majoring in neuroscience or physiology. Survey and methods of neuroscience, including genetics, physiology, and behavior. Neurodevelopment, neurochemistry or molecular neuroscience, sensory systems, motor control, and behavioral neuroscience.

Animal Science (AnSc)

Department of Animal Science

College of Agricultural, Food, and Environmental Sciences

AnSc 1011. Domestic Animals and Society. (3 cr) Controversial issues in animal agriculture including animal products in the human diet; livestock and human competition for limited resources; animal behavior, welfare, and rights; organic vs. conventionally-produced food; livestock integration into sustainable resource utilization.

AnSc 1021. Avian Sampler. (1 cr) Topics vary, see Class Schedule or contact the department.

AnSc 1101. Introductory Animal Science. (4 cr) Fundamental concepts of animal breeding, physiology, nutrition, and management as they apply to the production of beef, dairy, horses, poultry, sheep, swine, and other livestock.

AnSc 1403. Companion Animal Nutrition and Care. (2 cr) For those without animal or nutrition training who have an interest in animal care. Nutrition of healthy animals and factors including behavior, environmental conditions, food type and availability. Focus on companion animals.

AnSc 1511. Food Animal Products for Consumers. (3 cr) Introduction to the compositional variation, processing, selection, storage, cookery, palatability, nutritional value, and safety of red meat, poultry, fish, and dairy products.

AnSc 2011. Dairy Cattle Judging. (2 cr; QP–, SP–, #) Evaluation of dairy animals on the basis of physical appearance, including classes of heifers and cows from the six major dairy breeds. Held in conjunction with the Minnesota State Fair. Training in oral reasons.


AnSc 2013. Beginning Livestock Judging. (2 cr; QP– 1120 recommended, SP– jr or sr or #; SP–, SP–Soph or jr or sr, #; 2202 recommended or #) Visual evaluation of beef cattle, swine, and sheep for type, muscling, degree of finish, structure, and soundness. Short oral presentations. Preparation for collegiate livestock judging competition.

AnSc 2211. Biometrics for Livestock. (3 cr; QP– Math 1031 or higher or department for offerings) Descriptive statistics; elementary probability; correlation; regression; ANOVA; statistics as applied to livestock.

AnSc 2301. Systemic Physiology. (4 cr; QP–Bio 1009 or equiv; SP–Bio 1009 or equiv) Introduction to physiology of the neural, circulatory, respiratory, immune, and digestive systems of domestic animals.

AnSc 2401. Animal Nutrition. (3 cr; QP–Chem 1002 or Chem 3301; SP–BioC 1012 or Chem 2301) Classification and function of nutrients; use of nutrients for body maintenance, growth, egg production, gestation, and lactation; comparative study of the digestive systems of farm animal species.

AnSc 3141. Advanced Dairy Judging. (1 cr; QP– 1110 or #; SP– 2211 or #) Training in presentation of oral reasons in dairy cattle judging. Selected students from this course participate in fall intercollegiate dairy judging contest.


AnSc 3143. Meat Judging and Grading. (2 cr; QP– 1143, #; SP– 1511, #) In-depth training in beef, pork, and lamb judging, writing reasons, and beef carcass grading and specifications. Field trips to packing plants. Students selected from course participate in intercollegiate meats judging contests.

AnSc 3203. Environment, Global Food Production, and the Citizen. (3 cr; QP– Bio 1009 or equiv; SP–, SP– Bio 1009 or equiv) Ecological and ethical concerns of food production systems in global agriculture—past, present, and future. Examine underlying ethical positions about how agroecosystems should be configured. Interactive learning utilizing decision cases, discussions, videos, and other media.

AnSc 3221. Animal Breeding. (4 cr; QP– GCB 3022 recommended) Application of qualitative and quantitative genetics to animal breeding. Concepts of livestock improvement through selection and mating programs.


AnSc 3307. Artificial Insemination Techniques. (1 cr; QP– 3305 recommended, #; SP– 3305 recommended, #) Hands-on training and techniques of artificial insemination at an off-campus laboratory setting. Proper techniques of AI and semen handling, and criteria for selection of stallion.

AnSc 3511. Animal Growth and Development. (3 cr; QP– 3301, SP– 2301) Basic principles of animal growth; critical evaluation of interaction of nutrition, hormones, exercise, heredity, and disease in regulating growth.

AnSc 4011. Dairy Cattle Breeding. (3 cr; QP– 3220; SP– 3221) Applying quantitative genetic principles to the breeding of dairy cattle. Primary emphasis on the evaluation of males, females, and systems of mating. Rates of genetic improvement with and without AI.

AnSc 4092. Special Problems in Animal Science. (1-4 cr; QP–, SP–, #) Research in an area of animal science under the supervision of a faculty member. Written report on the research is required.

AnSc 4093. Tutorial in Animal Science. (1-4 cr; QP–, SP–, #) Informally structured to encourage in-depth study of specific disciplines in animal science. Pertinent readings; preparation of written essays of high quality required.

AnSc 4096. Professional Experience Program: Internship. (1-4 cr; max 6 cr; QP–, COAFES undergrad, #) Complete internship contract available in COAFES Career Services before registering; UC only; SP–, COAFES undergrad, #; complete internship contract available in COAFES Career Services before registering; UC only; S-N only.

Supervised professional experience in animal industries and farm enterprise systems with study of various aspects of the industry and related fields; evaluative reports and consultations with faculty advisers and employers.

AnSc 4099. Special Workshop in Animal Science. (1-4 cr) Workshops on a variety of topics in animal science. Consult Class Schedule or department for offerings. Topics may use past lecturers/experts.

AnSc 4401. Swine Nutrition. (3 cr; QP– 3401, 3510 recommended; SP– 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. (3 cr; QP– 3401; SP– 2401) Nutrient requirements of ruminants, physiology of digestion in ruminants, nutrient content of feedstuffs, primarily forages; energy utilization, protein and nonprotein nitrogen utilization; nutritional disorders; formulation of adequate rations.


AnSc 4501. Principles of Farm Animal Environment. (3 cr; QP– 3301, jr or sr or #; QP– 2301 or jr or #) Biological and physical processes involved in the adjustment of animals to ambient environments and their applications to farm animal management.

AnSc 4601. Pork Production Systems Management. (4 cr; QP– 3220, 3305, 5401; 5609 recommended; SP– 3221, 3305, 4401, 4501 recommended) Focus on understanding the interrelationships of business, marketing, and biological performance of pigs in various types of production systems.

AnSc 4602. Sheep Production Systems Management. (4 cr; QP– 3401; 3220 recommended; SP– 3201, 3221 recommended) Sheep management using feeding, breeding, selection, health, and physiological management aids for breeding flock and market lamb production. Taught via ITV from Crookston campus and the West Central Experiment Station, Morris.

AnSc 4603. Beef Production Systems Management. (4 cr; QP– 5403 recommended; SP– 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. Raition formulation, management, and marketing of feedlot cattle.
AnSc 4604. Dairy Production Systems Management. (4 cr; QP–4301; 3305, 3220, 5403 recommended; SP–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; QP–4301; 5403 recommended; SP–2401; 4405 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; QP–4609; 5601, SP–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; QP–4609; 5603, SP–4609; 4603) Analysis of beef production systems using case studies and visits to beef cow-calf operations and feedlots.


Anthropology (Anth)

Department of Anthropology
College of Liberal Arts

Anth 1001. Human Evolution. (4 cr) From ancestors of chimpanzees and humans to origins of modern humans. Principles of evolutionary theory, behavioral biology, and comparative anatomy used to reconstruct the major events in human evolution and the behavior of ourselves and our ancestors.

Anth 1003. Understanding Cultures. (4 cr) Introduction to social and cultural anthropology. Comparative study of societies and cultures around the world. Topics include adaptive strategies; economic processes; kinship, marriage, and gender; social stratification; politics and conflicts; religion and ritual; personality and culture.

Anth 1011. Human Evolution: Honors. (4 cr; QP-Honors student; SP-Honors student) From ancestors of chimpanzees and humans to origins of modern humans. Principles of evolutionary theory, behavioral biology, and comparative anatomy used to reconstruct the major events in human evolution and the behavior of ourselves and our ancestors.

Anth 1013. Understanding Cultures: Honors. (4 cr; SP-Honors student) Introduction to social and cultural anthropology. Comparative study of societies and cultures around the world. Topics include adaptive strategies; economic processes; kinship, marriage, and gender; social stratification; politics and conflicts; religion and ritual; personality and culture.

Anth 3001. Introduction to Archaeology. (3 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; SP–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; SP–1003, 3003 or #) Studying sociocultural forms by analyzing linguistic data obtained in a fieldwork setting. Students work with a fluent speaker of a non-English language to explore an unfamiliar culture in the manner of an ethnographer working with a key informant.

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

Anth 3009. Rise of Civilization. (3 cr) The concept of civilization and how early hunter gatherer groups through settled agricultural villages to the rise of towns and cities. Compares processes of change in eight regions of the world.

Anth 3010. Native North Americans in Regional Perspective. (3-6 cr [max 6 cr]) An in-depth cultural and historical analysis of the indigenous peoples of the Americas in the context of geographic space. Topics may include faunal and human remains, and local traditions.

Anth 3011. Archaeology of the Ancient Near East. (3 cr; SP–3001) Development of culture and society in ancient Near East from beginnings of agriculture and settled village life to first states and the threshold of imperialism (10,000 to 2,000 B.C.).

Anth 3013. Native Peoples of North America. (3 cr) A survey of cultural developments among native peoples of North America in historic times and the present day.

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 influences, with attention to area-wide patterns and local traditions.

Anth 3019. Hispanic Cultures of Latin America. (3 cr; SP–1003 or #) Hispanic cultures from Mexico to South America. Topics include economy, development, the family and rural traditions; gender; religion; values, ideology, and change. Concepts are introduced to explore continuity and change.

Anth 3020. Topics in the Anthropology of Africa. (3-6 cr [max 6 cr]) Perspectives on Africa using ethnographic methods and theories. Topics include kinship and gender; ecological adaptations; economic systems; belief systems; political organization; art and aesthetics; Islamicization; colonisation; 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; SP–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 3027. Archaeology of Prehistoric Europe. (3 cr) Early development of non-Mediterranean European societies 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 3029. Archaeology of Native Americans. (3 cr; SP–1003) Pre-European contact and contact period archaeology of American Indians north of Mexico.

Anth 3031. Altering 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 key areas of social life such as gender, identity, nationalism, and ethnicity.

Anth 3041. Ecological Anthropology. (3 cr; SP–5041; 1003) Concepts, theories, and methods of ecological anthropology (ecological ecology) show how humans interact with the biophysical environment. Compare biological and cultural interactions with the environment; examine adaptive strategies cross-culturally.

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; SP–1003 or #) Course examines religious beliefs and world views across 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 3047. 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 3221. Archaeology Field School. (3-6 cr [max 6 cr]; SP–3001, #) Archaeological field excavation, survey and research. Intensive training in excavation techniques, recordation, analysis, and interpretation of archaeological materials.

Anth 3310. Topics in Biological and Physical Anthropology. (3-6 cr [max 6 cr]; SP–1001) 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; SP–Jr or sr major) Evaluation of work to date; planning future course work and prospects for senior research project. Includes defining senior project, finding an adviser, and developing preliminary bibliography. Normally completed at least two semesters before graduation.

Anth 4001. Advanced Method and Theory in Archaeology. (3 cr; SP–1001 or 3002) Survey and in-depth discussion of past and contemporary archaeological, theoretical, and methodological issues and approaches. Projects incorporating theories and methods. Emphasis on problem solving and integrating method and theory.

Anth 4003. Contemporary Perspectives in Cultural Anthropology. (3 cr; SP–1003, or # A-F only) Explores the concept of culture and the practice of fieldwork as they relate to various social institutions. Examines anthropological perspectives on race, ethnicity, and gender.

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

For definitions of course numbers, symbols, and abbreviations, see inside back cover.
Anth 4013. Senior Project. (3 cr; SP–Sr major; #) Independent research project fulfilling the senior option; directed by a faculty member.

Anth 4019. Symbolic Anthropology. (3 cr; SP–3211, 1003 or grad student or #) Examines pragmatic and structural aspects of social symbolism cross-culturally with special attention to power, exchange, social boundaries, gender, and ritual. "Cross-cultural" is intentional.

Anth 4021. Psychological Anthropology. (3 cr; SP–§3029; 1003, 3003 or #) Self, emotion, cognition, and child development in cross-cultural perspective. Examines cultural and social influences on personality, and psychological foundations of societies and culture.

Anth 4023. Culture Theory. (3 cr; SP–§r or Sr or grad student or #; A-F only) 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 4025. Studies in Ethnographic Classics. (3 cr; SP–1003 or A-F only) 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 of ethnographic practice, analysis, and writing by focusing on several classic monographic examples and associated theoretical writing.

Anth 4031. Applied Anthropology. (3 cr; SP–1003 or 4003 or grad student 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; SP–1003 or grad student) Introduces the history of and current issues in ethnographic research. Research projects, include participant observation, interviewing, research design, note taking, life history, and other ethnographic methods.

Anth 4043. Archaeology of Northern Europe. (3 cr) Archaeology of Scandinavia, 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) 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; and women’s speech; feminism in India; fundamentalism and postcolonial identities; gender and violence.

Anth 4047. Anthropology of American Culture. (3 cr; SP–1003 or 3003 or #) Anthropological approaches to contemporary American society and culture; tensions between market and family; unity and diversity; individualism and community.

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

Anth 4053. Economic Anthropology. (3 cr; SP–§2025, 1003 or 3003 or 4003 or grad student) Systems of production and distribution, especially in 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; SP–1003 or grad student) 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, Burma, New Guinea, Indonesia, and the United States.

Anth 4061. Culture and Childhood. (3 cr; SP–1003 or 3003 or grad student) The contexts, explanations, 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; SP–1003 or 4003 or #) Theories of change; modernization, dependency, and world system 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; SP–1003 or 4033 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; SP–1001, 3001 or grad student) 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; SP–1003 or 3003 or #; A-F only) 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 4980. Topics in Sociocultural Anthropology. (3-6 cr; max 6 cr; SP–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; SP–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; SP–#) 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; SP–#) 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; SP–#) Allows students to pursue special interests in anthropology under the guidance of a faculty member.

Anth 4994. Directed Research. (1-6 cr; max 6 cr; SP–#) Qualified students may conduct a well-defined research project under the guidance of a faculty member.

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


Anth 5029. Philosophical Anthropology. (3 cr; SP–Sr or grad student or A-F only) 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; SP–3047 or grad student or #) Advanced introduction to the development of feminist theory in anthropology. Theoretical and methodological shifts in feminist anthropology and ethnography. Feminist ethnography within the discipline as a whole; current debates concerning the reading and writing of ethnography.

Anth 5041. Ecological Anthropology. (3 cr; SP–§3041, §2213; grad student 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; SP–4003 or grad student 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 economices; and urban "problems."

Anth 5059. Anthropology of Religion. (3 cr; SP–1003 or #) Comparative study of myths, religious beliefs and rituals cross-culturally. Analysis of how religion and social relations are integrated. Careful examination of landmark cases and conceptual approaches in the anthropology of religion.

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

Applied Business (ABus)

University College

ABus 4011. Historical Perspectives and Contemporary Business Challenges. (3 cr; QP–Business intro course or SP–Business intro course or #; A-F only) Global competitiveness, product and service quality, information revolution, and changing customer and workforce demographics. Approaches to meeting these contemporary challenges studied against a historical backdrop of evolving management practices. Emphasis on developing systematic ways of analyzing complex problems.

ABus 4012. Problem Solving in Complex Organizations. (3 cr; A-F only) Open systems perspective. Emphasis on analyzing root causes and effects of problems and solutions across boundaries in the organization. Process analysis as a problem-solving tool. Commonly used problem-solving frameworks or processes. Techniques for conducting root cause analyses, expanding alternatives, predicting consequences, and making choices.
ABus 4021. Small Group Behavior and Teamwork. (3 cr; QP–Sociology of psychology course or #; SP–Sociology of psychology course or #; A-F only) Dynamics of small-group behavior with emphasis on work groups in organizations. Factors affecting performance and productivity. Identify formal and informal roles; providing a foundation for understanding how effective teamwork is created and sustained. Effective leadership skills and followership practiced.

ABus 4022. Managing Organizational Relationships. (3 cr; A-F only) Political dimensions of organization life and diagnosing how power is distributed and exercised in modern organizations. Cooperative relationships and frameworks for analyzing motives for observed behavior. Skewward, lateral, and downward relationships, with emphasis on recognizing potential ethical dilemmas.

ABus 4023. Communicating for Results. (3 cr; QP–English composition or #; SP–English composition or #; A-F only) Aspects of communication essential for being persuasive and influential. Organizing and presenting ideas effectively, strategies for audience analysis, choosing communication methods, making appropriate use of informal influence methods, and handling dissent. Processes for intercultural communication.

ABus 4024. Effective Oral Communication and Business Presentations. (2 cr; A-F only) Assists B&AB students in building and developing business presentation skills and oral communications effectiveness. Videotaping and supportive critique of actual presentations based on audience analysis, technique selection, and handling both receptive and hostile audiences.

ABus 4031. Accessing and Using Information Effectively. (3 cr; QP–Computer intro course or #; SP–Computer intro course or #; A-F only) Information’s role in business operations. Typology of information applied in case studies and exercises. Accessing external information using library resources such as information search services, CD-ROM, and periodicals. Accessing internal information using a desktop database system and electronic mail or computer conferencing.

ABus 4032. Quantitative Skills for Decision Making. (3 cr; QP–SP–#; A-F only) Exploratory data analysis, visual display of data, and basic mathematical and statistical analysis techniques. Decision theory and modeling.

ABus 4041. Leadership in a Global and Diverse Workplace. (3 cr; A-F only) Developing global and ethical perspectives and skills for working in settings with diverse personnel.

ABus 4042. Planning and Implementation at the Business Unit Level. (3 cr; A-F only) Creating and implementing operating plans. Operations flowcharts, budgets, schedules, and staffing plans. Importance of integrating plans with the overall business strategy. Factors involved in successful implementation. Importance of developing strategies for change.

ABus 4043. Project Management in Practice. (3 cr; QP–Operations mgmt or small business mgmt course or #; SP–Operations mgmt or small business mgmt course or #; A-F only) Tools and techniques for scheduling, coordinating, and allocating resources. Field project with a nonprofit organization in the community, smaller business, or the student’s employing organization. Project should be carried out in a team if possible.

ABus 4044. Tools for International Trade. (3 cr; A-F only) Emphasis on understanding international forces and trends and role providing a foundation in which businesses can work within the context of ongoing international change. Tools used in specific transactions and ways to diagnose in what circumstances they are most appropriately applied.

ABus 4101. Accounting and Finance for Managers. (3 cr; QP–Two principles of accounting courses or #; SP–Two principles of accounting courses or #; A-F only) Expands on students’ lower division work in financial accounting and adds principles of finance. Emphasis on business decision making from an accounting and financial perspective, including topics such as analysis of cost-volume-profit relationships, capital budgeting, variances, uses and sources of funds, and valuation.

ABus 4102. Operations in Manufacturing and Service Businesses. (3 cr; QP–Business operations or small business mgmt course or #; SP–Business operations or small business mgmt course or #; A-F only) Concepts and principles related to the management of operations functions, including operations strategy, process design, just-in-time, forecasting, inventory management, principles of scheduling, and quality improvement. Taught from service and manufacturing perspectives and stresses the relationships between operations and the environment.

ABus 4103. Marketing and Sales. (3 cr; QP–Intro to marketing or intro to sales course or #; SP–Business operations or small business mgmt course or #; A-F only) Legal, behavioral, ethical, competitive, economic, and technological factors affecting marketing operations, selection, training, motivation, compensation, forecasting, budgeting, and control.

ABus 4104. Management and Human Resource Practices. (3 cr; A-F only) Emphasis on day-to-day leadership, including organizing work, motivating employees, delegating, coordinating, and achieving results. Human resource practices, including selection, induction, and training of new employees; employee appraisal; handling grievances; and discipline.

ABus 4901. Special Topics in Applied Business. (3 cr; SP–Minimum of seven BAB courses recommended; A-F only) Content changes periodically to cover important topics not currently covered in the ABus curriculum. May include various management issues in a changing workplace.

ABus 4999. Practicum. (3 cr; QP–ABus student, minimum of 33 ABus cr, completed portfolio review, #; SP–ABus student, minimum of 33 ABus cr, completed portfolio review, #; A-F only) May involve work by the student’s employing organization; project in an organization providing an internship; integration of projects drawn from previous coursework; or development of a business plan for a new venture or expansion of an existing business. Students meet in scheduled class sessions on limited basis.

Applied Economics (ApEc)

Department of Applied Economics

College of Agricultural, Food, and Environmental Sciences

ApEc 1001. Orientation to Applied Economics. (1 cr; S-N only) Introduction to applied economics and agricultural and food business management majors and the Department of Applied Economics factors and how they affect product pricing, promotion, and marketing and channel decision-making processes. Personal selling function as an integral part of the overall distribution system, emphasizing sales force organization, selection, training, motivation, compensation, forecasting, budgeting, and control.

ApEc 1101. Principles of Microeconomics. (3 cr) Theory of the household and firm; demand and supply; price determination; government in the market; market structures; agriculture and food; externalities and the environment; labor markets and unions; capital and interest; project evaluation; human capital.

ApEc 1102. Principles of Macroeconomics. (3 cr) Unemployment and inflation; measures of national income; macro models; fiscal policy and problems; taxes and the national debt; money and banking; monetary policy and problems; poverty and income distribution; international trade and exchange rates; economic growth and development.


ApEc 3000. Seminar in International Agriculture. (1 cr) Presentation and discussion of students’ research papers, literature reviews of selected topics, or discussions by students and faculty of their experiences in international agriculture.


ApEc 3002. Applied Microeconomics: Managerial Economics. (3 cr; QP–3001, 1250 or Acct 1050 or #; SP–3001, 1251 or Acct 2050 or #) Microeconomic theory and its application to managerial problems. Integrates theory and applications on special topics: production functions, cost analysis, linear programming, market structure, pricing policy, risk analysis, and capital budgeting.

ApEc 3006. Applied Microeconomics: Government and the Economy. (3 cr; QP–ApEc/Econ 1101, 1102, SP–ApEc/Econ 1101, 1102) The public sector and market economics; public goods, externalities, and other allocation issues; government and the stabilization of the national economy; overview of the new classical and Keynesian models; principles of taxation; individual income tax, sales, business, and property taxes.

ApEc 3007. Applied Macroeconomics: Policy, Trade, and Development. (3 cr; QP–3006 or #; SP–3006 or #) Foreign trade, development, and growth. General equilibrium models show the affects of trading blocks on U.S. agriculture and the broader economy, the importance of growth on incomes, foreign trade, and policies that impact world trade and economic growth.

ApEc 3041. Economic Development of U.S. Agriculture. (3 cr; QP–3001, 1250 or Acct 1050, 1101, 1102 or #; SP–1101, 1102 or Econ 1101, 1102) Economic, political, social, and technical forces that have shaped the development of U.S. agriculture; the role of agricultural development in national economic development in the United States with implications for developing countries.

ApEc 3071. Agriculture and Economic Growth in Developing Countries. (3 cr; QP–1101, 1102, Econ 1101, 1102 or #; SP–1101, 1102 or Econ 1101, 1102) 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.

ApEc 3311. Introduction to Public Policy Analysis. (3 cr; QP–1101 or Econ 1101, SP–1101; A-F only) Elements of public policy analysis; the policy analyst’s roles; market failures; public choice; bureaucratic decision making; public services.

ApEc 3401. Markets, Marketing, and Prices. (2 cr; QP–1101 or Econ 1101; SP–1101 or Econ 1101) Market structure; demand and supply structure; regulations and institutions that influence the behavior of firms in agricultural marketing systems; performance in food assembly, manufacturing, and distribution industries.
Economic relationships in the marketing of livestock, dairy, and meat products; product grades; inspection and transportation; market structure, channels, pricing, and competition; government programs and policies.

ApEc 3421. Livestock and Meat Marketing Economics. (2 cr; QP–3400 or #; SP–3401)

Marketing ideas in the marketing of livestock, dairy, and meat products; product grades; inspection and transportation; market structure, channels, pricing, and competition; government programs and policies.

ApEc 3451. Food and Agricultural Sales. (3 cr; #1101 or #)

Professional selling of agricultural and food products. Build and refine sales abilities, identify and qualify, present, deliver effective sales presentations, and close the sale; elementary principles of market research. Students develop and deliver a sales presentation.

ApEc 3811. Principles of Farm Management. (3 cr; QP–1101 or Econ 1101; SP–1101 or Econ 1101)

Strategic and operations aspects of farm management; financial analysis, budgeting; strategic management; marketing plan and control; enterprise and whole farm planning and control; investment analysis, quality, risk, and personnel management.

ApEc 3821. Retail Center Management. (3 cr; QP–1101 or Econ 1101, 1250 or Acct 1050; SP–1101 or Econ 1101, 1250 or Acct 1050)

Management of garden centers, grocery stores, and other retail units selling perishable agricultural products.

ApEc 3991. Independent Study in Applied Economics. (1-4 cr; QP–#; SP–#)

Independent study and supervised reading and research on subjects and problems not covered in regularly offered courses.

ApEc 4096. Professional Experience Program: Internship. (1-3 cr [max 6 cr]; QP–COAFES or or, # complete internship contract available in COAFES Career Services before registering; UC only; QP–COAFES or or, # complete internship contract available in COAFES Career Services before registering; UC only; S-N only)

Professional experience in agribusiness firms or government agencies gained through supervised practical experience; evaluative reports and consultations with faculty advisers and employers.

ApEc 4103. World Food Problems. (3 cr; QP–Agro 5200, CAPS 5280, §FScn 5643; Jr or sr or grad student; SP–4103; QP–CAPS 4103; SP–FScn 4103; Jr or sr or grad student)

A multidisciplinary look at problems and possible solutions affecting food production, storage, and utilization in and between countries. Presentations and discussions introduce conflicting views on population, technology, and ethical and cultural values of people in various parts of the world.

ApEc 4311. Tourism Development: Principles, Processes, Policies. (3 cr; QP–1101, 1102 or Econ 1101, 1102; SP–1101, 1102 or Econ 1101, 1102)

Evolution of tourism industry; economic, environmental, and sociocultural impacts of tourism development; influence of government policies and organizations; models and tools needed for successful development; consequences of development activities and ways to involve stakeholders in decisions.

ApEc 4451. Food Marketing Economics. (3 cr; QP–§FScn 5474; 3001, Econ 3101 or #; SP–§FScn 4451; 3001, Econ 3101 or #)

Economics of food marketing in the United States. Food consumption trends; consumer food behavior; marketing strategies; consumer survey methodology; food quality assurance and retailing system; food policy issues related to food marketing. Individual and group projects.

ApEc 4501. Agribusiness Finance. (3 cr; QP–1250, Acct 1050 or equiv; SP–1251, Acct 2050 or equiv)

Analysis of financing and investment strategies for agribusiness firms and their effects on liquidity, solvency, and profitability; analysis of financial institutions, markets, and instruments; management problems and issues facing financial intermediaries serving agriculture.

ApEc 4611. Resource Development and Environmental Economics. (3 cr; QP–1101, 1102 or Econ 1101, 1102 or #; SP–1101, 1102 or Econ 1101, 1102 or #)

Basic concepts of resource use; financial and economic feasibility; external effects and market failures; resource use and environmental problems. Measuring impacts of resource development; economics of alternative resource programs and environmental strategies.

ApEc 4821. Agribusiness Management. (5 cr; SP–3002, 4501, Mgmt 3001)

Strategic and operations management for production, processing, wholesaling, retailing, and service. Establishing mission and goals; strategy formulation, implementation, and control; quality management; process selection, operations planning, inventory management, human resource issues; business plans; case study analysis.


Statistical and econometrics techniques for applied economists. Theory and application of multivariate regression models and modern econometric methods. Emphasis on use of statistical techniques to understand market behavior.

ApEc 5151. Applied Microeconomics: Firm and Household. (2 cr; QP–Econ 5151 or #; SP–Econ 5151 or #)

Quantitative techniques for analysis of economic problems of firms and households. Links between quantitative tools and economic analysis developed to understand economic theory and develop research skills. Quantitative tools include regression analysis, mathematical programming, and present value analysis.

ApEc 5152. Applied Macroeconomics: Income and Employment. (2 cr; SP–Econ 5152 or #)

Static general equilibrium open economy models and simple business cycle models examine economic growth, business cycles, and fiscal and monetary policy. Input-output analysis and large scale econometric models. Sources and properties of economy and sector-wide data, and empirical applications.

ApEc 5321. Regional Economic Analysis. (3 cr; SP–3006 or Econ 3102 or #; SP–3006 or Econ 3102 or #)

Regional development patterns and role of resources, transportation, and institutional constraints. Trade, migration, and investments in regional growth and change. Regional economic information in investment and location decisions. Measuring impacts, primary commodities and market instability, current trade issues.

ApEc 5581. Human Capital and Household Economics. (3 cr; SP–3001 or Econ 3101 or #)

Household economics: investment in human capital (e.g., children, education, health and nutrition); labor force participation, lifetime earnings, and nonmarket work; time allocation and substitution of capital for labor in the household in the western and third world.

ApEc 5611. Land and Water Economics. (3 cr; QP–3001 or Econ 3101 or #; SP–3001 or Econ 3101 or #)

Land as an economic and cultural resource. Property rights concepts, valuation of resources, and policy analysis. Materials drawn from economics, forestry, public finance, planning, and agriculture.

ApEc 5637. Agricultural Law. (3 cr; QP–#; Sr or grad student or #; SP–Sr or grad student or #)

Economic regulation of agriculture. Industrial organization and market structure in agriculture, public lands and water law, agricultural cooperatives, farm labor, farm finance, crop insurance and disaster assistance, agricultural biotechnology, food and drug law, price and income regulations, and international trade.

ApEc 5651. Economics of Natural Resource and Environmental Policy. (3 cr; QP–3001, 5610 or Econ 3101, 3001, 4611 or Econ 3101)

Economic analyses including project evaluation of current natural resource and environmental issues. Emphasis on intertemporal use of natural resources, natural resource scarcity or adequacy, environmental quality and mechanisms for pollution control, and their implications for policy making.

ApEc 5711. U.S. Agricultural and Environmental Policy. (3 cr; QP–3001 or Econ 3101, 3001 or Econ 3101)

U.S. agricultural policy in an open world economy; role of private markets and government in regulating supply and demand; indirect price support, supply controls, environmental constraints, and export protectionism; functioning of markets; roles of public interest groups and future of American agricultural policy.

ApEc 5721. World Agriculture: Problems, Policies, and Sustainability. (3 cr; QP–3001 or Econ 3101, 3001 or Econ 3101)

Comparative agricultural systems and policies, issues of development and protection, resource use and sustainability in major production regions, international policy conflicts, international organizations and assistance, technological change, production and consumer behavior, and agricultural policy making.

ApEc 5751. Agricultural Trade and Trade Policy: Issues and Analysis. (3 cr; QP–3001 or Econ 3101; SP–3001 or Econ 3101)

Trade policies of import and export nations, gains from trade, trade negotiations and agreements, free trade and common market policies, exchange rate impacts, primary commodities and market instability, current trade issues.

ApEc 5811. Cooperative Organization. (3 cr; QP–3001, 3002 or #; SP–3001, 3002 or #)

Application of economic analysis to the cooperative form of organization. Producer and consumer cooperatives used to examine economic issues such as changing market organization, financing, management incentives, taxation, and cooperative regulation. Cooperatives as a tool for economic development included.

ApEc 5861. Economics of Agricultural Production. (3 cr; SP–5151 or Econ 5151 or #)

Production economics applied to agriculture, profitable combination of production factors; comparative advantage and location of production.

ApEc 5891. Independent Study: Advanced Topics in Farm and Agribusiness Management. (1-4 cr; QP–#; SP–#)

Special topics or individual work suited to the needs of particular groups of students.

ApEc 5991. Special Topics and Independent Study in Applied Economics. (1-4 cr [max 12 cr]; QP–#; SP–#)

Special classes, independent study, and supervised reading and research on subjects and problems not covered in regularly offered courses.
Arabic (Arab)

Department of Afro-American and African Studies

College of Liberal Arts

Arab 1101. Beginning Arabic. (4 cr)
For students with no previous training in Arabic. Oral practice, reading, comprehension and basic grammar.

Arab 1102. Beginning Arabic. (4 cr; SP–1101 or equiv or #)
Continuation of Arab 1101. Comprehension, oral practice and reading of standard Arabic.

Arab 1201. Colloquial Arabic. (4 cr)
Intended primarily for business persons and travelers. Fundamentals of vocabulary and sentence structure, and introduction to Arabic script.

Arab 1202. Colloquial Arabic. (4 cr; SP–1201 or #)
Intended primarily for business persons and travelers. Fundamentals of vocabulary and sentence structure, and introduction to Arabic script.

Arab 3036. Islam: Religion and Culture. (3 cr; SP–§Afro 5036)
Religion of Islam, faith, practices, sectarian splintering, expansion outside original home to status of world religion, institutions, status in world societies—Asia, Europe, the Americas.

Arab 3101. Intermediate Arabic I. (4 cr; SP–1102 or equiv or #)
Advanced grammar and conversational practice, reading Arabic texts.

Arab 3102. Intermediate Arabic II. (4 cr; SP–3101 or #)
Advanced grammar, analyses of readings, oral comprehension.

Arab 3491. Classical Islamic Civilization. (3 cr; SP–§Arab 5491)
Islamic legacy in the classical age (800-1400) including the medical and natural sciences, mathematics, philosophy, literature, and their transmission to Europe.

Arab 3524. Introduction to the Qur’an. (3 cr)
Discussion of textual, thematic, interpretive, and narrative aspects of the Qur’an and its influence on modern Arabic literature. All reading in English.

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

Arab 3541. Islam in the Catholic Age: Arab Phase 600 A.D. to 900 A.D. (3 cr; SP–§Arab 5541)
The rise of Islam in its Arabian setting. Roles of the prophet, the Orthodox and Umayyad Caliphs. Development of the Islamic state and empire. Status of Muslims and non-Muslims.

Arab 3542. Medieval Islam. (3 cr; SP–§Arab 5542)
Islamic dynasties, Mamluks and Mongols, and Crusaders and Assassins. Abbasid Caliphate’s disintegration and rise of Seljuk Turks.

Arab 3543. Arabs Under Mamluks and Ottomans: 1300-1920. (3 cr; SP–§Arab 5543)
Struggle against Crusaders and Mongols. Disintegration and reemergence under Muhammad Ali of Egypt; dynastic struggles in Syria; rise of Young Turks; Arab revolt.

Arab 3544. Arab World: 1920 to the Present. (3 cr)
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 3547. The Ottoman Empire. (3 cr)
Founding of Ottoman society and state to empire, 1300 to end of the empire in 1920. Lands, institutions, peoples, legacy, impact on Europe.

Arab 3993. Directed Study. (1-3 cr; SP–#)
For advanced students with individual faculty members.

Arab 5001. Research Methods in Arabic Studies. (3 cr)
Skills and techniques required to deal with medieval and modern works in Arabic literature and Islam. A survey of the most important research bibliographies in Arabic and Islamic studies. Bibliographic references in English and, when appropriate, Arabic.

Arab 5036. Islam: Religion and Culture. (3 cr; SP–§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. (4 cr; SP–Arab 3102 or equiv or #)
Advanced readings in classical and modern Arabic. Compositions based on texts.

Arab 5102. Advanced Arabic II. (4 cr; SP–Arab 5101 or #)
Continuation of Arab 5101. Readings of Arabic texts, and writing compositions based on texts.

Arab 5491. Classical Islamic Civilization. (3 cr; SP–§Arab 5036)
The free verse movement and its major trends: post-romantic, social realist, symbolist, resistance, and prose poem. Emphasis on leading poets such as al-Ma’alika, al-Sayyab, al-Bayati, and Adunis. Theoretical and critical essays. All readings in English.

Arab 5502. The Arabic Novel in Translation. (3 cr)
The novel as a new genre in Arabic literature. Trends: realist, psychological, existentialist, feminist, post-modernist, fantastic, and experimentalist. Emphasis on major writers such as Mahfouz, Ghanem, Salih, Jabha, El Sa’awi, Duffi, and Khouri. Theoretical and critical essays. Cultural and historical context.

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

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

Arab 5541. Islam in the Catholic Age: Arab Phase 600 A.D. to 900 A.D. (3 cr; SP–§Arab 5541)
The rise of Islam in its Arabian setting. Roles of the prophet, the Orthodox and Umayyad Caliphs. Development of the Islamic state and empire. Status of Muslims and non-Muslims.

Arab 5542. Medieval Islam. (3 cr; SP–§Arab 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: 1300-1920. (3 cr; SP–§Arab 5543)
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; SP–§Arab 5544)
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; SP–5302 or #)
Readings and discussion of selected works in Arabic. Topics specified in Class Schedule.

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

Arabic (Arm)

Department of Classical and Near Eastern Studies

College of Liberal Arts

Arm 5011. Biblical Aramaic and Old Aramaic Inscriptions. (3 cr; SP–One yr Hebrew or Arabic or #)
Biblical Aramaic—grammar, fluency in reading Biblical Aramaic and Old Aramaic inscriptions.

Arm 5012. Syriac. (3 cr; SP–One yr Hebrew or Arabic 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)
Introduction to the conceptual function of drawing in architecture. Includes history of drawing in architecture, critical review of the drawing conventions and systems, and exploration of drawing processes.

Arch 3401. Environmental Design and the Sociocultural Context. (3 cr; SP–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 3490. Honors Theory Seminar. (3 cr; SP–CLA or BA Honors student or #)
Contemporary issues in the literature of architecture; specific buildings or building types; or areas of architectural thought, history, representation, design, technology. Limited to 12 students. Topics, selected by faculty from their area of scholarship, will be announced in the Class Schedule the semester before being offered.

Arch 3993. Directed Study. (1-3 cr; SP–#; only)
Guided individual reading or study.

Arch 5123. Architectural Thesis. (8 cr; SP–5122, 5241)
BA Arch major; students must submit thesis plan in semester prior to writing thesis. A-F only
Student’s choice, study and solution of an architectural problem to demonstrate proficiency in all phases of design.

Arch 5241. Principles of Design Programming. (3 cr; QP–For undergrads 5122, 5 Arch major; for grades 8257, M Arch major or #; A-F only)
Concepts and techniques of architectural programming, including space and activity analysis, site selection, precedent study, code review,
appropriate technology identification, hypothesis formulation and evaluation. Emphasis on conceptual development, research, and analytic drawing.

Arch 5281. Undergraduate Architecture Studio I. (3 cr; SP–3411, 3412, BA Arch major or #; A-F only)
Exploration of architectural questions found in settlement patterns and the architectural elements found in their formal organization. Study of mapping techniques, orthographic projections, analytic drawing, and models.

Arch 5282. Undergraduate Architecture Studio II. (6 cr; SP–5281, Arch major or #; A-F only)
Selected architectural problems developed by appointed faculty to deepen and enrich architectural ideas introduced in the required architectural studio sequence.

Arch 5292. Undergraduate Architecture Studio IV. (6 cr; SP–5281, Arch major or #; A-F only)
Architectural problems with emphasis on development of a project. Emphasis on integral part of design, site planning, and design process. For accelerated status undergraduates only.

Arch 5311. Theory of Architectural Representation. (3 cr; SP–5371, 5372, Arch grad student or #; A-F only)
Introduction to emerging computer graphics with photography and architectural graphic conventions. Explores historical, theoretical, and critical issues of representation and the influence of visual media on the architectural field.

Arch 5331. Visual Communication Techniques in Architecture. (3 cr; SP–For undergrads 3311, BA Arch or BED major; for grads M Arch major or #; SP–for undergrads 3301, BA Arch or BED major; for grads M Arch major or #; A-F only)
Introduction to basic principles of visual communication techniques, using various visual media and methods of investigation.

Arch 5321. Architecture in Watercolor. (3 cr; SP–For undergrads 3311, BA Arch or BED major; for grads M Arch major or #; SP–For undergrads 3301, BA Arch or BED major; for grads M Arch major or #; A-F only)
Watercolor as a tool in the design process. Survey of painting techniques, medium, tools, and materials. Emphasis as a cultural medium. Relationships, mixing, composition, and applications to design.

Arch 5351. AutoCAD I. (3 cr; SP–For undergrads 5281, arch major; for grads M Arch major or #; may not be taken for graduate cr)
Basic concepts, tools, and techniques of computer-aided drawing with current AutoCAD Release. Strategies and techniques for producing dimensioned and annotated drawings suitable for plotting and an introduction to 3-D drawing capabilities. Use of dimension variables, attributes, blocks, symbols, and the creation of customized menus.

Arch 5352. AutoCAD II. (3 cr; SP–For undergrads 5351, arch major; for grads M Arch major or #; may not be taken for graduate cr)
Intermediate concepts, tools, and techniques of computer-aided drawing with current AutoCAD Release. Strategies and techniques for producing dimensioned and annotated drawings suitable for plotting. Use of dimension variables, attributes, blocks, symbols, and the creation of customized menus.

Arch 5361. Topics in Architectural Representation: 3-D Architectural Modeling and Design. (3 cr; SP–For undergrads 5281 or 5351, arch major; for grads M Arch major or #; A-F only)
Introduction to 3-D Studio for architectural modeling, rendering, and animation. Video recording and editing.

Arch 5371. Computer Methods I. (1 cr; SP–5281, M Arch major or #)
Introduction to current techniques, computer programs, and their application to architectural computing.

Arch 5372. Computer Methods II. (1 cr; SP–5371, §8252 and M Arch major or #)
Current techniques, computer programs, and their application to architectural computing and design.

Arch 5373. Computer Methods III. (1 cr; SP–5372, §8253, M Arch major or #)
Advanced techniques, computer programs, and their application to architectural computing in design, theory, and technology.

Arch 5374. Computer Methods IV. (1 cr; SP–5373, §8254, M Arch major or #)
Advanced architectural computing applications in design, history, theory, representation, and technology.

Arch 5381. Introduction to Computer Aids for Architectural Design. (3 cr; SP–BA Arch or BED major or M Arch or graduate LA major or #; A-F only)
Introduction to electronic media for design, including 2-D drawing, 3-D modeling and animation, printing, and plotting. Introduction to electronic networking and communications, database management, spreadsheet analysis, land-use analysis, and project management.

Arch 5382. Computer Aids for Architectural Design. (3 cr; SP–For undergrads 5381, BA Arch or BED major; for grads M Arch major or #; A-F only)
Undergraduate students only. Understanding computer-aided tools used in design and practice, including 2-D and 3-D CAD and image manipulation. Exploring advanced multimedia visualization techniques for design, including solid modeling, photo-realistic imaging, animation, and video-editing and rendering.

Arch 5410. Topics in Architectural History. (1-3 cr; SP–For undergrads 3412, arch major; for grads M Arch major or #; A-F only)
Selected topics in architectural history. Readings, research, and seminar reports.

Arch 5421. Principles of Design Theory. (3 cr; SP–M Arch major or #; A-F only)
Principles of design and their instrumentation. How and why architecture theory is generated. Types and significance of formal analysis. Theoretical positions and modes of criticism.

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

Arch 5424. Renaissance Architecture. (3 cr; SP–For undergrads 3411, arch major; for grads M Arch major or #; A-F only)
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; SP–For undergrads 3411, arch major; for grads M Arch major or #; A-F only)
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; SP–For undergrads 3411, 3412, arch major; for grads M Arch major or #; A-F only)
History of architecture and urban design in Italy from 1500 to 1750. Emphasis on major figures (Bernini, Borromini, Cortona, Guarini) and the evolution of major cities (Rome, Turin).

Arch 5427. Architecture and Nature: 1800-1850. (3 cr; SP–For undergrads 3411, 3412, arch major; for grads M Arch major or #; A-F only)
History of architecture and urban design in Europe from 1800 to 1850. Emphasis on major figures (Quatremere de Quincy, Viollet-Le Duc, Ledoux, Durand, Camillo Sitte, and Le Corbusier). Recent developments and theoretical positions of neo-rational and contextual arguments for contemporary applications of the idea of type.

Arch 5430. Architecture and Culture. (3 cr; SP–3412, arch major or graduate LA major or #; A-F only)
Architecture as a cultural medium. Relationships among architecture, people, and culture; research findings and design; vernacular and high style architecture. Physiological and symbolic messages; reception theory in architectural practice; cultural critique and change; implications for architectural practice.

Arch 5450. Gender and Architecture. (3 cr; SP–Arch or WoSt major or M Arch major or #)
Examination of ideas related to gender and architecture, gendered and non-gendered places and practices, and their relations to cultural norms and change.

Arch 5461. North American Indian Architecture. (3 cr; SP–For undergrads 3412, arch major or AmIn major; for grads M Arch major or #; A-F only)
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. Environmental and Material Forces in Architecture. (4 cr; SP–5350, 5351, arch major or #; A-F only)
Exploration of relationship between architectural form, human experience, and building technologies. Design principles and concepts of environmental technology (microclimate, thermal, aural, luminous design) and building technology (materials, methods of construction, structure). Impact of ecological issues, construction materials, and structural systems on architectural design.
Arch 5511. Construction Materials in Architecture. (3 cr; SP–M Arch major or #; A-F only)
Study and analysis of building materials, assemblies, and construction operations shaping building designs. Examination of material properties for design and detailing of buildings, systems, and components, and their implications in design applications. Modeling and hands-on building experiences.

Arch 5512. Building Methods in Architecture. (3 cr; SP–5511, M Arch major or #; A-F only)
Analysis of architectural materials, building systems, and construction operations related to enclosure systems design, building infrastructure, and detailing. Application of legal constraints and regulations (e.g., ADA, building codes, life-safety issues) in preparation of drawings, specifications, and construction documents for building design.

Arch 5513. Environmental Technology I: Thermal Design in Architecture. (3 cr; SP–M Arch major or #; A-F only)
Thermal and climatic issues in the design of small and mid-size buildings. Investigations in built and mechanical methods to modify climate. Evaluation of the impact of design techniques on energy use, the environment, and architectural meaning.

Arch 5514. Environmental Technology II: Lighting and Acoustic Design. (3 cr; SP–M Arch major or #; A-F only)
Principles of daylighting, electric lighting, and acoustic design in architecture. Relationship between luminous and acoustic environments, human comfort and architectural experience. Analytical methods, design process, and modeling of daylighting.

Arch 5525. Design in Masonry. (3 cr; QP–5521, M Arch major or #; SP–5512, M Arch major or #; A-F only)
Design principles, construction methods, and document production for masonry structures.

Arch 5539. Daylighting and Architecture Design. (3 cr; QP–5531, M Arch major or #; SP–5514, M Arch major or #; A-F only)
Role of daylighting in architectural design: principles, strategies, energy use and environmental issues, psychology of light, color, and integration of electric lighting. Design projects investigate qualitative and quantitative issues through drawing, physical models, and photometric analysis.

Arch 5542. Building Energy Systems. (3 cr; QP–5541, M Arch major or #; SP–5513, M Arch major or #; A-F only)
Understanding functions of building mechanical systems and their integration with other building components through case studies. Residential and commercial HVAC, systems, alternative energy sources, energy efficiency, structural implications of mechanical systems, indoor air quality, and environmental control strategies.

Arch 5550. Topics in Architecture Technology. (1-3 cr; SP–Arch or M Arch major or #)
Selected topics in architecture technology, including construction, environmental management, energy performance, lighting, or materials.

Arch 5561. Building Production Processes. (3 cr; QP–5283, arch major or BED major or M Arch major or #; SP–5292, 5201, arch major or BED major or M Arch major or #)
Introduction to design-build processes including document production, contract execution, and project management. Case study and hands-on experiences examine construction industry organization, scheduling, consultant relations, legal and code restraints, contractual stipulations, budget and project resource allocations.

Arch 5571. Architectural Structures I: Wood and Steel Design. (3 cr; SP–M Arch major or #; A-F only)
Influence of history and culture on architecture and structure. Fundamentals of structural mechanics, structural analysis, structural form finding, and structural design by experimental, quantitative/intuitive, and quantitative methods. Vector-active and force-active structural systems, funicular structures, bending and compression elements, plates and grids, tensile architecture, shells. Description of traditional construction materials.

Arch 5572. Architectural Structures II: Concrete and Masonry Design. (3 cr; QP–5572, M Arch major or #; SP–5571, M Arch major or #; A-F only)
Overview of advanced materials: reinforced fiberglass, structural glass, and structural tensile fabrics. Impact of construction technology on architecture and methods of integrating knowledge of structural materials and construction methods into the design process.

Arch 5621. Professional Practice in Architecture. (3 cr; SP–M Arch major or #; A-F only)
Legal, ethical, business, and practical requirements of architectural practice. Contemporary and historical models of contract formation, business principles, accounting, project management, design services, and marketing.

Arch 5631. Legal Contracts in Architecture. (3 cr; SP–M Arch major or #; A-F only)
Legal subject matter relevant to the work of architects and design professionals.

Arch 5645. Real Estate Development in Architecture. (3 cr; SP–For undergrads BA Arch major; for grads M Arch major or #)
Fundamentals of real estate development and investment building. Processes and rules of specialists in development of investment projects. Topics include pro forma value and depreciation, tax shelter, feasibility, market analysis, appraisal equity financing, design, construction, leasing, and property management.

Arch 5650. Topics in Architectural Practice. (1-3 cr; SP–5621, arch major or #; SP–5621, M Arch 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; SP–Arch or M Arch major or #)
Selected topics in the theory, philosophy, research, and methods of architectural historic preservation.

Arch 5671. Historic Preservation. (3 cr; SP–3412 or #)
Philosophy, theory, and origins of historic preservation. Historic archaeology 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 5672. Historic Building Conservation. (3 cr; SP–3412, 3411 or #; SP–3412, 5671 or #)
Historic building materials, systems, and methods of conservation. Discussion of structural systems, building repair and pathology, introduction of new environmental systems in historic buildings, and conservation of historic interiors. Research on historic building materials and techniques using primary and secondary resources and on documentation of a specific historic site through large-format photography and measured drawings.

Arch 5673. Historic Building Research and Documentation. (3 cr; QP–3412, 5552 or #; SP–3412, 5672 or #)
Theory, philosophy, 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; SP–Arch or BED major or M Arch or LA graduate major or #; A-F only)
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; SP–Arch or BED or Geog major or M Arch or LA grad major or #; A-F only)
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 5750. Topics in Urban Design. (1-3 cr; SP–5711, M Arch or LA grad major or #; A-F only)
Special topics in theory and practice of urban design.

Arch 5993. Directed Study. (1-3 cr; SP–# only; A-F only)
Guided individual reading or study.

Area Studies (Area)

Institute for Global Studies
College of Liberal Arts

Area 3144. Introduction to Area Studies. (4 cr)
Approaches to the relationships between local experience and global issues. Gender relations serve as a point of entry into such themes as identity, livelihood, immigration, and family examined through case studies from three regions of the world.

Arch 3910. Topics in East Asian Studies. (3 cr)
Description varies with topic title.

Arch 3920. Topics in European Studies. (3 cr)
Description varies with topic title.

Arch 3930. Topics in Latin American Studies. (3 cr)
Description varies with topic title.

Arch 3940. Topics in Middle Eastern Studies. (3 cr)
Description varies with topic title.

Arch 3950. Topics in Russian Area Studies. (3 cr)
Description varies with topic title.

Arch 3960. Topics in South Asian Studies. (3 cr)
Description varies with topic title.

Arch 3993. Directed Studies. (1-4 cr [max 12 cr]; QP–#; A-F only)
Qualifying students work on a tutorial basis.

Arch 4504. Senior Project. (3 cr; QP–Sr or #; A-F only)
Research methods, writing skills, and bibliography related to field of study.

Area 5114. International Perspectives—U.S.–Mexico Border Cultures. (3 cr; SP–Grad)
The relations of Mexico and the United States from an international perspective with a central focus on the cultural interchange in the border lands between the two countries. Uses both literary and historical materials.

Area 5910. Topics in East Asian Studies. (3 cr)
Description varies with topic title.

Area 5920. Topics in European Studies. (3 cr)
Description varies with topic title.

Area 5930. Topics in Latin American Studies. (3 cr)
Description varies with topic title.

Area 5940. Topics in Middle Eastern Studies. (3 cr)
Description varies with topic title.

Area 5950. Topics in Russian Area Studies. (3 cr)
Description varies with topic title.

Area 5960. Topics in South Asian Studies. (3 cr)
Description varies with topic title.

Area 5993. Directed Studies. (1-4 cr [max 12 cr]; QP–#; A-F only)
Guided individual reading or study. Open to qualified students for one or more semesters.

Area 3994. Directed Research. (1-4 cr [max 12 cr]; QP–#; A-F only)
Research methods, writing skills, and bibliography related to field of study.

Area 5114. International Perspectives—U.S.–Mexico Border Cultures. (3 cr; SP–Grad)
The relations of Mexico and the United States from an international perspective with a central focus on the cultural interchange in the border lands between the two countries. Uses both literary and historical materials.

Area 5910. Topics in East Asian Studies. (3 cr)
Description varies with topic title.

Area 5920. Topics in European Studies. (3 cr)
Description varies with topic title.

Area 5930. Topics in Latin American Studies. (3 cr)
Description varies with topic title.

Area 5940. Topics in Middle Eastern Studies. (3 cr)
Description varies with topic title.

Area 5950. Topics in Russian Area Studies. (3 cr)
Description varies with topic title.

Area 5960. Topics in South Asian Studies. (3 cr)
Description varies with topic title.

Area 5993. Directed Studies. (1-4 cr [max 12 cr]; QP–#; A-F only)
Qualifying students work on a tutorial basis.
Arts 3804. Neon (3 cr; CR–1001)
Introduction to neon sculpture; investigating materials, methods, concepts, and studio procedures. Work with glass tubing, electrical components, mixed media, and installation.

Arts 5104. The Nature of Abstraction (3 cr; SP–3102 or #)
Exploration of abstraction as concept and studio practice with attention to developing individual work. Emphasis on understanding topics relevant to abstraction. Approached from the discipline of painting and open to various material sensitivities.

Arts 5105. Advanced Dimensional Painting (3 cr; SP–3105 or #)
Illusionary space applied to sculptural forms. Practical applications of spatial and painterly concepts with emphasis on critical and visual judgment. Development of a cohesive body of work reflecting the interaction of both two and three dimensions.

Arts 5106. Advanced Drawing: Interpreting the Site. (3 cr; SP–3106 or #)
Focus is on the search for personal content as inspired by the site. Field trips (2/3 of course) to draw or paint from various metropolitan area locations. Interpretations will be enhanced by experimentation with new marks and symbols.

Arts 5110. Advanced Drawing. (3 cr [max 12 cr]; SP–3101 or 3111 or #)
Development of personal direction in terms of form and content. Various media and aesthetic and conceptual approaches.

Arts 5120. Advanced Painting. (3 cr [max 12 cr]; SP–3102 or #)
Development of personal vision and content through painting. Emphasis on critical thinking, self-evaluation, and the independent pursuit of ideas.

Arts 5130. Advanced Watercolor. (3 cr [max 12 cr]; SP–3102 or #)
Expressive and technical possibilities of transparent watercolor. Emphasis on pictorial structure, color relationships, and visual expression. Work from still life, nature, the life model, and imagination.

Arts 5310. Advanced Sculpture: Direct Metal. (3 cr [max 12 cr]; SP–3301 or #)
Direct metal sculpture in steel and other metals. Studio practice and investigation of historical and contemporary methods and concepts. Development of personal sculptural imagery.

Arts 5320. Advanced Sculpture: Spatial Problems. (3 cr [max 12 cr]; SP–3302 or #)
Sculptural practice outside traditional media and approaches. Installation, theater, public art, and architecture as topics for individual investigations into spatial organization.

Arts 5330. Advanced Sculpture: Metal Casting. (3 cr [max 12 cr]; SP–3303 or #)
Metal casting of sculpture in bronze, iron, aluminum, and other metals. Studio practice and investigation of historical and contemporary methods and concepts. Development of personal sculptural imagery.

Arts 5340. Advanced Sculpture: Carving and Construction. (3 cr [max 12 cr]; SP–3304 or #)
Carving and construction using wood and other materials. Studio practice and investigation of historical and contemporary methods and concepts. Development of personal sculptural imagery.

Arts 5350. Advanced Sculpture: Kinetics. (3 cr [max 12 cr]; SP–3305 or #)
Studio practice in kinetic sculpture and investigation of historical and contemporary methods and concepts of sculpture produced by motion. Development of personal imagery.

Arts 5360. Advanced Performance Art and Installation. (3 cr [max 12 cr]; SP–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 5370. Advanced Sculpture: Traditional Approaches. (3 cr [max 12 cr]; SP–3307 or #)
Clay figure modeling. Mold making using historical and contemporary systems; casting in semiformal materials. Studio practice and investigation of traditional sculptural methods and concepts. Development of personal imagery.

Arts 5400. Seminar: Concepts and Practices in Art. (3 cr [max 6 cr]; SP–3401 or #)
Discussion of various ideologies and cultural strategies that influence the practice and interpretation of art. Emphasis on diversity of viewpoints within the practice of contemporary art and culture. Application of these issues in development of the final BFA exhibition.

Arts 5402. Artists’ Books. (3 cr; SP–3402 or #)
Advanced projects in the creation of unique, handmade books using a variety of structures, media, and techniques. Critical, historical, and theoretical issues surrounding contemporary book arts.

Arts 5403. Women’s Images and Images of Women. (3 cr; SP–3101 or 3102 or #)
For description, see 3403.

Arts 5490. Workshop in Art. (1-3 cr [max 12 cr]; SP–3403 or #)
Selected topics and intensive studio activity. Topics vary yearly.

Arts 5510. Advanced Printmaking: Intaglio and Screen. (3 cr [max 12 cr]; SP–3501 or #)
In-depth research of intaglio and screen printing with investigation of historical and contemporary applications. Development of imagery using color, photomechanical and digital processes, and cross-media approaches.

Arts 5520. Advanced Printmaking: Relief and Lithography. (3 cr [max 12 cr]; SP–3502 or #)
Relief printing and lithography for creative expression. Studio practice with stone, metal and wood. Investigation toward developing personal visual language and aesthetics. Historical and contemporary awareness, evolving technologies and strategies.

Arts 5550. Advanced Papermaking. (3 cr [max 12 cr]; SP–3505 or #)
Focus on distinct expressive qualities of handmade paper and its versatility as a contemporary art form. Independent research interests are pursued in consultation with instructor.

Arts 5610. Advanced Electronic Art. (3 cr [max 12 cr]; SP–3601 or #)
Synthesis of artistic form and content using digital technologies. Independent projects pursued in consultation with instructor.

Arts 5710. Advanced Photography. (3 cr [max 12 cr]; SP–3701 or #)
Design and implementation of individual advanced projects. Demonstrations, lectures, and critique. Reading, writing, and discussion of related articles and exhibitions.

Arts 5810. Advanced Ceramics. (3 cr [max 12 cr]; SP–3801, 3802 or #)
Critical discourse of aesthetics, history, and contemporary issues in clay and criticism. Independent, advanced projects.

Arts 5821. Ceramic Materials Analysis. (3 cr; SP–3801 or 3802 or #)
Ceramic materials and their interrelationships. Advanced investigation of glazes, slip formulation, and clay bodies in both high and low temperature ranges. Individual interests related to students aesthetic needs.

Arts 5830. Advanced Ceramics: Mold Making. (3 cr [max 12 cr]; SP–3803 or #)
Advanced mold making for ceramics. Plaster mold fabrication, ceramic production and contemporary methods and concepts. Development of personal visual expression.

Arts 5840. Advanced Neon. (3 cr [max 12 cr]; SP–3804 or #)
Emphasis on the development of personal sculptural sensibility. Studio practice with neon glass tubing and electrical components. A mixed media approach is encouraged.

Arts 5990. Independent Study in Art. (1-4 cr [max 12 cr]; SP–major, #)
Independent study project designed by student in consultation with instructor.

Art History (ArtH)
Department of Art History
College of Liberal Arts

ArtH 1001. Introduction to Art History. (4 cr)
Global examples will be used to consider issues such as the creative process, how art shapes human thought, art as commodity, art and religion, representation of the human body, and the constructed space in which humans function known as architecture.

ArtH 1016. Introduction to Asian Art. (4 cr)
An introduction to the issues and themes of South Asian, Southeast Asian, and East Asian art from earliest times to the present.

ArtH 1026. Honors: Introduction to Asian Art. (4 cr; QP–Permission of CLA honors adviser; SP–Permission of CLA honors adviser)
For description, see 1016.

ArtH 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 that study the past. Study of selected sites considers motives and methods of research, and how the results are used by archaeologists and the general public.

ArtH 1921. Introduction to Film Study. (4 cr)
Fundamentals of film language and major theories of cinema presented through detailed analysis of several films including John Ford’s Stagecoach and Jean-Luc Godard’s Breathless.

ArtH 3005. American Art. (4 cr)
Survey of American art from colonial to the present with special emphasis on the relationship of painting, sculpture, the decorative arts, architecture, costume, and material culture to current interpretations of American history.

ArtH 3008. History of Ancient Art. (4 cr)
Architecture, sculpture, and painting of selected early cultures; emphasis on influences contributing to the development of Western art.

ArtH 3009. History of Medieval Art. (4 cr)
Emphasis on principal monuments, their decoration and function (e.g. Old St. Peter’s, Rome; Hagia Sophia, Istanbul; Palace Chapel, Aachen; St. Sermin, Touron; Cathedral of Chartres, Paris, Rheims).

ArtH 3011. History of Renaissance and Baroque Art. (4 cr)
Major architects, sculptors, and painters in Western Europe from the 15th through the 18th centuries (e.g. Brunelleschi, Michelangelo, Raphael, Leonardo, Caravaggio, Bernini, Rembrandt, Rubens, Poussin, Watteau).

ArtH 3012. History of 19th- and 20th-Century Art. (4 cr)
Major monuments and issues of modern period: sculpture, architecture, painting, and prints. Movements include neoclassicism, romanticism, realism, impressionism, evolution of modernism, symbolism, fauvism, cubism, dadaism, surrealism, abstract expressionism, pop art, conceptualism, and post-modernism.

ArtH 3013. Introduction to East Asian Art. (4 cr)
A selective examination of works of art produced in China, Korea and Japan from the neolithic era to modern times. Nearly every major type of object and all major styles are represented.

ArtH 3014. Art of India. (4 cr)
Indian sculpture, architecture, and painting from the prehistoric Indus Valley civilization to the present day.
Arth 3015. Art of Islam. (4 cr)
Architecture, painting, and other arts from Islam's origins to the 20th century. Cultural and political settings as well as themes that unify the diverse artistic styles of Islamic art will be considered.

Arth 3017. Islamic Culture. (4 cr)
Emphasis on visual arts and literature produced by the Muslim world from Spain to the Indian subcontinent. Analysis of visual and literary sources will form the basis for understanding diverse cultural developments.

Arth 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.

Arth 3142. Art of Egypt. (4 cr)
Arts and architecture of Egypt from prehistoric times to the emergence of modern Egypt, with emphasis on elements of continuity and change that have shaped Egyptian culture.

Arth 3152. Art and Archaeology of Ancient Greece. (4 cr)
Introduction to the civilization of ancient Greece through art and material culture. Case studies of selected monuments and sites.

Arth 3162. Roman Art and Archaeology. (4 cr)
Introduction to the art and material culture of the Roman World: origins, changes and continuities, “progress” or “decay” in the late Empire, legacy to the modern world.

Arth 3305. 17th- and 18th-Century Painting in France. (4 cr)
Survey of French painting from Baroque through the beginnings of Neo-Classicism (e.g. De La Tour, Le Nain, Vouet, Poussin, Watteau, Boucher, Chardin, Dufour).

Arth 3422. History of Graphic Arts: 1780 to 1900. (4 cr)
History and theory of the creation of lithography, social caricature (e.g., Daumier, Gavarni), the revival of etching (e.g., Goya and mid-century practitioners, Whistler), and color lithography (e.g., Toulouse-Lautrec, Vuillard, Bonnard). Media changes of 20th century: the revolutionary nature of new media.

Arth 3484. The Art of Picasso and the Modern Movement. (4 cr)
Works of Picasso in all media. Blue, Rose, Cubist, Classical, and later periods of Picasso's development against innovations in media; collage, utilization of found-objects, printmaking and ceramics. Auto-biographical nature of imagery gives methodological basis for exploring frequently personalized themes.

Arth 3575. The Art of Walt Disney in American Culture. (4 cr)
Walt Disney, his companies, and the influence of their products on 20th century American culture. Animation, architecture, city planning, the relationship between the fine arts and popular culture, and the creation of art under industrial conditions of collaboration and profit.

Arth 3576. American Popular Culture. (4 cr)
American popular culture in the 19th and 20th centuries; fashion, greeting cards, holiday celebration, public spectacle, magazine covers, and commercial design.

Arth 3921. Art of the Film. (4 cr)
History of the motion picture as an art form; major films, directors, genres, and styles. Films discussed include The Birth Of A Nation, Citizen Kane, Bicycle Thieves, Rashomon, and Jules and Jim.

Arth 3930. Honors-Junior-Senior Seminar. (3 cr; SP-Honors jr or sr or ArtH major; A.F-only)
Focus on a major art historical theme, artist, period, or genre. Exclusively for honors majors in art history.

Arth 3971. Major Project. (1 cr; SP-ArtH major; A.F-only)
Completion of a research paper begun in a 5xxx “project course.”

Arth 3975. Directed Museum Experience. (1-2 cr; SP-ArtH major; S-N only)
Internship or docentship in an approved program in an art institution or museum. Open to both majors and nonmajors. Must consult with director of undergraduate studies.

Arth 5013. Hellenistic and Early Roman Art and Archaeology. (1-3 cr; SP-Arth 3008, jr or grad student; A.F-only)
Sculture, painting, architecture, and topography in developing centers of Hellenistic culture in the eastern Mediterranean, and in Etruscan and Roman towns from 400 B.C. to the beginnings of the Roman Empire.

Arth 5018. Greek Architecture. (3 cr; SP-Arth/Class 3008, jr or grad student; A.F-only)
Geometric through classical examples of religious and secular architecture and their setting at archaeological sites in Greece, Asia Minor, and Italy.

Arth 5111. Prehistoric Art and Archaeology of Greece. (3 cr; SP-Jr or grad student; A.F-only)
Artistic and architectural forms of Neolithic period in Aegean area and Cycladic, Minoan, and Mycenaean cultures. Aims and methods of modern field archaeology; the record of human habitation in the Aegean area. Archaeological evidence as a basis for historical reconstruction.

Arth 5112. Archaic and Classical Greek Art. (3 cr; SP-Jr or grad student; A.F-only)
Sculpture, painting, architecture, and minor arts in Greek lands from the 9th through 5th centuries B.C. Examination of material remains of Greek culture; archaeological problems such as identifying and dating buildings, analysis of methods and techniques.

Arth 5120. Field Research in Archaeology. (3 cr; SP-ArtH major)
Field excavation, survey, and research at archaeological sites in the Mediterranean area. Techniques of excavation and exploration; interpretation of archaeological materials.

Arth 5172. House, Villa, Tomb: Roman Art in the Private Sphere. (3 cr; SP-Intra art history course or SP-ArtH major)
The architecture, painting, and sculpture of urban houses, country estates, and tombs in the Roman World. Relationships between public and private spheres, and literary and physical evidence; usefulness of physical evidence in illuminating gender roles.

Arth 5182. Art and the State: Public Art in the Roman Empire. (3 cr; SP-Intra art history course or SP-ArtH major)
Origins of Roman public art; use in maintaining community; role of 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; SP-Jr or grad student; A.F-only)
The origin, character, and development of Gothic sculpture in France, the German empire, and the Netherlands, 1150-1400. Emphasis on French sculpture of 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; SP-3xxx ArtH course or SP-ArtH major)
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 5324. 15th-Century Painting in Northern Europe. (3 cr; SP-Jr or grad student or SP-ArtH major)
The origin, character, and development of painting in the Netherlands 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; SP-Jr or grad student or SP-ArtH major)
17th-century painting in Spain (e.g., Ribera, Velazquez, Murillo); 18th- and 18th-century architecture, sculpture, and painting in Italy (e.g., Carravaggio, Carracci, Bernini, Algardi, Borromini, Piranesi).

Arth 5347. 17th and 18th-Century Art of Northern Europe. (3 cr; SP-3xxx; 3011 or grad student or SP-ArtH major)
17th- and 18th-century architecture, sculpture, and painting in France (e.g., Versailles, Poussin, Watteau).

Arth 5341. Age of Revolution: French Painting 1789 to 1870. (3 cr)
Analysis of 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 5345. Design Reform in the Era of Art Nouveau. (3 cr)
History of art nouveau in France, Belgium, England, Germany, Austria, Scotland, United States. Innovations in architecture, graphics, decorative arts; continental variants of the style. Major promoters and pioneers of modern design. Critical issues of design reform; texts integrated with principal monuments.

Arth 5463. Early 20th-Century Painting and Sculpture. (3 cr)
Primary movements of early 20th century: fauvism, German expressionism, cubism, futurism, dadaism, surrealism, non-objectivism, constructivism, Orphism, early abstraction. Framed against postimpressionism and internationalism at turn of century.

Arth 5465. 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 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 illustrators 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 sociocultural conditions. Critical attention to problems of style, the artistic 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)
The goal of the course is to develop a more effective way to understand the unique qualities of an 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.
Astronomy (Ast)

**Department of Astronomy**

**Institute of Technology**

**Ast 1001. Exploring the Universe.** (4 cr; QP–§1011, §1012H, §1032) The human place in the Universe. Study of Earth, other planets, sun, stars, galaxies. Background and fragility of life on Earth. Scale, origin, history of universe and our relationship to it.

**Ast 1004. Mathematics and Our Universe.** (3 cr) Selected topics in mathematical formalism that lead to a deeper understanding of the universe.

**Ast 1011. Exploring the Universe, Honors.** (4 cr; SP–§1011, §1032; high school trigonometry, high school physics or chemistry; SP–§1001, high school trigonometry, high school physics or chemistry)

**Biochemistry (BioC)**

**Department of Biochemistry, Molecular Biology, and Biophysics**

**College of Biological Sciences and the Medical School**

**BioC 1001. Elementary Biochemistry.** (3 cr; QP–High school chem or & SP–High school chem or college general chem) Chemistry and biochemistry as they apply to the organization, function and regulation of living systems, especially humans. Suitable for undergraduates who desire an introduction to biochemistry, including students in health sciences programs such as dental hygiene or occupational therapy.

**BioC 1012. General Principles of Biochemistry.** (3 cr; QP–Chem 1001 or 1 qr college chem; SP–Chem 1011) Continuation of Chem 1011. Elementary survey of biochemistry beginning with a review of organic chemistry.

**BioC 3001. Biochemistry for Health Sciences.** (3 cr; QP–College chem or & SP–College chem or #) Survey of organic chemistry and biochemistry: outlines and metabolism of biomolecules, basic principles of molecular biology, and regulation of physiological processes. Suitable for undergraduate science majors, pre-med or pre-nursing students, or other health sciences students.

**BioC 3021. Biochemistry.** (3 cr; QP–BioI 1009 or 1022, 8 cr organic chemistry; SP–§Bio 3021, BioI 1002 or 1009, Chem 2301) Fundamentals of biochemistry including structure and function of proteins, nucleic acids, lipids and carbohydrates; metabolism and regulation of metabolism; quantitative treatments of chemical equilibrium, enzyme catalysis and bioenergetics; the chemical basis of genetic information flow.

**BioC 3960. Research Topics in Biochemistry.** (1 cr [max 2 cr]; QP–Interest in a biochemistry major, #; SP–Interest in a biochemistry major, #; S-N only) Lectures and discussion on current research in the department.

**BioC 4001. Biochemistry.** (3 cr; QP–General chem, organic chem or & SP–General chem, organic chem or #) Chemical properties, biosynthesis, catalysis, structure and function of biomolecules. Fundamental aspects of molecular biology and metabolic regulation. Required for first-year medical technology majors. Appropriate for advanced undergraduates and graduate students.

**BioC 4002. Biochemistry of Physiological Processes.** (2 cr; QP–MdbC 5300 or SP–MdbC 5300 or #) Physiological biochemistry emphasizing processes occurring in humans. Required for medical technology majors.

**BioC 4025. Laboratory in Biochemistry.** (2 cr; QP–2021 or 5331, SP–2021 or 4331 or Bio 2021) Theory and principles of the fundamental techniques used in modern biochemistry laboratories as well as the practical use of these techniques during the laboratory part of the course.

**BioC 4331. Biochemistry I: Structure, Catalysis, Metabolism and Bioenergetics of Biological Systems.** (4 cr; QP–BioI 1009 or BioI 1202, 2 qtrs organic chemistry or #; SP–BioI 1002 or 1009, Chem 2302) Advanced survey of structure and catalysis, metabolism and bioenergetics.

**BioC 4332. Biochemistry II: Molecular Mechanisms of Gene Action and Biological Regulation.** (4 cr; QP–5332 or #; SP–4331 or #) Advanced survey of molecular biology, mechanisms of gene action, and biological regulation.

**BioC 4418. Topics in Molecular Immunology.** (3 cr; QP–MdbC 5218 or & SP–MdbC 4313 or #; AF only) Molecular interactions occurring among proteins and peptides involved in immune recognition.
Bioc 4521. Introduction to Physical Biochemistry. (3 cr; QP–Chem 1025, Math 1261, Phys 1253; SP–Chem 1022, Math 1272, Phys 1202) Introduction to physical chemical principles and their applications in biochemistry. Thermodynamics, kinetics, spectroscopy, and solution dynamics as applied to biochemical reactions and biopolymers.

Bioc 4993. Directed Studies. (1-7 cr; max 7 cr) QP–10 or 30 cr may count toward major requirements; #: A-S; N only) Individual study on selected topics or problems with emphasis on selected readings and use of scientific literature.

Bioc 4999. Directed Research. (1-7 cr; max 15 cr) QP–10 or 30 cr may count toward major requirements; #: A-S; N only) Laboratory or field investigation of selected areas of research.

Bioc 5309. Biocatalysis and Biodegradation. (3 cr; QP–§MicB 5352; BioC 3021 or BioC 5331 or MicB 5321, organic chem, biochem or equiv required, intro biochemistry desirable; SP–MicB 5352; intro physical chemistry or equiv required, intro biochemistry desirable) Applications of enzymes in biochemistry, biotechnology, and environmental remediation; application of NMR, electron spin resonance, optical, infrared, and circular dichroism spectroscopies to proteins, nucleic acids, and membranes.

Bioc 5530. Selected Topics in Molecular Biophysics. (1-3 cr; QP–§MicB 5525; BioC/MdBc 5523 or 5527 or 5528 or equiv; SP–§MicB 5530; BioC/MdBc 5527 or 5528 or equiv) Discussion of topics from current literature on the biophysics of proteins, nucleic acids, muscle, and membranes. Content and instructors vary from one offering to another, on an approximately every other year rotation.

**Biology (Bio)**

**College of Biological Sciences**

Bio 1001. Introductory Biology I: Evolutionary and Ecological Perspectives. (4 cr) Biological diversity from genetic variation to the diversity of species and ecosystems; genetic, evolutionary, and ecological processes governing human diversity, population growth, health, agriculture, and conservation.

Bio 1002. Introductory Biology II: Molecular, Cellular, and Developmental Perspectives. (5 cr; QP–1201 or equiv, Chem 1031, SP–1001 or equiv, Chem 1021; A-F only) Chemistry of living things, cell structure and transport, energy processes in cells, introduction to primary metabolism, molecular genetics, cell physiology, cell cycles, principles of animal and plant development, regulation of development. Lab focuses on molecular scientific techniques and investigative design.

Bio 1009. General Microbiology. (4 cr; QP–High school chemistry, 1 term college chemistry recommended; SP–High school chemistry, 1 term college chemistry recommended) Introduction to major concepts of modern biology. Topics include molecular structure of living things, energy recruitment and utilization, flow of genetic information through organisms and populations, principles of inheritance, ecology, and evolution. Includes lab.

Bio 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.

Bio 1041. Preparation for Graduate Programs in Science. (1 cr; SP–§ 3-5 only) Necessary elements in preparing in mathematics, physical and biological sciences to prepare for graduate work in science. Required for new freshmen in the Mathematics and Science Tutorial (MST) Program.

Bio 1051. Introduction to Environmental Science. (3 cr; SP–1001) A study of current environmental issues that impact the world including air and water pollution, human population, toxic and hazardous wastes, urban land use, biological diversity, energy, attitudes toward nature, environmental politics, and ethics.

Bio 1093. Biology Colloquium: Directed Study. (1 cr; QP–1951 or 1952 or 1953; SP–1020 or 11020; S-N only) Directed study or research undertaken by a student concurrently enrolled in Biol 1020 with oversight by a faculty sponsor.

Bio 1101. Heredity and Human Society. (3 cr; QP–§ES 1053, §ESB 3022; SP–14003, §ESB 3022) Principles of heredity and their social and cultural implications.

Bio 1111. Freshman Seminar for the Biological Sciences. (2 cr; A-F only) Orientation to the university environment, special topics in the biological sciences, directed study. Topics vary according to instructor.


Bio 2005. Animal Diversity Laboratory. (1 cr; QP–§1106, §1111; SP–§2012; §3211or §3211, Phl 3051 or §3051) Dissection and direct observation of representatives of major animal groups.

Bio 2012. General Zoology. (4 cr; QP–1009 or 1201; SP–1009 or 1001) Surveys major animal groups (phyla) with applications of morphological, physiological, and developmental characteristics to define evolutionary relationships. Discusses parasitic forms affecting human welfare. Lab requires dissection including mammals.

Bio 2022. General Botany. (3 cr; QP–1009 or 1201; SP–1009 or 1001; A-F only) Principles of plant biology: organization, function, growth and development, and reproductive biology of plants and plant-like organisms. Includes lab.

Bio 2032. General Microbiology With Laboratory. (4 cr; QP–1203 or 1009, Chem 1052, intended primarily for non-microbiology majors; SP–§3301, § McB4 2032; 1002 or 1009, Chem 1022; intended primarily for non-microbiology majors) Fundamental principles of microbiology: bacterial metabolism, growth, and genetics; biology of viruses and fungi; control of microorganisms; host-microbe interactions; microorganisms and disease; applied microbiology. Includes lab.

Bio 2201. Introduction to Computing in Biology. (1 cr; QP–1009 or 1202 or equiv, declared biological sciences major; SP–1009 or 1002 or equiv, declared biological sciences major; S-N only) Hands-on use of microcomputers to show how computers can manipulate data, prepare graphs and graphics, acquire and analyze scientific data, perform literature searches, prepare scientific presentations, and communicate with others via the network.

Bio 3002. Plant Biology: Function. (2 cr; QP–1202 or 1009, one qtr chemistry with some organic content [e.g., Chem 1001] SP–1002 or 1009, one qtr chemistry with some organic content [e.g., Chem 1011] $3005 or §Agro 3005 or §Short 3005) How plants make and use food; mineral function and uptake; water relations; transport processes; growth and development.

Bio 3005. Plant Function Laboratory. (2 cr; QP–1009 or 1202, one qtr chemistry with some organic content [e.g., Chem 1001] $3002, Plant Biology: Function) A labracketive course to accompany Biol 3002. Lab work will investigate a variety of plant processes at subcellular, organ, and whole plant levels.


Includes lab.
Biol 3021. Biochemistry. (3 cr; QP–OP 1200 or 1202, 8 cr
organic chemistry; SP–$BioC 3021; 1002 or 1009, Chem
2301)
Fundamentals of biochemistry including structure
and function of proteins, nucleic acids, lipids and
carbohydrates, metabolism, and regulation of
metabolism. Quantitative treatments of genetic
equilibria, enzyme catalysis, and bioenergetics;
and the chemical basis of genetic information flow.

Biol 3101. Introduction to Neuroscience I: From
Molecules to Madness. (3 cr; OP–$NSc 3115, §Phsl 3115;
5004; BioC 3012 or BioC 3331; SP–$NSc 3116, §Phsl 3116;
Biol/BioC 3012 or BioC 4331)
Basic principles of cellular and molecular
neurobiology and nervous systems.

Biol 3102. Introduction to Neuroscience II: Biological
Behavioral Basis of Behavior. (3 cr; OP–$NSc 3102, §Phsl
3102; or NSc 3101, or Phsl 3101; SP–$NSc 3102, §Phsl
3102; or NSc 3101 or Phsl 3101; SP–§3101 or Phsl 3101; A-F
only)
Organization of neural systems and subsystems
underlying the sensory and motor aspects of behavior.

Biol 3105. Neurobiology Laboratory I. (1.5 cr;
QP–§NSc 3105, §Phsl 3105; NSc 3101 or Phsl 3101 or SP;
SP–§NSc 3101, §Phsl 3101; 3101 or NSc 3101 or Phsl 3101;
A-F only)
Principles, methods, and laboratory exercises for
investigating neural mechanisms and examining
experimental evidence.

Biol 3115. Neurobiology Laboratory II. (1.5 cr;
QP–$NSc 3115, §Phsl 3115; NSc 3101 or Phsl 3101 or SP;
SP–$NSc 3115, §Phsl 3115; 3101 or NSc 3101 or Phsl 3101;
A-F only)
Principles, methods, and laboratory exercises for
investigating neural mechanisms and examining
experimental evidence.

Biol 3211. Animal Physiology. (3 cr; QP–OP 1099 or 1201,
Chem 1051; SP–Phsl 3051; 1001 or 1009, Chem 1021;
Biol 2005 strongly recommended)
Comparative physiology of various animal groups.
Compare ways different animals solve similar
physiological problems.

Biol 3301. Biology of Microorganisms. (5 cr; QP–$5013,
Mbc 3103, VPB 3103; 3001 or BioI/BioC 3021 or BioC
5331 or OP–$5023, §Mbc 3202; §VPB 3202; §Mbc 3301, §VPB
3202; 1002 or 1009, Chem 2302; A-F only)
Taxonomy, anatomy, physiology, biochemistry,
pathogenesis, immunology, ecology of microbes.
Molecular structure in relation to bacterial function
and disease. Effects of medical and veterinary
microbiological agents.

Biol 3407. Ecology. (3 cr; QP–OP 1099 or 1201 or equiv,
Math 1251 or 1142 or equiv; SP–1001 or 1009, equiv,
Math 1271 or 1142 or equiv)
Scientific exploration of principles of population
growth, migration, interactions, and of ecosystem
function applied to ecological issues of scientific and
societal importance, including the regulation of human
populations; dynamics, and impacts of disease;
invasions by exotic organisms; habitat fragmentation,
biodiversity.

Biol 3409. Evolution. (3 cr; QP–OP 1099 or 1203; SP–1002
or 1009)
Study historical evolution through divergence of
biological forms in fossil record and in presently
existing biological diversity. Genetic mechanisms of
evolution elucidated by examples of ongoing
evolution in wild and domesticated populations, and in
disease-causing organisms.

Biol 3411. Introduction to Animal Behavior. (3 cr;
QP–OP 1099 or 1200, 8 cr
biochemistry or physiol 1002 or 1009 or #)
Survey of the biological study of animal behavior,
including mechanism development, function,
and evolution. Emphasis on evolution of adaptive behavior
and social behavior in the natural environment.

Biol 3412. Biological Rhythms and Timing
Mechanisms. (3 cr; OP–OP 1099 or 1201; SP–1001 or 1009)
Timing mechanisms and rhythms of organisms in
physiological processes, ecological adaptation, and
health; current hypotheses concerning their cellular
and molecular nature. Individual projects.

Biol 3600. Directed Instruction. (1-2 cr (max 6 cr;
QP–1991, 1952 or 1953; SP–1020, application required;
up to 4 cr major optional)
Leadership opportunities for upper division students
wishing to assist with the Biology Colloquium.

Biol 3700. Undergraduate Seminar. (1 cr (max 3 cr;
S–N only)
Faculty members lead groups of students in discussions on topical
interests. Oral reports on topics of current interest to biologists.
Progress reports on laboratory and field research by students.

Biol 4003. Genetcs. (3 cr; OP–BioC 3021 or 3331;
SP–BioI/BioC 3021 or BioC 3331)
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 4004. Cell Biology. (3 cr; OP–BioC 5003 or BioC
3331; BioC 3021 or BioC 5331; SP–BioI/BioC 3021 or BioC
5331, BioC 4003 or BioC 4332)
Processes fundamental to cells emphasizing
eukaryotic cells. Assembly and function of membranes
and organelles. Cell division, cell form and
movement, intercellular communication, transport,
and secretion pathways. Some discussion of
specialized cells including cancer cells and
differentiated cells.

Biol 4125. Recombinant DNA Laboratory. (3 cr;
QP–$5825, §Mbc 5425; BioC 3021 or BioC 5003;
SP–$4825, BioI/BioC 3021 or BioC 4003, BioC 4025, GCB
4015, GCB 4025 or Mbc 3301; A-F only)
Basic recombinant DNA techniques: Methods for
growing, isolating, and purifying recombinant DNAs
and cloning vectors, DNA sequencing and sequence
analysis, gene expression, Polymerase Chain Reaction
(PCR), Southern and Western blotting, and other
current techniques.

Biol 4501. Social Uses of Biology. (3 cr; OP–10 cr in
sciences; SP–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 4825. Recombinant DNA Laboratory. (3 cr;
QP–BioI/BioC 3409 or intermediate-level lab in biochemistry or genetics or cell biology
or microbiology; enrollment in Summer Undergraduate
Research Program in Life Sciences; SP–$4125;
biochemistry or genetics course, internships, and
lab in biochemistry or genetics or cell biology or
microbiology, enrollment in Summer Undergraduate
Research Program in Life Sciences; A-F only)
Basic recombinant DNA techniques. Methods for
growing, isolating, and purifying recombinant DNAs
and cloning vectors.

Biol 4850. Special Topics in Biology. (1-7 cr (max 7 cr;
QP–$1061, SP–A–A–)
Biol 4850. Special Topics in Biology. (1-5 cr (max 10 cr)
In-depth study of a specialized topic in the life
sciences.

Biol 5040. Evolution. (3 cr; OP–$3409; 1009 or 1202,
grad student or #; SP–$3409; 1001 or 1009, grad student or
$
Historical evolution through consideration of
divergence of biological forms in fossil record and in
presently existing biological diversity. Genetic
mechanisms of evolution elucidated by examples of
ongoing evolution in wild and domesticated
populations and in disease-causing organisms.

Biol 5501. Biological Collections: Curation and
Management. (1 cr; OP–1103 or 1106 or 3011 or 3012;
SP–2012 or 2002 or 3007 or 3211)
Roles and value of biological collections in terms of
biology; 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;
SP–9 cr in the life sciences; SP–9 cr in the life sciences,
A-F only)
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.
(1-4 cr (max 12 cr; OP–BA or BS in science or science
education or elementary education or K-12 licensed
teacher; OP–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.

Biomedical Engineering (BME)
within joints. Application to injury, disease, and treatment of specific joints, design of orthopedic devices, and implants.

BMEn 5301. Bioengineering. (3-4 cr; SP-Engineering upper div or grad student) Introduces biomedical engineers to concepts of cell and tissue structure and function. Basic principles of cell biology and their utilization in engineering applications such as tissue engineering and artificial organs.

BMEn 5310. Biological Transport Processes. (3-4 cr; SP-IT upper div or grad student or #; Chen 5103 or ME 5342 recommended; A-F only) Introduction to biological fluid, mass, and heat transport. Mass transfer across membranes; fluid flow in vessels and interstitium; heat transfer in cells, tissues, and body. Applications to blood oxygenation, respiration, drug delivery, and tissue engineering.

BMEn 5350. Cell Engineering. (3 cr; QP-Cell biol or equiv; SP-5302 or equiv, 5310 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 5371. Biomedical Applications of Heat Transfer in Humans. (3-4 cr; QP-Phs 3053, Phs 3056, Phs 5441; SP-Phs 3053, Phs 3056, Phs 5441) Overview of physiology underlying thermoregulation in humans, clinical applications of heat transfer in humans, and framework for a design project.

BMEn 5910. Special Topics in Biomedical Engineering. (2-4 cr)

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

### Biosystems and Agricultural Engineering (BAE)

#### Institute of Technology

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

BAE 4013. Transport in Biological Systems. (3 cr; QP-3150, CE 3400, ME 5342; SP-3013, CE 3502, ME 3324, upper div IT; A-F only) Application of thermodynamics, fluid flow, heat/mass transfer to designing biological processes and materials at cell, organism, and system level. Agricultural, environmental, food, and bioprocess applications.

BAE 4023. Instrumentation and Control for Biological Systems. (3 cr; QP-CE 3400, BE 3009, ME 3390 or Stat 3091; SP-EE 3005 or EEE 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 4112. Senior Design I. (2 cr; QP-Upper div IT; 20 cr BAE completed or in progress; SP-2113, upper div IT, sr or A-F only) Review of design concepts and process. Case studies involving engineering design. Discussion of safety/ethical issues. Develop proposal for senior design project (individual or group) to be completed in 4122. Oral presentation of written proposal.

BAE 4122. Senior Design II. (2 cr; QP-3891, SP-4112, A-F only) Complete design project started in 4112. Report, poster, and oral presentation of final design.

BAE 4313. Device of Design Systems. (3 cr; QP-AEM 3016, AEM 3036; SP-4101, AEM 3031, upper div IT) Case studies of machines/processes. Design for world class: market; crop production (tractors, harvesters, implements); food- and crop-processing systems (pumping, conveying); animal systems (milking parlors design, waste-handling machines).


BAE 4523. Water Management Engineering. (3 cr; QP-3002 or CE 3300, CE 3400, upper div IT or grad student in IT major; SP-3023 or CE 3301, CE 3502, upper div IT, A-F only) 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; QP-3002, upper div IT or grad student; SP-3023, upper div IT) Sources and characteristics of agricultural wastes, including livestock, food processing, and domestic wastes. Biological, physical, chemical, rheological, and microbiological properties. Effects on environment. Collection, storage, treatment (aerobic and anaerobic), and uses/disposal. Land application.

BAE 4713. Bioprocess Engineering. (3 cr; QP-3150; SP-3002, upper div IT) Fermaturation and separation 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; QP-Chen 5103 or ME 5342; upper div IT or grad student in IT major; SP-CE 3502, ME 3324, upper div IT) Application of principles of heat transfer and fluid flow to design of food processing operations such as thermal and aseptic processing, freezing, pumping, drying, evaporation, and extrusion. Marketing, government regulation, nutrition issues.

BAE 4900. Intern Reports. (2 cr [max 4 cr]; QP-IT or COAFES student in BAE, SP-IT or COAFES student in BAE, Sr–N only) Reports on intern work assignments reviewed by faculty and industry advisers.

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

BAE 5513. Watershed Engineering. (3 cr; QP-3052 or CE 3300; CE 3400; upper div IT or grad student; SP-3023, upper div IT) Application of engineering principles to managing surface runoff from agricultural, range, and urban watersheds. Design of facilities and selection of land use practices for controlling surface runoff to mitigate problems of flooding and degradation of surface-water quality.

### Business Administration (BA)

#### Curtis L. Carlson School of Management

BA 1001. Introduction to Information Technology. (2 cr; S-N only) Self-paced course to assess students’ computing skills and identify resources to help them develop necessary skills in word processing, spreadsheets, presentation software, e-mail, LUMINA, remote access, and the World Wide Web.

BA 3033. Business Communication. (4 cr; QP-Freshman composition, CSOM student; SP-Freshman composition, CSOM student; Sr–F only) Uses cases, simulations, and other “real-world” situations to give students opportunity to practice and refine the written and oral communications skills needed for effective participation in contemporary organizations. Current communication technology used in course delivery and assignments. Topics range from basic principles to communication strategy.

### Business and Industry Education (BIE)

#### Department of Work, Community, and Family Education

College of Education and Human Development

BIE 1301. Introduction to Vocational and Technical Teaching. (2 cr; A-F only) Techniques for the occupationally certifiable individual who plans to enter the field of vocational teaching. Required for initial state vocational licensure.

BIE 1396. Supervised Vocational-Technical Teaching. (2 cr; S-N only) 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 problemsolving 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; SP–AE E 3112; 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 3113. Manufacturing Technology. (3 cr; SP–3111)
Study of manufacturing concepts, principles, and applications; automated manufacturing, including computer integrated manufacturing and robotics; design, operation, and management of manufacturing systems and products; lab.

BIE 3114. Construction Technology. (3 cr; SP–3111)
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; SP–3AEE 3121; 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; SP–3121; A-F only)
Information and communication systems, electronic publishing, printing technology, broadcast and recording technologies, telephone and on-line communication, photography, multimedia, and computer technology. Lab.

BIE 3123. Energy, Power, and Transportation Technology. (3 cr; SP–3122; A-F only)
Explores mechanical, fluid, and electrical power and technologies associated with the transportation of people and materials. Lecture and lab.

BIE 3151. Technical Development: Advanced. (1-4 cr [max 12 cr])
Individualized advanced technical development in construction, communication technology, manufacturing, power and energy, and transportation.

BIE 3993. 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 Microcomputer Applications. (3 cr)
Instructional uses of microcomputers and representative business and marketing education applications, including word processing, databases, spreadsheets, and graphics.

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

BIE 5013. Spreadsheet Analysis Using Microcomputers. (3 cr; SP–5011 or equiv)
Develop computer use in using spreadsheets to analyze data, monitor business records, and create models.

BIE 5014. Data Base Microcomputer Applications. (3 cr; SP–5011 or equiv)
Examination of business needs requiring computerized data bases. Use microcomputer database software to develop, maintain, and prepare reports.

BIE 5015. Integrated Microcomputer Applications in Business and Marketing Education. (3 cr; SP–5011, 5012, 5013 or equiv)
Use of realistic business microcomputer applications requiring the integration of two or more application packages. Pedagogical issues of learning advanced microcomputer application capabilities and teaching similar applications to designated groups of learners.

BIE 5080. Special Topics in Business and Industry Education. (1-4 cr [max 4 cr])
Content varies by offering.

BIE 5010. Technological Problem Solving. (3 cr; SP–3111, 3112, 3121, 3122; A-F only)
A capstone technology education course in which students research problems relative to various technological systems and develop solution(s) to the identified problems.

BIE 5151. Technical Development: Specialized. (1-12 cr [max 12 cr]; A-F only)
Students select study and 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)
Examination of social, economic, psychological, philosophical, legislative and pedagogical foundations of industrial education in the United States. Comparison with selected foreign countries. Analysis of contemporary trends against the backdrop of early foundations.

BIE 5344. Facilities Management in Business and Industry. (3 cr; SP–3112; A-F only)
Planning, evaluating, and managing industrial education shop and lab facilities.

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

BIE 5401. Introduction to Business and Marketing Education. (3 cr)
Conceptual models of business and marketing education useful in the design and delivery of business and marketing education programs in secondary and post secondary schools, adult education settings, and business and industry.

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 Concepts. (3 cr)
Recent research and developments in teaching business concepts related to economics, business organization and management, business law, entrepreneurship, marketing, international business, information systems, accounting, risk management, and personal finance.

BIE 5457. Methods of Teaching for Business Employment. (3 cr)
Recent research and developments in teaching for business employment, including administrative support positions, accounting and information processing, marketing, sales, computer operations, and personal finance.

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 5596. Occupational Experience in Business and Industry. (1-10 cr [max 10 cr]; S-N only)
Observation and employment experiences in business and industry to developing technical or occupational competencies; 100 clock hours of supervised work experience per cr.

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

BIE 5601. Student and Trainee Assessment. (2 cr; SP–5HRD 5601; A-F only)
Development of tests of knowledge; effect and processes for programs focused on instruction of skills associated with business and industry; development of learning progress reporting systems; evaluation of instructional effectiveness.

BIE 5605. Critical Issues in Business and Industry. (3 cr)
Identification and analysis of major current issues in business and industry education.

BIE 5624. Sales Training. (3 cr; SP–5HRD 5624; A-F only)
Training competent customer service employees as part of a market strategy. Explore training strategies using the appropriate instructional methods for different situations and settings.

BIE 5625. Technical Skills Training. (3 cr; SP–5HRD 5625)
Analyze technical skills and training practices in business and industry; systems and process analysis; troubleshooting of work behavior; design methods and developing training materials.

BIE 5626. Customer Service Training. (3 cr; SP–5HRD 5626; 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; SP–5HRD 5627)
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; SP–5HRD 5628; 5011 or equiv)
Designing, creating, and presenting information using multimedia resources in business settings.

BIE 5629. Course Development for Business and Industry. (2 cr; SP–5HRD 5629; A-F only)
Identifying content, objectives, sequencing, planning lessons, methods, and media for instruction, evaluation, and feedback.

BIE 5661. Instructional Methods for Business and Industry Education. (2 cr; SP–5HRD 5661)
Basic instructional strategies and techniques in instructional settings, from schools and colleges to business and industry.

BIE 5662. Computer Training in School and Industry Settings. (3 cr; SP–5HRD 5662; 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 5993. Directed Study in Business and Industry. (1-4 cr)
In-depth individual inquiry in the content areas related to business and industry.
Central Asian Studies (CAS)

Institute of Linguistics and Asian and Slavic Languages and Literatures

College of Liberal Arts

CAS 3511. Ancient Iran. (3 cr; §MELC 3511)
Development of ancient Iranian culture under the Achaemenids and Sassanians; the impact of the Zoroastrian religion on Iranians and of Hellentism 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; §SP–§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; §SP–§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; §SP–§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; §SP–§MELC 3601)
Social, political, and religious thought of Iranian and (Soviet) Central Asian writers of fiction since the early years of the 20th century; emphasis on themes of tradition, modernization (Westernization and Sovietization), women’s rights, and secularization.

CAS 3602. Persian Poetry in Translation. (3 cr; §SP–§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, Yusuf, and Farrukhzad are among the poets whose works are examined.

CAS 5594. Directed Research. (1-10 cr; §SP–§A–F)

Chemical Engineering (ChEn)

Department of Chemical Engineering and Materials Science

Institute of Technology

ChEn 4001. Material and Energy Balances. (4 cr; QP–Chem 3302, Math 2241, Phys 1253; ChEn major; SP–Math 2223, Math 2243 or §Math 2243, Phys 1302, Chem 2302 or §Chem 2302, ChEn major; A–F only)
Description and analysis of chemical engineering systems: units and dimensions, materials balances on systems with and without chemical reactions, elementary phase equilibria and phase diagrams, energy balances. Numerical methods for typical chemical engineering problems.

ChEn 4002. Transport Phenomena. (4 cr; QP–Chem 5001, 5101, upper div ChEn major; SP–4001, upper div ChEn major; A–F only)
Fluid statics and dynamics and their applications to chemical engineering systems, conduction, and diffusion.

ChEn 4003. Heat and Mass Transfer. (4 cr; QP–Chem 5001, 5101, upper div ChEn major; SP–4002, upper div ChEn major; A–F only)
Principles and applications of heat and mass transfer in chemical engineering systems.

ChEn 4004. Separation Processes. (4 cr; QP–Chem 5003, 5101; SP–4003, 4101; A–F only)
Introduction to unit operations and mass transfer operations used in separation processes.

ChEn 4101. Chemical Engineering Thermodynamics. (4 cr; QP–Chem 5101, Chem 5534; SP–4001 or §Chem 5001, Chem 3501; A–F only)
Applications of concepts of thermodynamics and chemical equilibrium to problems in chemical engineering.

ChEn 4102. Reaction Kinetics and Reactor Engineering. (4 cr; QP–Chem 5201, 5202; SP–4101, A–F only)
Chemical equilibrium and chemical kinetics applied to chemical engineering systems. Behavior and design of chemical reactors, interaction between chemical and physical rate processes. Mathematical modeling and design of reactors.

ChEn 4401. Chemical Engineering Lab I. (3 cr; QP–Chem 5151, 5101, 5201; SP–4003, 4101; A–F only)
Principles and 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 and written presentations.

ChEn 4402. Chemical Engineering Lab II. (4 cr; QP–Chem 5401, 5003, 4004)
Principles and 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 and written presentations.

Business, Government, and Society (BGS)

Department of Strategic Management

Curtis L. Carlson School of Management

BGS 3002. Business and Society in the U.S. and World Economy. (4 cr; A–F only)
Insights into ethical constraints and imperatives, stakeholder management and role of government regulations and the public policy process in domestic and global operations; technology and legal aspects; knowledge and skills to deal with the conflicts faced domestically and globally by managers.

BGS 3040. The Environment of the International Firm. (4 cr; QP–Mgmt 3001, SP–Mgmt 3001; A–F only)
The challenges, opportunities, and problems businesses face when operating outside their domestic environment; competitive forces that have consequences for their performance and survival; broad introduction to international economics, finance, and trade issues that affect multinational business decisions and operations.

BGS 4004. Managing the Multinational Business. (4 cr; QP–BA 3040, SP–BA 3040; A–F only)
Structures and strategies of the global business including issues such as personnel, technology, and operations in host nations. Introduction to the challenges unique to the management of the multinational firm that may involve topics such as comparative culture, trade, and ethics.

Business Law (BLaw)

Department of Accounting

Curtis L. Carlson School of Management

BLaw 3058. The Law of Contracts and Agency. (4 cr; QP–40 or more cr; SP–40 or more cr; A–F only)
Origin of law, its place in and effect on society; history and development of law; system of courts; legal procedure. Law of contracts as the basic law affecting business transactions. Laws affecting the sale of goods and contracts and the law of agency.

BLaw 5078. Partnerships and Corporations. (2 cr)
Partnership and corporate forms of business entities, including methods of creating the relationships and the study of law used to regulate and control these organizations and their members.

BLaw 5088. Law of Personal Property, Real Property, and Commercial Paper. (2 cr)
Basic concepts of personal property, including rights of possessors, bailors, and finders and holders of security interests. Real property law. Transfers of ownership, control of and encumbering such interests. The law of paper (negotiable instruments).

Cell Biology and Neuroanatomy (CBN)

Department of Cell Biology and Neuroanatomy

Medical School

CBN 1027. Human Anatomy for Kinesiology Students. (3 cr; QP–Kin major or adviser approval; SP–Kin major or adviser approval; A–F only)
Introduction to human anatomy with emphasis on musculoskeletal anatomy germane to athletic training, biomechanics, exercise physiology, motor learning, and motor development.

CBN 3001. Human Anatomy. (3-4 cr; SP–Biol 1009 or equiv, soph)

ChEn 4502. Chemical Engineering Process Design II. (3 cr; QP–5501; SP–4004, 4501; A-F only) Continue review from (4501) of unit processes and operations, introducing detail for design, cost analysis, control, operability, modifications, and alternatives. Case studies and special topics.

ChEn 4593. Directed Study. (1-4 cr; QP–#; SP–#) Directed study under faculty supervision.

ChEn 4594. Directed Research. (1-4 cr; QP–#; SP–#) Independent lab research under faculty supervision.

ChEn 4595. Special Topics. (1-4 cr; QP–#; SP–#) New or experimental special topics course.

ChEn 4601. Process Control. (3 cr; QP–5301, 5104; SP–4102; A-F only) 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; QP–5601; SP–4601 or 4601; A-F only) 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 5103. Porous Media. (3 cr; QP–5103, 5202; SP–5MAE 5219; ChEn 4003; ChEn 4102; A-F only) Geometry and topology of porous materials. Fundamentals of flow, transport, and deformation. One-phase and two-phase Darcy flows, convective dispersion in microporous materials. Relations of macroscopic properties and behavior to underlying microscopic structures and mechanisms. Nanoporous materials. Examples from nature and technology.

ChEn 5104. Coating Process Fundamentals. (3 cr; QP–5103, 5202; SP–4003, 4102; A-F only) Basic process functions; viscous flow and rheology, capillarity, wetting; electrostatic effects; phase change, colloidal transformations, 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 5302. Chemical Reaction Engineering and Catalysis. (3 cr; QP–5301; 4102; A-F only) Continuous and batch reactors, heat management, catalytic reactor design, models, mass transfer in reactors, polymerization, solids processing, multiphase reactors. Fundamentals and mechanisms of catalytic reactors. Industrial examples in petroleum/chemical industries.

ChEn 5751. Biochemical Engineering. (2 cr; QP–5103 or #; SP–4002; A-F only) Chemical engineering principles applied to analysis and design of complex cellular and enzyme processes. Quantitative description of cells for production of proteins, synthesis of antibodies with mammalian cells, or degradation of toxic compounds in contaminated soil.

ChEn 5753. (Biological) Biomedical Transport Processes. (3 cr; QP–#; ME 5301, SBMEn 5310; ChEn 4003 or ME 3322) Introduction to fluid, mass, and heat transport in biological systems. Mass transfer across membranes, fluid flow in capillaries, interstitium, veins and arteries. Heat transfer in single cells and tissues. Whole organ and body heat transfer issues. Blood flow and oxygenation. Heat and mass transfer in respiratory system. Biotransport issues in artificial organs, membrane oxygenators, and drug delivery applications.

ChEn 5754. Food Processing Technology. (3 cr; QP–5103; SP–4002; A-F only) 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 estimation; 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; QP–5103 or #; SP–4002; A-F only) Principles of mass transfer in gases, liquids, biological and macromolecular solutions, gels, solids, membranes, and capillaries. Porous solids interaction between mass transfer and chemical reaction. Applications in biological, environmental, mineral, and chemical engineering systems.

Chem 1011. General Principles of Chemistry. (4 cr; QP–#; For students not passing placement exam; high school chemistry or equivalent, 2 yrs high school math; high school physics recommended; SP–For students not passing placement exam; high school chemistry or equivalent, 2 yrs high school math; high school physics recommended) Introduction to chemistry, including elementary organic chemistry. Matter and energy, atoms, compounds, solutions, chemical reactions, mole and chemical calculations, gases, liquids, solids, chemical bonding, atomic and molecular structure, acids, bases, equilibria. Problem solving emphasized. Physical and chemical properties of hydrocarbons and organic compounds containing halogens, nitrogen, or oxygen.

Chem 1021. Chemical Principles I. (4 cr; QP–primarily for science or engineering majors; 1001 or passing placement exam; SP–Primarily for science or engineering majors; 1001 or passing placement exam) Atomic theory; periodic properties of elements; thermodynamics; behavior of gases, liquids, and solids; molecular and ionic structure and bonding; organic chemistry and polymers; energy sources and environmental issues related to chemical use.

Chem 1022. Chemical Principles II. (4 cr; QP–1051 or equivalent, SP–1021 or equivalent) Chemical kinetics; radioactive decay; chemical equilibrium; 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 1032. Honors Chemistry II. (4 cr; QP–IT honors or consent of IT Honors Office, 1051-H or equivalent or pass; Honors placement exam; SP–IT honors or consent of IT Honors Office, 1021 or equivalent or pass Honors placement exam; A-F only) Advanced introductory course including chemical kinetics and reaction mechanisms; principles of chemical and physical equilibria; acids and bases; entropy and second law of thermodynamics; electrochemistry and corrosion; descriptive chemistry of the elements; coordination chemistry; biochemistry; applications of chemical principles to environmental problems. Lab emphasizes writing appropriate to scientific journals.

Chem 2094. Directed Research. (1-3 cr; QP–#; SP–#) Learning experience in areas not covered by regular courses. Individually arranged with faculty member.

Chem 2101. Introductory Analytical Chemistry Lab. (3 cr; QP–#; SP–1052; A-F only) Lab for 2101. Hands-on experience with acidimetry and complexometry, single and multicomponent analysis by spectrophotometry, analysis of mixtures by ion exchange and gas chromatography, enzymatic and rate methods.

Chem 2301. Organic Chemistry I. (3 cr; QP–#; For students not passing SP–1022 or equivalent) Important classes of organic compounds, their constitutions, configurations, and conformations and reactions; relationships between molecular structure and chemical reactivity/properties; spectroscopic characterization of organic molecules.

Chem 2302. Organic Chemistry II. (3 cr; QP–#; SP–2301) Reactions, synthesis, and spectroscopic characterization of organic compounds, organic polymers and biologically important classes of organic compounds such as lipids, carbohydrates, amino acids, peptides, proteins, and nucleic acids.

Chem 2311. Organic Lab. (3 cr; QP–#; SP–2302 or #; SP–2302) Lab techniques in synthesis, purification, and characterization of typical organic compounds.

Chem 2312. Honors Organic Lab. (3 cr; QP–#; ChemE, BioC majors only; SP–#; S-N only) Honors organic chemistry lab replacing 2311 and 4311.

Chem 2313. Honors Organic Lab. (3 cr; QP–#; Chem, ChemE, BioC majors only; SP–#; S-N only) Honors organic chemistry lab replacing 2311 and 4311.

Chem 2910. Special Topics in Chemistry. (1-6 cr; max 6 cr; QP–#; QP–#) Topics in chemistry. Opportunities and current research.

Chem 2920. Special Topics in Chemistry. (1 cr; max 6 cr; QP–#; QP–#) Topics in chemistry. Opportunities and current research.

Chem 3501. Physical Chemistry I. (3 cr; QP–#; SP–1052, Math 3251, Phys 1253; SP–1 yr college chemistry, 1 yr college physics, 1 yr college calculus) Introduction to physical chemistry as it relates to macroscopic descriptions of chemical systems. Chemical thermodynamics, phase equilibria, chemical equilibria. Phenomenological reaction kinetics. Kinetic theory of gases. Collision theory of reaction rates. Thermodynamic vs. kinetic control of chemical reactions.

Chem 3502. Physical Chemistry II. (3 cr; QP–#; SP–1052, Math 3251, Phys 1253; SP–1 yr college chemistry, 1 yr college physics, 1 yr college calculus) Introduction to microscopic descriptions of chemical systems. Elementary quantum theory. Applications to atomic and molecular structure. Molecular spectroscopy. Quantum statistical mechanics. Statistical theories of reaction rates.

Chem 4094. Directed Research. (1-3 cr; QP–#; SP–#) Learning experience in areas not covered by regular courses. Individually arranged with faculty member.

Chem 4101. Intermediate Analytical Chemistry Lecture. (3 cr; QP–#; SP–1052, 5313, 5501 or 5534; SP–2101, 2111, 3501; A-F only) Basic electronic, optical, and computer technologies employed in design of chemical instrumentation. Advanced topics in spectroscopy (e.g., FT-nmr, FT-IR, atomic absorption/emission); electrochemistry; mass spectrometry.

For definitions of course numbers, symbols, and abbreviations, see inside back cover.
Chem 4111. Intermediate Analytical Chemistry Lab. (2 cr; QS-3133, chemistry major; SP-4101, chemistry major; A-F only) Instrumental techniques, including spectrophotometric methods, electrochemical methods, and analysis based on separation. Emphasizes use of computers in data collection and reduction.

Chem 4121. Process Analytical Chemistry. (3 cr; QS-3202, 3501, 5334, 5335, chemical engineering major; SP-2302, 2311, 3501, chemical engineering major; A-F only) Strategies and techniques for analysis. Use of modern instruments, including spectrophotometry, chromatography and electrochemistry.


Chem 4511. Advanced Physical Chemistry Lab. (2 cr; QS-5501 or 5534, 5502 or 5533, chemistry major; SP-3501-3502, chemistry major) Experiments illustrating principles and methods of thermodynamics, reaction kinetics, and quantum mechanics.

Chem 4701. Inorganic Chemistry. (3 cr; QS-5501 or 5534; SP-3501 or 3502 or 3530) 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 4711. Advanced Inorganic Chemistry Lab. (2 cr; QS-5701 or chem major; SP-4701 or 4701, chem major; A-F only) Lab experiments in inorganic and organometallic chemistry illustrating synthetic and spectroscopic techniques.


Chem 5201. Solid State Chemistry. (4 cr; QS-3301, 5501 or 5534 or # SP-3501 or equiv or #) Advanced introduction to materials chemistry, basic structure of crystalline solids and fundamentals of crystallography and X-ray diffraction. Close packing applied to metals, covalent/ionic solids, and molecular crystals. Methods of synthesis of solid state compounds. Characterization techniques. Selected physical properties of materials.

Chem 5221. Introduction to Polymer Chemistry. (4 cr; QS-3302, 5502 or # SP-2302, 3502 or #) Introduction to polymer chemistry. Condensation, radical, ionic, emulsion, ring-opening, and metal-catalyzed polymerizations. Chain conformation, solution thermodynamics, molecular weight characterization, physical properties.

Chem 5223. Polymer Laboratory. (2 cr; QS-5610 or SP-5221 or 6211 or #) Synthesis, characterization, and physical properties of polymers. Free radical, condensation, emulsion, and anionic polymerization; infrared spectroscopy and gel permeation chromatography; viscoelasticity, rubber elasticity, and crystallization.
Child Psychology (CPsy)

Institute of Child Development

College of Education and Human Development

CPsy 2301. Introductory Child Psychology. (4 cr; QP–4 cr intro psychology; SP–4 cr intro psychology)
Introduction to the science of child behavior; review of theory and research.

CPsy 3301. Introductory Child Psychology for Social Sciences. (4 cr)
The science of child behavior; review of theory and research. Designed for majors in psychology, sociology, and related disciplines; not suggested for child psychology majors.

CPsy 3308. Introduction to Research Methods in Child Psychology. (4 cr; QP–1301, Psy 1001; SP–2301, Psy 1001; A-F only)
Techniques used in the study of child development; emphasis on collection, organization, and analysis of data.

CPsy 3360. Child Psychology Honors Seminar. (2 cr; QP–CPsy honors student; SP–CPsy honors student; A-F only)
Acquaints students with the various research projects and activities in the Institute for Child Development and in related departments. Faculty are invited to discuss their research projects with seminar participants.

CPsy 4302. Infant Development. (4 cr; QP–1301 or #; SP–2301 or # A-F only)
Perceptual, motor, emotional, social, and cognitive development during the first two years of life; the developing infant in his or her social and physical environment.

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

CPsy 4310. Special Topics in Child Development. (2-4 cr [max 12 cr]; QP–1301; SP–Psy 1001)
Selected topics in child development are examined in depth; topics and cr vary.

CPsy 4311. Behavioral and Emotional Problems of Children. (4 cr; QP–1301 or equiv; SP–Intro psychology; A-F only)
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 4313. Developmental Disabilities. (4 cr; QP–1301 or equiv; SP–Psy 1001)
Surveys all areas of exceptionality: mental, hearing, vision, physical and speech and language handicaps; learning disabilities; autism; emotional and behavior disorders; and giftedness.

CPsy 4329. Biological Foundations of Development. (4 cr; QP–1301 or equiv; SP–2301 or equiv; A-F only)
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; QP–1301, Psy 1001; SP–2301, Psy 1001; A-F only)
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 4334. Children, Youth in Society. (4 cr; QP–1301; SP–2301; A-F only)
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 4336. Development and Interpersonal Relations. (4 cr; QP–1301, 3331/5331; SP–2301 or equiv, 4331, A-F only)
Processes and functions of interactions with parents and peers; analysis of theory and research on developmental changes and influences.

CPsy 4341. Perceptual Development. (4 cr; QP–1301; SP–2301)
Perceptual learning and the development of sensory and perceptual processes.

CPsy 4343. Cognitive Development. (4 cr; QP–1301; SP–2301; A-F only)
Cognitive processes; relevant theory, research literature, and methodology.

CPsy 4345. Language Development and Communication. (4 cr; QP–1301; SP–2301; A-F only)
Structure and function of language; factors influencing development; methodological problems, language scales, theories.

CPsy 4993. Directed Instruction in Child Psychology. (1-4 cr [max 4 cr]; QP–4 cr child psychology; SP–4 cr CPsy)
Students serve as teaching assistants in courses with the instructor’s permission. Peer advising opportunities are also available for one cr or more per semester.

CPsy 4994. Directed Research in Child Psychology. (1-4 cr [max 4 cr]; QP–4 cr CPsy; SP–4 cr CPsy)
Individual empirical investigation. Undergraduates contribute significantly in the planning and implementing of scientific studies while gaining experience and expertise in the methodology of research.

CPsy 4996. Field Study in Child Psychology. (1-4 cr [max 4 cr]; QP–4 cr CPsy; SP–4 cr CPsy; S-N only)
Independent reading varies depending on student’s specific area of interest. Students receive cr while interning in the metropolitan area.

Chinese (Chn)

Institute of Linguistics and Asian and Slavic Languages and Literatures

College of Liberal Arts

Chn 1011. Beginning Modern Chinese. (5 cr)
Speaking and reading modern standard Chinese through structured practice.

Chn 1012. Beginning Modern Chinese. (5 cr; SP–1011 or equiv or #)
Speaking and reading of modern standard Chinese through structured practice.

Chn 1015. Accelerated Beginning Modern Chinese. (5 cr; SP–Dialect background or prior experience)
Same content as Chn 1011-1012 concentrating on pronunciation and Chinese characters. For students with dialect background or prior experience.

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

Chn 3022. Intermediate Modern Chinese. (5 cr; SP–3021)
Modern standard Chinese skills developed further through conversation and reading.

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

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

Chn 3041. Business Chinese. (4 cr; SP–3032 or equiv or #)
Reading and analysis of commercial and business texts.
Chn 3111. Introductory Classical Chinese. (4 cr; SP–3022 or equiv or #) Study of classical Chinese through reading and analysis of representative texts.


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

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


Chn 4125. Structure of Modern Chinese. (4 cr; SP–3022 or equiv or #) Analysis of the grammatical structures of modern standard Chinese.

Chn 4234. Chinese Poetry in Translation. (4 cr; SP–Knowledge of Chinese not required) Major themes, genres, and technical conventions of Chinese poetry from the classical age of poetry to the modern period.


Chn 4292. Directed Reading. (1-5 cr; SP–#,①,①) Guided individual reading or study.

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

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


Chn 5120. Topics in Chinese Linguistics. (4 cr [max 8 cr]; SP–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]; SP–3032) Studies of representative literary works from May 4, 1919 to the present.

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


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

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

Chn 5393. Directed Study. (1-5 cr [max 18 cr]; SP–#,①,①) Guided individual reading or study.

Civil Engineering (CE)

Department of Civil Engineering

Institute of Technology

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 3147. Computer Applications in Civil Engineering I. (3 cr; QP–CE sr, GeoE student, Math 1261, SP–CE, GeoE student, Math 1272; A-F only) Introduction to computer tools and methods for solving civil engineering problems. Tools include spreadsheets, AutoCad, Mathcad, and Visual Basic. Methods can include numerical integration, curve fitting, linear and nonlinear equations, and differential equations.

CE 3201. Transportation Engineering. (3 cr; QP–IT, Phys 1251; SP–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 cr; QP–IT, Math 1251; SP–IT or Math 1271; A-F only) 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 3401. Linear Structural Analysis. (3 cr; QP–AEM 3016, IT or grad student; SP–IT, AEM 3031; A-F only) Analysis of determinate/indeterminate trusses and frames and of deformation by virtual work; application of energy, slope-deflection, and moment distribution methods to indeterminate structures. Influence lines. Design.

CE 3402. Construction Materials. (3 cr; QP–AEM 3016, upper div IT; SP–AEM 3031, upper div IT; A-F only) Basic concepts of behavior mechanisms for construction materials such as concrete, metals, asphalt, plastics, and wood. Standard specifications for material properties. Techniques for testing.


CE 3502. Fluid Mechanics. (4 cr; QP–Math 2261, AEM 1015 or AEM 3016, IT or WPS major; SP–Math 2243, AEM 3015 or AEM 3021, IT or Forestry major; A-F only) Fluid statics and dynamics. Kinematics of fluid flow, equations of motion, pressure-velocity relationships, viscous effects, boundary layers. Momentum and energy equations, lift and drag. Flow in pipes and pipe systems. Hydraulic machinery. Fluid measurements.

CE 4101. Project Management. (3 cr; QP–Upper div IT; SP–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 4102. Capstone Design. (3 cr; QP–CE sr; SP–CE sr; A-F only) Teams formulate and 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; QP–Upper div IT or grad student; SP–Upper div IT) “Systems” approach to problems. Operations research—decision engineering, 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; QP–Math 3251, Math 3252, CE or upper div GeoE 3-3101, Math 2243, Math 2263, CE or upper div GeoE 3-A-F only) 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]; QP–#; SP–#) 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]; QP–#; SP–#) 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. (4 cr; QP–Upper div CE, #; SP–Upper div CE, approval of department co-op director; S-N only) Formal written report of work during six-month professional assignment.

CE 4201. Highway Design. (3 cr; QP–IT or grad student, 3200 or SP–CE or upper div GeoE or grad student, 3202, 3201 or #; A-F only) Vertical and horizontal alignment, earthwork computations, highway capacity, forecast of traffic volume demand, impact of vehicle type on geometric design, intersection design.

CE 4231. Pavement Engineering. (3 cr; QP–3300, 5603, IT or grad student; SP–3201, 3300, 3402, upper div IT or #) Concepts and principles in rigid and flexible pavement design. Traffic loads, soil considerations, and material characteristics for highway and airfield pavement design.

CE 4232. Cemented Materials. (3 cr; QP–5603, upper div IT or grad student; SP–3402, upper div IT or grad student or #) Characteristics of and lab testing for mineral aggregates: cement, mortar, fresh/hardened concrete, and asphalt-cement mixtures. Construction and long-term performance of mixtures.

CE 4301. Soil Mechanics II. (3 cr; QP–3300, upper div IT or grad student; SP–3301, GeoE 3301, upper div IT or #; A-F only) Traction and stress, Mohr-Coulomb failure criterion. Experiments on strength and angle of internal friction.
Earth pressure theories; rigid and flexible retaining walls. Bearing capacity of shallow foundations. Stability of slopes.

CE 4311. Rock Mechanics II. (3 cr; CE 4301, 4302, or GeoE 5302, 5303 required; or SP-331, 332, 333, upper div IT or grad student in IT major or A-F only)

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 4351. Groundwater Mechanics. (3 cr; SP-3040, IT or grad student or SP-3502, upper div IT or grad student or A-F only)


CE 4352. Groundwater Modeling. (3 cr; SP-3045, IT or grad student or SP-3502, upper div IT or grad student or A-F only)

Analytical 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. (3 cr; SP-3500, 3502, upper div IT or grad student; SP-Upper div IT or grad student, C or better in 3402/3400, A-F only)

Limit-state design. Steel: tension, compression, flexure, combined compression and flexure, connections. Concrete: beams in flexure and shear, one-way slabs, T-beams, development length, serviceability.

CE 4411. Matrix Structural Analysis. (3 cr; SP-3500, upper div IT or grad student; SP-3401, upper div IT or grad student or A-F only)

Analysis of linear structural systems by matrix methods, stiffness and flexibility methods. Introduction to computerized structural analysis of trusses and frames, including coding in a programming language.

CE 4412. Reinforced Concrete Design II. (3 cr; SP-3501, 3502, upper div IT or grad student; SP-Upper div IT or grad student, C or better in 4401 or A-F only)

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; SP-5610, IT or grad student; SP-Upper div IT or grad student, C or better in 4401 or #4411 recommended; A-F only)

Design of steel and composite steel/concrete structures, including multistory frames and plate-girders bridges. Beam-columns, torsion, connections, frames.

CE 4501. Hydrologic Design. (4 cr; SP-3400, IT or grad student or SP-3502, A-F only)


CE 4502. Water and Wastewater Treatment. (3 cr; SP-3400, Chem 1025, IT or grad student or SP-3501; A-F only)

Classical Civilization (ClCv)

Department of Classical and Near Eastern Studies
College of Liberal Arts

ClCv 3201. The Olympic Games. (3 cr)
The Olympic Games (776 B.C. to A.D. 338) and other ancient athletic festivals, including those for women participants. Greek art and literature serve as basic sources. Comparisons are made with modern athletic events.

ClCv 3340. Practicum in Archaeological Field and Computer Techniques. (3 cr; SP–ClCv major or #; one course in ancient art and archaeology)
Methods used for excavation of Old and New World sites. Meets at archaeometry/computer lab for part of the semester and at a selected site in Minnesota for two-day-long sessions for nine to ten weeks.

ClCv 3510. Great Books. (3 cr; max 9 cr; SP–jr or sr or #)
Intensive study of major works of classical antiquity and later (written in or translated into English), related by kind, theme, style, or perspective. Sometimes including works from non-Western cultures.

ClCv 3711. Classics of Literary Criticism. (3 cr; SP–1 course in literature, 2nd course in literature or philosophy or #)
Principles of criticism as expounded and employed in major critical works by writers such as Plato, Aristotle, Horace, Longinus, Sir Philip Sidney, John Dryden, Samuel Johnson, David Hume, William Wordsworth, Samuel Taylor Coleridge, and T. S. Eliot.

ClCv 3940. Preseminar: Classical Traditions in Western Culture. (3-4 cr; max 6 cr; SP–ClCv major or #)
The nature of Greco-Roman classical traditions manifested in various cultural spheres: language and literature, fine arts, history, science, philosophy, theology, and other disciplines; the political, social, educational, and religious life of society. The perspective, scope, breadth, and depth of the course will vary.

ClCv 3950. Topics in Classical Civilization. (3-4 cr; max 9 cr)
Topics specified in the Class Schedule.

ClCv 3993. Directed Studies in Classical Civilization. (1-4 cr)

ClCv 3994. Directed Research in Classical Civilization. (1-4 cr)

ClCv 3996. Directed Instruction in Classical Civilization. (1-4 cr)

Classics (Clas)

Department of Classical and Near Eastern Studies
College of Liberal Arts

Clas 1001. Ancient Greece: 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: Athens and Democracy. (3 cr)
The emergence of democracy in the shadows of two brutal wars; one foreign, one civil. Reflections on democracy, war, and empire through the lens of tragedy, comedy, and 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.

Clas 1006. Ancient Rome: The Sins of the Emperors. (3 cr)
The Roman Empire; “silver age” of Latin literature and rise of Christianity; art and architecture.

Clas 1023. Late Antiquity: The Christian Revolution. (3 cr)
Change and continuity in Roman Empire from its 2nd-century zenith through 3rd-century crisis to the first Christian emperor (A.D. 306 to 337) and beyond. Replacement of classical paganism by Christianity. Beginnings of monasticism. Superpower relations between Roman and Persian Empires. Meets with 3023.

Clas 1024. Late Antiquity: Pagans, Bishops, and Barbarians. (3 cr; SP–3024)
Cultural diversity (A.D. 363 to circa A.D. 500). Replacement of the Roman Empire in Western Europe by barbarian kingdoms, consolidation of Constantinople as capital in the East. Literature, art, and 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 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 and 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 1118.

Clas 1142. Honors Course: Greek and Roman Mythology. (4 cr; SP–Honors student or #)
Introduction to the stories and the study of Greek and Roman mythology.

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 1182. Honors Course: Jesus in History. (4 cr; SP–Undergrad honors status)
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 1082.

Clas 1201. The Olympic Games. (3 cr)
Surveys the Olympic Games (776 B.C. to A.D. 338) and other ancient athletic festivals, including those for women participants. Greek art and literature serve as basic sources. Comparisons are made with modern athletic events.

Clas 3001. 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. Late Antiquity: The Christian Revolution. (3 cr; SP–1023)
Change and continuity in Roman Empire from its 2nd-century zenith through 3rd-century crisis to the first Christian emperor (306 to 337 A.D.) and beyond. Replacement of classical paganism by Christianity. Beginnings of monasticism. Superpower relations between Roman and Persian Empires. Meets with 1023.

Clas 3024. Late Antiquity: Pagans, Bishops, and Barbarians. (3 cr; SP–1024)
Cultural diversity (A.D. 363 to circa 500 A.D.). Replacement of the Roman Empire in Western Europe by barbarian kingdoms, consolidation of Constantinople as capital in the East. Literature, art, and thought resulting from new dominance of Christianity, particularly Augustine of Hippo. Meets with 1024.

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 3071. Greek and Hellenistic Religions. (3 cr)
Greek religion from the Bronze Age to Hellenistic times. Sources include literature, art, and archaeology. Homer and Olympian deities; ritual performance, prayer and sacrifice; temple architecture; death and the afterlife; mystery cults; philosophical religion; Near Eastern salvation religions.

Clas 3072. The New Testament. (3 cr)

Clas 3073. Roman Religion and Early Christianity. (3 cr)

Clas 3081. Classical Epic in Translation. (3 cr; SP–5081)
Homer’s Iliad and Odyssey; Virgil’s Aeneid; cultural context of epic; development of the hero; epic style; poetics of epic.

Clas 3082. Greek Tragedy in Translation. (3 cr)
Origins of tragedy; ancient theatres; selected plays of Aeschylus, Sophocles and Euripides.

Clas 3083. Ancient Comedy. (3 cr)
Greek and Roman comic drama; Aristophanes, Menander, Plautus, Terence, etc.

Clas 3088. Archaeology in Biblical Lands I: Old Testament Period. (3 cr)

Clas 3142. Art of Egypt. (4 cr)
Arts and architecture of Egypt from prehistoric times to the emergence of Pharaonic Egypt, with emphases on the elements of continuity and of change that have shaped Egyptian culture.

Clas 3145. Advanced Greek and Roman Mythology. (3 cr; SP–1042 or #)
Study of the different theoretical approaches to Greek and Roman mythology.

Clas 3152. Art and Archaeology of Ancient Greece. (4 cr)
Introduction to the civilization of ancient Greece as revealed through art and material culture. Case studies of selected monuments and sites.

Clas 3162. Roman Art and Archaeology. (4 cr)
Introduction to the art and material culture of the Roman World: origin, change and continuity, “progress” or “decay” in the later Empire, and its legacy to the modern world.

Clas 3171. Honors Course: Greek and Hellenistic Religions. (4 cr)
Greek religion from the Bronze Age to Hellenistic times. Sources include literature, art, archaeology. Homer and Olympian deities; ritual performance; prayer and sacrifice; temple architecture; death and the afterlife; mystery cults; philosophical religion; Near Eastern salvation religions. Meets with 3071. Honors students also meet weekly for recitation.

Early Jesus movement in its cultural and historical setting: origins in Judaism; traditions about Jesus. Apostolic legend; controversies and interpreters. Questions of authority, religious practice, and structure; emergence of the canon of scripture. Contemporary methods of New Testament study; biblical writings as history and narrative. Meets with 3072. Honors students meet weekly for recitation section.

Clas 3173. Honors Course: Roman Religion and Early Christianity. (4 cr)

Clas 3080. New Testament Proseminar. (3 cr; SP–1082 or 3072 or equiv)
Study of some specific aspect of the New Testament and related literature. The class is organized as a discussion seminar. Topics specified in the Class Schedule.

Clas 3081. Classical Epic in Translation. (3 cr; SP–3081)
Homer’s Iliad and Odyssey. Virgil’s Aeneid; cultural context of epic; development of the hero; epic style; poeties of epic.

Clas 3082. Greek Tragedy in Translation. (3 cr; SP–3082)
Origins of tragedy; ancient theatres; selected plays of Aeschylus, Sophocles and Euripides.

Clas 3083. Ancient Comedy. (3 cr; SP–3083)
Greek and Roman comic drama; Aristophanes, Menander, Plautus, Terence, etc. Meets with 3083.

Clas 3085. Greek Philosophy: The Pre-Socratics to Plato. (3 cr)
Origins of tragedy; ancient theatres; selected plays of Aeschylus, Sophocles and Euripides.

Clas 3088. Archaeology in Biblical Lands I: Old Testament Period. (3 cr; SP–3088)


Clas 5030. Hellenistic and Early Roman Art and Archaeology. (3 cr; SP–Clas/ArtH 3008, jr or #)
Sculpture, architecture, painting, and topography in developing centers of Hellenistic culture in eastern Mediterranean and in Etruscan and Roman towns from 400 B.C. to the beginnings of the Roman Empire.

Clas 5108. Greek Architecture. (3 cr; SP–Clas/ArtH 3008, jr or #)
Geometric through classical examples of religious and secular architecture and their setting at archaeological sites in Greece, Asia Minor and Italy.

Clas 5111. Prehistoric Art and Archaeology of Greece. (3 cr; SP–JR; one Greek art or archaeology course or #)
Artistic and architectural forms of Neolithic period in Greek area and Cycladic, Minoan, and Mycenaean cultures. Aims and methods of modern field archaeology; the record of human habitation in the Aegean area. Archaeological evidence as a basis for historical reconstruction.

Clas 5112. Archaic and Classical Greek Art. (3 cr; SP–JR; Clas/ArtH 5111)
Sculpture, painting, architecture and minor arts in Greek lands from the 9th through 5th centuries B.C. Examination of material remains of Greek culture; archaeological problems such as identifying and dating buildings; analysis of methods and techniques. Emphasis on Periklean Athens.

Clas 5120. Field Research in Archaeology. (3 cr; SP–#)
Field excavation, survey, and research at archaeological sites in the Mediterranean area. Techniques of excavation and exploration; interpretation of archaeological materials.

Clas 5145. Advanced Greek and Roman Mythology. (3 cr; SP–3145; 1042 or #)
Study of the different theoretical approaches to Greek and Roman mythology. Meets with 3145.

Clas 5172. House, Villa, Tomb: Roman Art in the Private Sphere. (3 cr; SP–One intro art history course or #)
The architecture, painting and sculpture of urban houses, country estates, and tombs in the Roman World. Relationships between public and private spheres, and literary and physical evidence; usefulness of the physical evidence in illuminating gender roles.

Clas 5182. Art and the State: Public Art in the Roman Empire. (3 cr; SP–One 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.

Clas 5252. History of Early Christian Art in Context. (3-4 cr; SP–One 3xx intro art history 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.

Clas 5340. Practicum in Archaeological Field and Computer Techniques. (3 cr; SP–3340; CIcv major or # or one course in ancient art and archaeology)
Students learn survey techniques and methods used for excavation of Old and New World sites. Meets at archaeometry/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. (3 cr; SP–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; SP–3940, two literature courses or #)

Clas 5950. Topics in Classical Literature. (3 cr; SP–3950)
Topics specified in Class Schedule. Meets with 3950.

Clas 5993. Directed Studies. (1-4 cr; SP–#)
Guided individual reading or study.

Clas 5994. Directed Research. (1-12 cr; SP–#)
Guided individual reading or study.
Clinical Laboratory Science (CLS)

Department of Laboratory Medicine and Pathology
Medical School

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

CLS 5065. Introduction to Clinical Immunohematology Laboratory. (2 cr; SP–A-F only)
Exercises illustrating basic 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; SP–A-F)
Assignment on an individual basis to one of a wide variety of special areas of experience in the clinical laboratory.

CLS 5100. Virology, Mycology, and Parasitology for Medical Technologists. (2 cr; SP–One microbiology course with lab and one biochemistry course; A-F only)
Basic aspects of laboratory diagnosis of viral, fungal, and parasitic infections.

CLS 5102. Principles of Diagnostic Microbiology. (4 cr; SP–One microbiology course with lab; one biochemistry course; A-F only)
Current techniques used in the laboratory diagnosis of infectious disease; isolation and identification of bacteria and yeasts; antimicrobial susceptibility testing.

CLS 5120. Seminar: Clinical Laboratory Science. (1 cr; max 3 cr; S-N only)
Review and discussion of current literature; presentation and discussion of research.

CLS 5125. Practicum Teaching. (1-2 cr; SP–A-F only)
Supervised experience in teaching; development of skills in effective use of instructional materials, tests, and measurements.

CLS 5127. Introduction to Management and Education I. (1 cr; SP–A-F only)
Basic concepts in management and education.

CLS 5128. Introduction to Management and Education II. (1 cr; SP–S-P; MedT 4127; A-F only)
Basic concepts in management and education.

CLS 5129. Elements of Laboratory Administration. (2 cr; SP–A-F only)
Introduction to laboratory administration. Leadership styles, employee selection and evaluation, communications, motivation, morale, discipline, job descriptions, record keeping, budgets, cost accounting, purchasing, product evaluation, laboratory safety, labor relations, and governmental regulations.

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

CLS 5135. Advanced Clinical Microbiology. (3 cr; SP–A-F)
Observation, study, and practice in special problems, advanced techniques, and methodology in clinical microbiology.

CLS 5140. Techniques for Teaching. (2 cr; SP–A-F only)
Development of objectives, classroom activities, and evaluation criteria for medical technology education.

CLS 5155. Advanced Clinical Hematology. (3 cr; SP–A-F)
Observation, study, and practice in special problems, advanced techniques, and methodology in clinical hematology.

CLS 5165. Advanced Clinical Immunohematology. (3 cr; SP–A-F)
Observation, study, and practice in special problems, advanced techniques, and methodology in clinical immunohematology.

CLS 5175. Advanced Clinical Chemistry. (3 cr; SP–A-F)
Observation, study, and practice in special problems, advanced techniques, and methodology in clinical chemistry.

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

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

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

CLS 5310. Clinical Chemistry I: Lecture. (2 cr; SP–One organic chemistry course with lab; one biochemistry course; A-F only)
Principles and theory of clinical chemistry to assess renal and metabolic disease/dysfunction, electrolyte balance, and acid-base balance. Introduction to principles and processes for quality management in the clinical laboratory.

CLS 5311. Clinical Chemistry I: Laboratory Applications. (2 cr; SP–One organic chemistry course with lab; one biochemistry course; A-F only)
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.

CLS 5320. Clinical Chemistry II: Lecture. (2 cr; SP–5310 or MedT 4310; one organic chemistry course with lab; one biochemistry course; A-F only)
Principles and theory of clinical chemistry to assess 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; SP–One organic chemistry course with lab; one biochemistry course; MedT 4310 or CLS 5310; A-F only)
Application of clinical chemistry principles and laboratory techniques in the analysis of serum, plasma, and urine. Focus on tests to evaluate selected disorders. Development of laboratory skills and instrumentation use with emphasis on quality control and technique.

CLS 5768. Advanced Hematology. (5 cr [max 30 cr]; SP–A-F)
Practical experience in bone marrow collection from patients. Diagnosis of hematological diseases by evaluation and interpretation of cells from clinical specimens of bone marrow, peripheral blood, and, if applicable, lymph nodes.

CLS 5864. Research Seminar. (1 cr; max 10 cr; SP–S-N only)
Departmental research seminar series.

CLS 5865. Departmental Seminar. (1 cr [max 10 cr]; SP–S-N only)
Departmental clinical laboratory research seminar series.

College of Liberal Arts (CLA)

College of Liberal Arts
CLA 1001. Topics: Freshman Seminar. (1-4 cr)
Interdisciplinary seminar for freshmen. Topics vary according to instructor and will be specified in the Class Schedule.

CLA 1011. Topics: Freshman Seminar, Writing Intensive. (1-4 cr)
Interdisciplinary, writing-intensive seminar for freshmen. Topics vary according to instructor and will be specified in the Class Schedule.

College of Veterinary Medicine (CVM)

College of Veterinary Medicine

CVM 1000. Introduction to Veterinary Medicine. (1 cr; S-N only)
History of the veterinary profession, careers within the profession, and employment trends. Information about admission to the D.V.M. program. Veterinary technology programs. Open to any student with an interest in a veterinary medicine career.

Communication Disorders (CDis)

Department of Communication Disorders
College of Liberal Arts
CDis 1301. The Physics and Biology of Spoken Language. (4 cr)
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)
Processes and impairments of human oral communication. Fluency, phonology, voice disorders including laryngeectomy, cleft palate, language disorders, augmentative communication, hearing and hearing impairment. Identification and intervention strategies.

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 3304. Phonetics. (3 cr)
Phonetic analysis, transcription of speech (using IPA classification system); articulatory correlates of speech sounds. Extensive practice transcribing. Emphasis on narrow transcription of normal adult English, and special populations in Speech-Language Pathology. Non-English IPA sounds needed for special populations.
CDis 3305. Speech Science. (3 cr; QP – 5301, 5302, 5303 or SP – 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; QP – 5301, 5302 or SP – 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 3401. Communication Disorders and Cultural Diversity. (3 cr) Examination of the influence of culture on communication disorders and the role of speech-language pathologists in serving increasingly diverse populations in public schools.

CDis 3402. Major Project in Speech and Hearing Science. (3 cr; QP – Jr or Sr CDis major; SP – Jr or Sr CDis major; S-N only) Seminar for completion of the undergraduate major project paper by students in their junior or senior years.

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; QP – 5302 or SP – 3302 or #) Current concepts of the nature and treatment of disorders related to voice, resonance fluency, and swallowing. Disorders associated with dysarthria, cleft palate, laryngeectomy, stuttering, voice quality, and dysphagia.

CDis 4601. Language Disorders. (3 cr; QP – 5305 or SP – 3305 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 4801. Hearing Measurement and Disorders. (4 cr; QP – 5301, 5302 or SP – 3301, 3302 or #) Introduction to the theory, administration and interpretation of behavioral and physiological hearing tests for all age groups. Immittance, pure tone speech, otocoustic emissions, and evoked potential measures. Special emphasis on hearing screening protocols.

CDis 4802. Rehabilitative Audiology. (3 cr; QP – 5304, 5701 or SP – 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; QP – 5304 or SP – 3301 or #) Develops of oral language, listening, and speech production skills in infants and children with hearing losses. The normal developmental processes of 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; QP – SP – 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; QP – SP – 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; QP – SP – 3303, 4301, 4501 or #) Normal and disordered aspects of voice and resonance. Organic and functional voice disorders, laryngeectomy, and cleft palate. Basic information regarding the nature and clinical management of these disorders.

CDis 5503. Motor Speech Disorders. (3 cr; QP – SP – 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; QP – 5509 or SP – 3305, 4301, 4501 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; QP – SP – 3304, 4601 or #) Theory and research related to the nature, assessment, and treatment of phonological disorders in children.

CDis 5603. Communication Assessment and Intervention: Preschoolers and Persons With Severe Disabilities. (3 cr; QP – SP – 4601 or #) Assessment and intervention options for school age children with communication delays or disorders and for chronologically older individuals who experience severe developmental disabilities.

CDis 5604. Language Assessment and Intervention: School Age Children, Adolescents. (3 cr; QP – SP – 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 Disabilities in Adults. (3 cr; QP – SP – 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; QP – SP – 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; QP – 5611 or SP – 5606 or #) Operational procedures for dedicated augmentative communication devices and their use in the general education setting. 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; QP – 5701 or SP – 4801 or #) Basic audiometric battery including pure tones, speech, masking, and immittance in adults; industrial audiometry and otocoustic emissions.

CDis 5802. Hearing Aids I. (3 cr; QP – 5304, 5701 or SP – 3305, 4801 or SP – 3305 or 4801 or #) Survey of modern wearable hearing aids including hearing screening protocols, etiology of hearing loss, audiologic considerations, hearing loss and functional limitations, and management of hearing loss in adults, including aphasia, right-hemisphere syndrome, traumatic brain injury, and dementia. Consideration of neurologic substrates, assessment and diagnosis, and clinical intervention.

CDis 5803. Hearing Loss in Children: Diagnosis. (3 cr; QP – 5701 or SP – 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 care management with children and families.

CDis 5810. Laboratory Module in Audiology. (1 cr) Intensive study of clinical methods in audiology. Designed to supplement didactic courses in the audiology curriculum; enhance skills through laboratory study individually or in small groups.

CDis 5900. Topics: Communication Disorders. (1-4 cr) Study of issues relevant to the field of communication sciences and disorders. Topics listed in Communication Disorders office.

CDis 5993. Directed Study. (1-12 cr; max 18 cr) QP – SP – Directed readings and preparation of reports on selected topics.

Comparative Literature (CLit)

Department of Cultural Studies/Comparative Literature

College of Liberal Arts

CLit 5331. The Discourse of the Novel. (3 cr; §CSCL 5331) Comparative study of the novel, 18th century to present. Its relations to ordinary language practices, emergent reading publics, technologies of cultural dissemination, problems of subjectivity, and its role in articulating international cultural relations.

CLit 5555. Introduction to Semiotics. (3 cr; §CSCL 5555) Problems of the nature of the sign; sign function; sign production; signifying systems as articulated in philosophy, linguistics, anthropology, psychoanalysis, and art theory. Application of semiotics to various signifying practices (literature, cinema, daily life).

CLit 5751. Basic Concepts of Cinema. (4 cr; §CSDS 5751, §CSCL 5751) Examination of the cinema as an object of theoretical and historical analysis. Emphasis on the concepts that have emerged to radically transform the scope and aim of film analysis since the 1960s. Readings of filmic and theoretical texts.

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; #; SP – Guided individual reading and study.

For definitions of course numbers, symbols, and abbreviations, see inside back cover. 311
CSci 2101. Social, Legal, and Ethical Issues in Computing. (3 cr; QP—At least soph; SP—At least sojrh or §)
Impact of computers on society. Computer science perspective of ethical, legal, social, philosophical, political, and economic aspects of computing.

CSci 3970. Industrial Student Co-op Assignment. (2 cr; max 8 cr; QP—CSci, in coop program; SP—CSci, in coop program; §)
Industrial work assignment in a co-op program involving advanced computer technology. Reviewed by a faculty member. Grade based on final written report covering the work assignment.

CSci 3980. Undergraduate Colloquium. (1 cr; max 2 cr; QP—Upper div CSci; can be repeated for cr; SP—Upper div CSci; can be repeated for cr)
Current computing trends and hot topics; industrial and career related topics; research topics; research presentations; and relate research opportunities; graduate school options.

CSci 4011. Formal Languages and Automata Theory. (4 cr; QP—3311, 3321; SP—1902, 2011 or § or cr for grads in CSci)
Logical and mathematical foundations of Computer Science. Theoretical models and their applications. Formal languages, models of computation, computability, undecidability, computational complexity. Regular expressions, grammars, parsing, interpreters, and compilers.

CSci 4041. Algorithms and Data Structures. (4 cr; QP—3311 and 3321; SP—1902 and 2011 or § or cr for grads in CSci)
Rigorous analysis of algorithms and their implementation. Algorithm analysis, sorting algorithms, binary trees, heaps, priority queues, heapsort, balanced binary search trees, AVL trees, hash tables and hashing, graphs, graph traversal, single source shortest path, minimum cost spanning trees.

CSci 4061. Introduction to Operating Systems. (4 cr; QP—3327; SP—2021 or § or cr for grads in CSci)
Foundations of operating systems. History and evolution of operating systems, shells, tools, memory organization, file system overview, I/O, concurrent processes, and interprocess communication.

CSci 4081. Introduction to Software Engineering. (4 cr; QP—3311, 3321; SP—1902 and 2011 or § or cr for grads in CSci; §5801)
Basic theory and practice of software engineering. Software process models, requirements/specifications, design, verification, and validation.

CSci 4921. History of Computing. (3 cr; QP—§HSSci 3321; SP—§HSSci 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 4970. Advanced Project Laboratory. (3 cr [max 9 cr]; QP—§1902; SP—Upper div CSci, 4061, § cannot be taken for grad cr)
Formulate and solve open-ended project: design, implement, interface, document, test. Team work strongly encouraged. Arranged with CSci faculty.

CSci 5103. Operating Systems. (3 cr; QP—5102; SP—4061 or §)
Conceptual foundation 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; QP—3322, 3327; SP—4011 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 5107. Computer Graphics. (3 cr; QP—3322; SP—4041 or §)
Introduction to theory and practice of graphics programming. Graphics programming fundamentals; overview of 2D graphics and algorithms, 3D modeling and rendering techniques, animation, and scientific visualization. Graphics language currently used is OpenGL.

CSci 5115. User Interface Design, Implementation and Evaluation. (3 cr; QP—5106 or 5211; 5702 recommended; SP—5106 or 5211 or § or #)
Theory, design, programming, and evaluation of interactive application interfaces. Human capabilities and limitations, interface design and engineering, prototyping and post-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; QP—5107 or 5310; SP—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 presentation, constraints). Course is built around implementation assignments and case studies of toolkits.

CSci 5131. Internet Programming. (3 cr; QP—5106 or 5211; 5702 recommended; SP—5106 or 5211 or § or #)
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; QP—5106; SP—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 knowledge.

CSci 5201. Computer Architecture. (3 cr; QP—3327; SP—2021 or §; EE 5361)
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; QP—5102; SP—4061 or §)
Fundamental concepts, principles, protocols, and applications. Layered network architectures, data link protocols, local area networks, routing protocols, congestion/flow control, emerging high-speed networks, network programming interfaces, management, security, and applications. Ethernet, ATM, TCP/IP, HTTP, and WWW. Basic knowledge of computer architecture and operating systems is recommended.

CSci 5212. Network Programming and Administration. (3 cr; QP—5211; SP—5211 or §)
Network and distributed programming concepts using C, C++, or Java on UNIX or PC platforms. TCP/IP, sockets, and RPC. Hands on experience with network components. Students plan, configure, install, diagnose, performance tune, operate, and manage state-of-the-art computer networks, interconnecting devices, and protocols.

CSci 5283. Computer Aided Design I. (3 cr; QP—3327; SP—2021 or §)
CAD for digital systems. Emphasizes VLSI. Hardware description languages, 3-D simulation, test generation.

CSci 5284. Computer Aided Design II. (3 cr; QP—3327; SP—2021 or §)

CSci 5301. Numerical Analysis. (3 cr; QP—Math 3261;
CSci 5302. Analysis of Numerical Algorithms. (3 cr; QP–SP-5301; SP-5301 (preferred) or 2031 or #)
Additional topics in numerical analysis: interpolation, approximation, extrapolation, numerical integration and differentiation, numerical solutions of ordinary differential equations.

CSci 5304. Computational Aspects of Matrix Theory. (3 cr; QP–SP–5302; SP–5302 or #)

CSci 5315. Numerical Methods for ODEs. (3 cr; QP–SP–5302 or #)

CSci 5403. Computational Complexity. (3 cr; QP–SP–5400; SP–4041 or #)
Computational models, complexity measures in each model, and related complexity classes.

CSci 5421. Advanced Algorithms and Data Structures. (3 cr; QP–SP–3322; SP–4041 or #)

CSci 5442. Computational Geometry and Applications. (3 cr; QP–SP–5421; SP–5421 or #)
Designing efficient algorithms and data structures for geometric problems; models of computation, convex hulls, geometric duality, multidimensional search, Voronoi diagrams and Delaunay triangulations, linear programming in fixed dimensions, lower bound techniques. Applications and advanced topics.

CSci 5451. Introduction to Parallel Computing: Architectures, Algorithms and Programming. (3 cr; QP–SP–3322; SP–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 parallelisms, parallel programming paradigms, message passing programming in MPI, data parallel programming in HPF, shared-address space programming in threads.

CSci 5511. Artificial Intelligence I. (3 cr; QP–SP–3311; SP–2011 or #)

CSci 5512. Artificial Intelligence II. (3 cr; QP–SP–5511; SP–5511 or #)

CSci 5521. Pattern Recognition. (3 cr; QP–SP–5301, Stat 3091; SP–5301, Stat 3021 or #)

CSci 5551. Introduction to Intelligent Robotic Systems. (3 cr; QP–SP–5511; SP–5511 or #)
Transformations, kinematics/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; QP–SP–5511; SP–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 5571. Expert Systems. (3 cr; QP–SP–5511; SP–5511 or #)
Introduction to ideas and issues of expert systems. Knowledge representation, problem-solving, search, inference techniques, theorem proving. Use of an expert system shell.

CSci 5707. Principles of Database Systems. (3 cr; QP–SP–3322; SP–4041 or #)

CSci 5708. Architecture and Implementation of Database Management Systems. (3 cr; QP–SP–5702; SP–5707 or #)

CSci 5801. Software Engineering I. (3 cr; QP–SP–5106; SP–2011, 1962 or #; 14041; SP–5102 or #)
Introduction to software engineering. Reviews and expands on 4081. Software life cycle; development models; software requirements analysis; software design, coding, and maintenance.

CSci 5802. Software Engineering II. (3 cr; QP–SP–5180; SP–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; QP–SP–5106; SP–5980 or #)
Lectures and informal discussions on current topics in CSci.

CSci 5991. Independent Study. (1-3 cr; max 9 cr; QP–SP–5106; SP–5991 or #; QP–SP–5980 or #)
May be repeated for cr; SP–5991 or # may be repeated for cr. Independent study arranged with faculty member.

CSci 5994. Directed Research. (1-3 cr; max 9 cr; QP–SP–5106; SP–5994 or #; QP–SP–5980 or #; SP–5991 or #)
May be repeated for cr; SP–5994 or # may be repeated for cr. Directed research arranged with faculty member.

CSci 5995. Directed Research. (1-3 cr; max 9 cr; QP–SP–5106; SP–5995 or #; QP–SP–5980 or #; SP–5991 or #; SP–5994 or #)
May be repeated for cr; SP–5995 or # may be repeated for cr. Directed research arranged with faculty member.

CSci 5997. Directed Research. (1-3 cr; max 9 cr; QP–SP–5106; SP–5997 or #; QP–SP–5980 or #; SP–5991 or #; SP–5994 or #; SP–5995 or #)
May be repeated for cr; SP–5997 or # may be repeated for cr. Directed research arranged with faculty member.

CSci 5999. Directed Research. (1-3 cr; max 9 cr; QP–SP–5106; SP–5999 or #; QP–SP–5980 or #; SP–5991 or #; SP–5994 or #; SP–5995 or #; SP–5997 or #; SP–5998 or #; SP–5997 or #)
May be repeated for cr; SP–5999 or # may be repeated for cr. Directed research arranged with faculty member.

Construction Management (CMgt)

University College

CMgt 4011. Construction Documents and Contracts. (2 cr)
Primarily for students in the B.C.M. program or those working in construction. Definition, interpretation, use of drawings, specifications, agreements, bidding forms, general conditions, bonds, contracts, subcontracts, and related documents.

CMgt 4012. Risk Management, Bonds, and Insurance. (2 cr)
Primarily for students in the B.C.M. program or those working in construction. Identification and evaluation of the property, liability, and financial risks of a construction project. Tools of risk control and risk financing. Review of insurance coverage, contract bonds, and underwriting factors.

CMgt 4013. Legal and Ethical Issues in Construction. (2 cr)
Primarily for students in the B.C.M. program or those working in construction. Role of construction management professional in society; broad principles of conduct, as well as specific goals to be achieved in professional performance and behavior and review of mandatory requirements.

CMgt 4021. Construction Planning and Scheduling. (2 cr)
Primarily for students in the B.C.M. program or those working in construction. Project planning, scheduling, and control. Considering and understanding alternatives. Industry techniques (e.g., critical path method) using commercial software on personal computers. Updating and analyzing project schedules.

CMgt 4022. Construction Estimating. (2 cr)
Primarily for students in the B.C.M. program or those working in construction. Purposes and uses of various kinds of estimates. Techniques for performing quantity take-off, organizing bidding process, requesting and analyzing subcontractor proposals, unit pricing, using published resources, and preparing systems-based estimates. Personal computer programs, spreadsheets, and custom applications.

CMgt 4023. Value Engineering. (2 cr)
Primarily for students in the B.C.M. program or those working in construction. Step-by-step approach 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 4030. Construction Safety and Loss Control. (2 cr)
Primarily for those in the B.C.M. program or those working in construction. Introduction to construction safety, health, and loss control. Emphasis on hazard recognition, control procedures, and management systems for measuring and evaluating loss control performances in the construction industry.

CMgt 4040. Preparation of Specifications and Technical Writing for Construction Professionals. (3 cr)
Primarily for students in the B.C.M. program or those working in construction. Step-by-step process for research, analysis, and development of written construction documentation, including bidding and contract document relationships, project manual preparation, cost evaluation of building components, and quality assurance methodology. In-depth technical writing exercises exploring levels of product research and evaluation and a variety of presentation formats.

CMgt 4193. Directed Study. (1-4 cr)
CMgt 4196. Construction Management Internship. (3 cr)
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; SP–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)
Critical theories and methods for examining texts, artistic forms, and discursive practices that reflect and produce a society’s culture. Case studies from history and the present, including examples from the visual arts, music, video, film, literature, myth, ritual, and the built environment.

CSCL 1101. Introduction to Literary Cultures. (4 cr)
The literary and cultural history defining the international field of comparative literature. Classical, renaissance, modern, and postmodern periods as decisive moments in the emergence of this field. Readings in literary, historical, and philosophical texts.

CSCL 1201. Introduction to Visual Cultures. (4 cr)
The practices of visual representation that have come to play a central role in the interdisciplinary field of cultural studies. Contexts in which these representations circulate, and the “textual systems” of these practices.

CSCL 1301. Reading Culture: Theory and Practice. (4 cr)
Modes of expression through primary works and theoretical systems. How discourse creates and contests social borders, replicates cultures, and attaches differential privilege to practices of particular historical moments and locations. Discursive persuasion and authority.

CSCL 1401. Reading Literature: Theory and Practice. (4 cr)
Introduction to comparative analysis of literature, its genres, the relation of texts to their contexts of production and reception, and the decisive turning points in the history of world literatures.

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 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 styles, “classical” and “popular,” in relation to human subjectivity and configurations of culture, ideology, and power.

CSCL 3173. 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)
Comedic forms (jokes, camp and ethnic humor, classic drama, TV sitcoms) 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 3321. 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 perception of cultural diversity.

CSCL 3331. Science and the Humanities. (3 cr)
The sciences come “over truth” and “reality,” while technology recasts the world of knowledge and work. The question of texts-as-truth also facilitates the ongoing religious attacks on science in this millennial moment.

CSCL 3361. Visions of Nature: The Natural World and Political Thought. (4 cr; EE 3361)
Theories about the organization of nature, human nature, and their significance for the development of ethics, religion, political and economic philosophy, civics, and education in Western and other civilizations. Lectures, discussions, film assignments.


CSCL 3412. Psychoanalysis and Literature Part I: The Essential Freud. (3 cr)
Theoretical writings of Sigmund Freud; basic concepts of psychoanalytic criticism; dream and interpretation; genre of the case study; Freud’s ideas concerning the constitution of culture, identity, and gender; fantasy vs. reality; psychoanalysis of the author/character/culture.

CSCL 3413. Psychoanalysis and Literature Part II: Post Freudian Criticism. (3 cr)

CSCL 3421. Culture and the Production of Modern Identity I: 1600-1750. (3 cr)
History of cultural, perceptual and conceptual changes in Western societies, 1600 to 1750, concerning new and conflicting understandings of the human imagination, subjectivity, identity, and the body; addressed through philosophy, literature, visual arts, music, pedagogical and medical treatises, and manners.

CSCL 3422. Culture and the Production of Modern Identity II: 1750-1900. (3 cr)
History of cultural, perceptual and conceptual changes in Western societies, 1750 to 1900, concerning new and conflicting understandings of the human imagination, subjectivity, identity, and the body; addressed through philosophy, literature, visual arts, music, pedagogical and medical treatises, and manners.

CSCL 3456. Sexualities—From Perversion to Diversity. (3 cr)
Historical and critical study of forms of modern sexuality (heterosexuality, homosexuality, romance, erotic domination, lynching). How discourses constitute and regulate sexuality. Materials include scientific and scholarly literature, religious documents, fiction, personal narratives, films, advertisements.

CSCL 3458. The Body and the Politics of Representation. (3 cr)
Western representations of the human body, 1500 to present. Body’s appearance as a site and sight for production of social and cultural difference (race, ethnicity, class, gender). Visual arts, literature, music, medical treatises, courtesy literature, erotica.

CSCL 3472. Gay Men and Homophobia in American Culture. (3 cr)
The historical experience of gay men, the social construction of same-sex desire in American society since 1700, studied in a broad context of cultural history and discourse, including literature and the arts, journalism, science and medicine, religion, and law.

CSCL 3631. Jewish Writers and Rebels in German, Austrian, and American Culture. (3 cr; SP–3631, §W 3631; Knowledge of German not required; cr toward major or minor requires reading in German) Investigative literary and cultural modes of writing used by Jewish writers in Germany, Austria, and America to deal with problems of identity, anti-Semitism, and assimilation. Focus on 20th century. All readings (novels, poetry, stories) in English.

CSCL 3910. Topics in Cultural Studies and Comparative Literature. (3 cr)
Topics specified in Class Schedule.

CSCL 3979. Issues in Cultural Pluralism. (3 cr)
The politics of the person: is our destiny and nature to be either king or slave (Aristotle) or are we all created equal (Jefferson)? How do we judge ourselves and others, as individuals and as groups? How do we justify our judgments and move toward greater equality?

CSCL 4990. Senior Seminar and Workshop. (3 cr [max 3 cr])
Student-defined, faculty-assisted collective research project devoted to the comparative, sociohistorical analysis of discursive practices and cultural artifacts. Limited to CSCL majors, this seminar/workshop offers an opportunity to apply skills and knowledge gained in previous classes, and to develop skills in research, critique, and presentation.

CSCL 5147. Teaching as Dialogue. (3 cr)
Teaching and the teacher are the subject. Entering into dialogue is the method. Fused with the politics of teaching, the means of entering into dialogue questions of judgment, and the idea of self-teaching as the goal of teaching.

CSCL 5154. Theoretical Constructions of Space. (3 cr)
Inquiry into theories of space drawn from various disciplines including anthropology, architecture, geography, history, landscape design, philosophy, planning, and sociology. Focus on sociopolitical interests that are served and sustained; emphasis on opportunities and implications for personal identity.

CSCL 5256. Suburbia. (3 cr)
Suburbia from origins in 18th-century England to the present. Historical changes and present challenges, especially in America. Ideology, mythology, planning, development, geography, transportation, the family. Specific sites and designs; representations in film, television, popular literature, and music.

CSCL 5301. Society, Ideology, and the Production of Art. (3 cr; CS 5301)
Recent critical theories in the relation of the arts to social and ideological forces; selected artifacts from Western culture (Renaissance to 20th century; high, popular, and mass culture). Music, visual art, literature.
CI 5111. Introduction to Elementary School Teaching. (3 cr; SP—Foundations of ed major or elem ed initial licensure)
  Curriculum organization, instruction, management, assessment, and professional decision making.

CI 5183. Applying Instructional Methods in the Elementary Classroom. (1-2 cr; SP—Foundations of ed major or elem ed initial licensure; S-N only)
  Supervised experience in elementary classrooms.

Dance (Dnce)

Department of Theatre Arts and Dance College of Liberal Arts

All ballet, modern, and jazz technique classes through day school require a placement audition except 1001, 1101, and 1201. Contact the dance program office for audition times and dates.

Dnce 1001. Modern Dance Technique 1. (1 cr)
  Expressive body movement: alignment, proproprioeptiveness, body mechanics, weight, momentum, line, and intent.

Dnce 1002. Modern Dance Technique 2. (1 cr; SP—1001, A)
  Continuation of 1001. Expressive body movement: alignment, proproprioeptiveness, body mechanics, weight, momentum, line, and intent.

Dnce 1010. Modern Dance Technique 3. (2 cr max 4 cr; SP—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 1020. Modern Dance Technique 4. (2 cr max 4 cr; SP—1010, A)
  Continuation of 1010. 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 1102. Ballet Technique 2. (1 cr; SP—1101, A)
  Continuation of 1101. Principles, basic technique, and vocabulary of ballet; barre, center, and allegro.

Dnce 1110. Ballet Technique 3. (2 cr max 4 cr; SP—1102, A)
  Continuation of ballet training. Correct placement, line and historical development; barre, center, and allegro.

Dnce 1120. Ballet Technique 4. (2 cr max 4 cr; SP—1110, A)
  Continuation 1110. Ballet training; correct placement, line and historical development; 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 1202. Jazz Technique 2. (1 cr; SP—1201, A)
  Continuation of 1201. 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; SP—1202, A)
  Jazz technique; body isolations, placement, and musicality.

Dnce 1220. Jazz Technique 4. (1 cr max 2 cr; SP—1210, A)
  Continuation of 1210. Jazz technique; body isolations, placement, and musicality.

Dnce 1301. Tap Technique 1. (1 cr)
  Learning fundamental terms, basic rhythm structures, stock steps, and standard time steps.

Dnce 1302. Tap Technique 2. (1 cr; SP—1301 or #)
  Fundamental terms, basic rhythms and syncopation, stock steps, 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, round, and grapevine; technical emphasis on footwork and partnering.

Dnce 1312. International Folk Dance 2. (1 cr; SP—1311, A)
  Continuation of 1311. Basic folk steps including the schottische, polka, waltz, and grapevine; technical emphasis on footwork and partnering.

Dnce 1321. Ballroom 1. (1 cr)
  Principles of partnering. Elementary steps of the foxtrot, waltz, swing, cha-cha, rumba, and tango.

Dnce 1322. Ballroom 2. (1 cr; SP—1321, A)
  Continuation of 1321. Elementary steps of the foxtrot, waltz, swing, cha-cha, rumba, tango, mambo, and bolero. Partnering, style, and phrasing.

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; SP—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]; SP—#)
  Topics specified in Class Schedule.

Dnce 1626. Music for Dance. (3 cr; SP—1002, 1102 or A)
  Elements of music theory, form, analysis, and history necessary for the potential dancer, choreographer, and musician to better understand each art.

Dnce 3010. Modern Dance Technique 5. (2 cr max 4 cr; SP—1202, A)
  Application of principles of space, time, and energy. Alignment, power from pelvic center, rotation/turnout, muscular tonality, joint articulation, clarity of intent, stretch, strength, and stamina.

Dnce 3020. Modern Dance Technique 6. (2 cr max 4 cr; SP—3010, A)
  Continuation of 3010. Application of principles of space, time, and energy. Alignment, power from pelvic center, rotation/turnout, muscular tonality, joint articulation, clarity of intent, stretch, strength, and stamina.

Dnce 3110. Ballet Technique 5. (2 cr max 4 cr; SP—1120, A)
  Continuation of beginning technique. Stretch, strength, balance, and muscularity; longer phrases in adagio and allegro work; more complex elevations in petit allegro; practical work is conducted in context of study of technical development of ballet.

Dnce 3120. Ballet Technique 6. (2 cr max 4 cr; SP—3110, A)
  Continuation of 3110. Ballet technique. Stretch, strength, balance, and muscularity; longer phrases in adagio and allegro work; more complex elevations in petit allegro.

Dnce 3210. Jazz Technique 5. (1 cr max 2 cr; SP—1220, A)
  Continuation of jazz technique. Rhythm structures, longer phrases and greater physical speed, attack and control.

Dnce 3220. Jazz Technique 6. (1 cr max 2 cr; SP—3210, A)
  Continuation of 3210. Jazz technique. Rhythm structures, longer phrases and greater physical speed, attack and control.

Dnce 3301. Tap Technique 3. (1 cr; SP—1302 or #)
  Tap techniques and creative development through improvisational studies.

Dnce 3302. Tap Technique 4. (1 cr; SP—3301 or #)
  Tap techniques and rhythm structures.

Dnce 3433. Articulate Body. (3 cr; SP—Dnce major or minor, A)
  Lectures and movement sessions in biodynamic considerations for optimal dance performance and metabolistic demands of dance.

For definitions of course numbers, symbols, and abbreviations, see inside back cover.
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 3500. Topics in Dance. (1-2 cr [max 10 cr]; SP–#,Δ)
Topics specified in Class Schedule.

Dnce 3601. Dance Composition 1. (3 cr; SP–1020 or Δ, 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; SP–3601 or Δ, modern dance technique course)
Movement, vocabulary in relation to theme, space, time, energy, and body parts; solo, duet, and trio forms.

Dnce 3700. Performance. (2 cr; SP–# technique course, audition, Δ)
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; SP–1401)
Major developments in Western philosophic thought on dance and dance theory from its beginnings to the present.

Dnce 4487. 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 4601. Dance Composition 3. (3 cr; SP–1020, modern dance technique course, Δ)
Continuation of movement vocabulary through improvisation, analysis of form and structure, experimentation with tone and performance persona; effects of lights/costumes/text/props/music; development of larger ensemble works.

Dnce 4602. Dance Composition 4. (3 cr; SP–4601, modern dance technique course, Δ)

Dnce 4901. Senior Seminar. (3 cr; QP–Sr, Dnce or Th major; SP–Sr, Dnce or Th major; S–N only)
Seminar for completion of the major project. Meets with Th–4901.

Dnce 5010. Modern Dance Technique 7. (3 cr [max 6 cr]; SP–3020, Δ)
Continuation of technical development. Performance range and style. Students study with various guest artists.

Dnce 5020. Modern Dance Technique 8. (3 cr [max 4 cr]; SP–5010, Δ)
Continuation 5010 and modern technique. Performance range and style. Students study with various guest artists.

Dan 1001. Beginning Danish. (4 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.).

Dan 1002. Beginning Danish. (4 cr; SP–1001)
Continues the presentation of all four language modalities (listening, reading, speaking, writing), with a proficiency emphasis. Topics include free-time activities, careers, and the Danish culture.

Dan 1003. Intermediate Danish. (4 cr; SP–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.

Dan 1004. Intermediate Danish. (4 cr; SP–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.

Dan 3011. Advanced Danish. (4 cr; SP–Passing score on GPT)
To help students achieve advanced proficiency in Danish. 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.

Dan 3012. Advanced Danish. (4 cr; SP–3011)
Discussion of novels, short stories, plays, and articles complemented by structural, stylistic, and vocabulary building exercises.

Dan 4001. Beginning Danish. (2 cr; SP–#1001, passing score on GPT in another language or grad student) 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; SP–#1002, passing score on GPT in another language or grad student) 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; SP–#1003, passing score on GPT in another language or grad student) 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; SP–#1004, passing score on GPT in another language or grad student) 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.

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 includes identification and annotation of teeth and restoration, in wax, of portions of a typodont tooth.

DH 2191. Independent Study. (1-4 cr [max 6 cr]; S–N only)
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 pathophysiology to specific organ systems and more extensively the mouth. Emphasis on the identification and management of selected oral conditions.

DH 2212. Dental Hygienist-Patient Relationship. (1 cr; A–F only)
Oral hygiene techniques implemented through communication between patient and oral health care provider. Co-therapeutic problem solving.

DH 2221. Periodontontology. (3 cr; A–F only)

DH 2222. The Dental Hygiene Care Process Clinical Application II. (1 cr; A–F only)

DH 2231. Cariology. (2 cr; A–F only)
Dental caries: etiology, pathology, and prevention.

DH 2232. 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 2235. Oral and Maxillofacial Radiology. (2 cr; A–F only)
General principles of radiology, radiation physics, dosimetry, biology, 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 techniques; biological considerations of materials used in dentistry; dental specialties.
DH 3123. The Dental Hygiene Care Process Clinical Application III. (1-4 cr; A-F only)
Dental hygiene practice planning, alternative instruments and advanced skills related to the implementation of dental hygiene care. Clinical experience in dental hygiene patient care.

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 genetics, tobacco use, 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 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 radiography; 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 anatomical variations.

3191. Independent Study. (1-4 cr [max 6 cr]; S-N only)
Individually arranged study, instruction, or research with faculty to meet student needs and interests.

DH 3221. Local Anesthesia and Pain Management. (2 cr; A-F only)

DH 3224. The Dental Hygiene Care Process Clinical Application IV. (1-4 cr; A-F only)

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 3231. Research Methods in Dental Hygiene. (3 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 4125. The Dental Hygiene Care Process Clinical Application V. (1-6 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 needs through case presentations. Discuss community service, cultural diversity, and family violence issues as well as new products, techniques, and research.

DH 4128. Oral and Maxillofacial Radiology Clinic III. (0 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 disease and content of the specialty of dental public health; public health process as related to community setting.

DH 4132. 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 hygiene students. Apply patient care skills taught in other courses. Focus is on communication skills, patient management, teamwork, collegiality, and practice philosophy.

DH 4191. Independent Study. (1-4 cr [max 6 cr]; S-N only)
Individually arranged study, instruction, or research with faculty to meet student needs and interests.

DH 4226. The Dental Hygiene Care Process Clinical Application II. (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 needs through case presentations. Discuss community service, cultural diversity, and family violence issues as well as new products, techniques, and research.

DH 4227. Advanced Dental Hygiene Clinical Experience I. (1-6 cr; S-N only)

DH 4228. Advanced Dental Hygiene Clinical Experience II. (1-6 cr; S-N only)

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 dental 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 processes.

DH 4238. Patient Management IV (PCG). (1 cr; A-F only)
Small-group, cooperative learning setting integrates dental and hygiene students. Apply patient care skills taught in other courses. Focus is on communication skills, patient management, teamwork, collegiality, and practice philosophy.

DH 4295. Information Technology. (1-4 cr)
Individual and/or group study; student(s) select courses/workshops based on individual needs and interests.

DH 4296. Special Topics. (1-4 cr)
Students select topics from current interest and continue education or other courses based on individual needs.

DH 4297. Topics in Interdisciplinary Health Care. (1-4 cr)
Individual and/or group study on selected topics related to diversity, cross-cultural health, and interdisciplinary health care.

DH 4298. Dental Hygiene Process of Care: Clinical Application. (1-4 cr)
Patient case selection, assessment, documentation, treatment planning, implementation, and evaluation of dental hygiene treatment; case presentations.

DH 4299. Selected Topics in Patient Education. (1-4 cr)
Program development and clinical application; student assesses, plans, implements, and evaluates a patient education program in a clinical setting.

DH 4300. Field/Practice Externship. (1-4 cr)
Clinical and/or community service externship completed on or off campus with diverse population.

Design, Housing, and Apparel (DHA)

Department of Design, Housing, and Apparel
College of Human Ecology

DHA 0621. Introduction to Drafting. (3 cr)
Architectural drafting practice and the use of drafting instruments. Line conventions, lettering, orthographic drawings, paraline drawing, architectural symbols, and vocabulary as related to interior design. (Independent and distance learning only.)

DHA 1101. Introduction to Design Thinking. (4 cr; A-F only)
Theories and processes that underpin design thinking. Investigate interactions between humans and their natural, social, and designed environments where purposeful design helps determine the quality of interaction; design professions; the power of design.

DHA 1171. Freshman Seminar in Design, Housing, and Apparel. (1-3 cr; SP-Fr only)
Small group seminar for freshmen only on a topic in design, housing, or apparel announced in advance.

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)
Study of basic clothing assembly from a micro to macro perspective. Can be taken in lieu of clothing construction proficiency exam.

DHA 1321. Foundations I: Drawing and Design in Two and Three Dimensions. (4 cr; QP-DHA major or pre-major; SP-DHA major or pre-major; A-F only)
Introduction to design elements and principles in the context of observational drawing. An integrative approach to two-dimensional design, three-dimensional design, and drawing gives students a broad conceptual framework for design exploration. Perceptual aspects of visual forms are emphasized.

DHA 1332. Foundations II: Color and Design in Two and Three Dimensions. (4 cr; QP-DHA major or pre-major; SP-DHA major or pre-major; A-F only)
Color theory and its application in two- and three-dimensional design introduced through lectures, demonstrations, extensive studio work, and critiques.
DHA 2213. Textile Analysis. (3 cr; A-F only)
The study of physical, chemical, and biological characteristics of fibers, yarns, textile structures and finishes, and their effect on the performance and appearance of textile products. Product categories include clothing, interior, and industrial textiles.

DHA 2214. Softline Analysis. (3 cr; QP – 3216; SP – 1201, 2213; A-F only)
Physical characteristics of garment components related to function of total garment. Laboratory problems based on methods of analysis including visual inspection of garment quality, construction techniques, costing, labor, target consumer, and fit related to function, quality, and sizing.

DHA 2221. Clothing Design Studio I. (4 cr; QP – DHA major or premajor, 1221 or pass sewing proficiency, 1323, 1326; SP – DHA major or premajor, 1201, 1221 or pass sewing proficiency; 1326; A-F only)
Introduction to theories used to solve interior design problems related to human behavior; the design process and communication skills required of the interior design profession.

DHA 2260. Interior Design Studio IV. (4 cr; QP – #; SP – DHA major, pass portfolio review; SP – DHA major, 1002 with C minimum, pass portfolio review; A-F only)
Survey of technological systems in housing with an emphasis on the consumption and conservation of natural resources and its impact on the performance and characteristics of fibers, yarns, textile structures and finishes. Focus on the integration of design, production, and marketing of garments. Emphasis on the interpretation and communication of ideas and concepts. Focus on the application of design principles and problem solving in the clothing industry. Credit/no credit option.

DHA 2311. Drawing and Illustration. (3 cr; QP – DHA major or premajor; SP – DHA major or premajor; A-F only)
Introduction to individual studio projects leading to the development of an understanding of the relationship of a two-dimensional pattern to a three-dimensional body. Emphasis on the development of conceptual design skills.

DHA 2343. Typographic Design. (3 cr; QP – DHA major, pass portfolio review; SP – DHA major, pass portfolio review; A-F only)
Introduction to the use of type in communication design. Emphasis on composition methods of text layout that enhance communication. Focus on the composition of visual information using grid structures to integrate text and image. Exploration of informational and expressive aspects of graphic design and hierarchical relationships of text elements. Investigation of methods of text layout that enhance communication.

DHA 2351. Graphic Design I: Text and Image. (3 cr; QP – 3550; DHA major, pass portfolio review; SP – 2345, DHA major, pass portfolio review; A-F only)
Introduction to the design and implementation of visual and textual communication. Credit/no credit option.

DHA 2352. Graphic Design II: Identity and Symbols. (3 cr; QP – 3351; DHA major, pass portfolio review; SP – 2345, DHA major, pass portfolio review; A-F only)
Introduction to the design and implementation of visual and textual communication. Credit/no credit option.

DHA 2353. Graphic Design III: Packaging and Display. (3 cr; QP – 3352; DHA major, pass portfolio review; SP – 2345, DHA major, pass portfolio review; A-F only)
Introduction to the design and implementation of visual and textual communication. Credit/no credit option.

DHA 2604. Interior Design Studio IV. (4 cr; QP – #; SP – DHA major, 2603 with C minimum, pass portfolio review; A-F only)
Introduction to the design and implementation of visual and textual communication. Credit/no credit option.

DHA 2612. Environmental Systems and Life Safety. (4 cr; QP – DHA major, pass portfolio review; SP – DHA major, pass portfolio review; A-F only)
Introduction to the design and implementation of visual and textual communication. Credit/no credit option.

DHA 2613. Lighting Design and Building Systems. (4 cr; QP – DHA major, pass portfolio review; SP – DHA major, pass portfolio review; A-F only)
Introduction to the design and implementation of visual and textual communication. Credit/no credit option.

DHA 2621. Computer Aided Design: Interior Design. (4 cr; QP – DHA major, pass portfolio review or SP – DHA major, pass portfolio review; A-F only)
Introduction to the design and implementation of visual and textual communication. Credit/no credit option.

DHA 317. Aesthetics of Clothing. (3 cr; QP – 3215, 3216; SP – 2213, 2214; A-F only)
Introduction to the design and implementation of visual and textual communication. Credit/no credit option.

DHA 3223. Clothing Design Studio III. (4 cr; QP – DHA major, 2311, 5218, pass portfolio review; SP – DHA major, pass portfolio review; A-F only)
Continued investigation of graphic design and packaging. Emphasis on the development of visual and sensory experiences.

DHA 3334. Graphic Design IV: Identity and Symbols. (3 cr; QP – 3351; DHA major, pass portfolio review; SP – 2345, DHA major, pass portfolio review; A-F only)
Continued investigation of graphic design and packaging. Emphasis on the development of visual and sensory experiences.

DHA 3505. Interior Design Studio V. (4 cr; QP – #; SP – DHA major, 2604 with C minimum; A-F only)
Introduction to the design and implementation of visual and textual communication. Credit/no credit option.

DHA 3606. Interior Design Studio VI. (4 cr; QP – #; SP – DHA major, 3505, 3506 with C minimum; A-F only)
Introduction to the design and implementation of visual and textual communication. Credit/no credit option.

DHA 3614. Interior Design Ethics and Professional Practice. (4 cr; QP – DHA major, pass portfolio review; SP – DHA major, 2604, pass portfolio review; A-F only)
Introduction to the design and implementation of visual and textual communication. Credit/no credit option.
DHA 4121. History of Costume. (4 cr; QP-General art history course; SP-General art history course; A-F only) Survey of the Western cultures from pre-history to present. Role of gender, race, and class with respect to changes in dress within historical moments and social contexts. Research approaches and methods in the study and interpretation of dress. 

DHA 4131. History of Visual Communication. (4 cr; QP-Intra-art history course; SP-Intra art history course; A-F only) 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; QP-Arch history course or SP-Arch history course or A-F only) 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; QP-SP-4161 or A-F only) Study of European and American interiors and furnishings including furniture, textiles, and decorative objects.

DHA 4196. Internship in DHA. (1-4 cr; QP-Completion of at least one-half of professional sequence, plan submitted and approved in advance by adviser and internship supervisor, SP-Completion of at least one-half of professional sequence, plan submitted and approved in advance by adviser and internship supervisor; written consent of faculty supervisor, SP-Internship course; A-F only) Supervised work experience relating activity in business, industry, or government to the student’s area of study. Integrative paper or project may be required.

DHA 4212. Dress, Society, and Culture. (4 cr; QP-SP-4110 or A-F only) Contemporary dress from diverse cultures within and outside the United States is analyzed using social science concepts. Course emphasizes dress as a nonverbal communication system.

DHA 4215. Quality Assurance for Softlines. (4 cr; QP-3215, 3216, SP-2213, 2214; A-F only) Quality assurance policies and objectives for softlines including apparel and other sewn products. Economics of quality, design for product effectiveness and reliability, quality specifications, conducting tests and interpreting results, inspection, acceptance sampling, and vendor relations.

DHA 4217. International Developments in Textiles and Apparel. (4 cr; QP-SP-1201; A-F only) Insight into the nature of production and labor, trade, and marketing in textile, apparel, and related goods in a global setting.

DHA 4225. Clothing Design Studio V. (4 cr; QP-DHA major, 5231; SP-DHA major, 3224; A-F only) Principles of mass production processes; market research/information and implementation; design to meet the needs of the market, production pattern making, grading, marker-making, cutting, production sewing systems, finishing, and cost analysis. Application of market research in designing a line of clothing.

DHA 4226. Clothing Design Studio VI. (4 cr; QP-DHA major, 5231; SP-DHA major, 4225; A-F only) Synthesis of clothing design work based on concepts examined in previous studio classes. Develop strategies for the public promotion of a clothing line and individual strategies for the promotion of career goals. Exhibition and portfolio presentations.

DHA 4241. Retail Promotion. (3 cr; QP-1211, Mtg 3001 or equiv; SP-1201, Mtg 3000 or equiv; A-F only) Integration of communication theory and theories of consumer behavior with the elements of retail promotion; advertising, sales promotions, point-of-purchase communications, and personal selling.

DHA 4330. Surface Fabric Design Workshop. (4 cr [max 6 cr]; A-F only) Studio experience in the development and production of surface design. Screen printing, batik, resist dying, shibori, cyanotypes, and dye transfers are included.

DHA 4334. Computer Applications II: Design for the Digital Environment. (3 cr; QP-3334 or #; DHA major, pass portfolio review; SP-2343 or #; DHA major, pass portfolio review; A-F only) Build on skills developed in DHA 2343 while focusing on design of visual communication for electronic environments. Develop skills in the use of software to manipulate and create digital images and animation. Sound and video input will be 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; QP-DHA major, pass portfolio review; #; DHA major, pass portfolio review; SP-DHA major, pass portfolio review; A-F only) Further exploration of expressive visual communication of words. Both the fundamental legibility of ‘the invisible art’ and overt expression through type will be addressed. An extended typographic project will be completed.

DHA 4350. Design Process: Materials. (3 cr [max 6 cr]; QP-DHA major, pass portfolio review; SP-DHA major, pass portfolio review; A-F only) Focus on the relationship between the material production and design problem, and its most effective solution. Develop production skills in the specified medium while gaining a sensitivity to the material’s expressive potential.

DHA 4354. Graphic Design IV: Integrative Campaign. (4 cr; QP-3352, DHA major, pass portfolio review; SP-3353, DHA major, pass portfolio review; A-F only) Focus on a multifaceted graphic communication campaign involving substantial investigation and concept development. The project will support a unified concept for an identified client that is aimed effectively at a specific market or interest group.

DHA 4355. Graphic Design Portfolio. (2 cr; QP-3353, DHA major, pass portfolio review; SP-4354, DHA major, pass portfolio review; A-F only) Preparation of a professional portfolio and discussion of professional issues.

DHA 4365. Graphic Design Senior Seminar. (4 cr; QP-3353, DHA major, pass portfolio review; SP-4354, DHA major, pass portfolio review; A-F only) This capstone class gives students the opportunity to complete a senior research and design project that demonstrates understanding and ability in the social, conceptual, and technical aspects of design.

DHA 4384. Interactive Media. (3 cr; QP-3353 or #; DHA major, pass portfolio review; SP-4354 or #; DHA major, pass portfolio review; A-F only) Design of interactive multimedia projects. Experience developing interactive presentations and electronic publishing. Software includes hypermedia, scripting, video and sound editing, animation, digital output.

DHA 4461. Multifamily Housing Management. (4 cr; QP-3463, SP-2401, 2402, 2463 or #; A-F only) Study historical perspectives, current status of multifamily housing, management approaches, user perspectives and psycho-social impacts of housing and community design, basics of management finance and maintenance for multifamily buildings.

DHA 4465. Housing in World Perspective. (3 cr; QP-3463, SP-2401, 2463 or #; A-F only) Study of housing in the historical and cultural contexts of other countries and regions. Concepts and theories of housing provision in developing societies.

DHA 4482. Residential Environmental Quality. (3 cr; QP-1401 or SP-2402 or #; A-F only) 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; QP-SP-DHA major, 3066 with C minimum, 3614; A-F only) Advanced studio course that emphasizes sense of place and the contribution of artifacts to the creation of interior environments. Focus is on historic precedents, adaptive reuse, renovation, and universal design projects.

DHA 4608. Interior Design Thesis. (6 cr; QP-SP-DHA major; 4607 with C minimum; A-F only) Discussion of current issues that affect interior design research and practice. Study of research methods used for programming and solutions, and development of a comprehensive independent interior design project generated from research conducted by student.

DHA 5111. History of Decorative Arts. (4 cr; SP-General art history survey course or #; SP-General art history survey course or A-F only) 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]; QP-On topic, check with dept; SP-Depends on topic, check with dept; A-F only) In-depth investigation of a single specific topic, announced in advance.

DHA 5193. Directed Study in Design, Housing, and Apparel. (1-4 cr; QP-SP-A-F only) Independent study in design, housing, and apparel under tutorial guidance.

DHA 5196. Field Study: National/International. (1-10 cr [max 10 cr]; QP-SP-A-F only) Faculty-directed field study in a national or international setting.

DHA 5216. Textile and Apparel Consumer. (3 cr; QP-3216 or SP-1201, 2213 or #; A-F only) Consumer actions concerning textile/clothing products for home (and other physical interiors) and personal use as a part of daily living in different social, economic, and cultural settings, nationally and internationally.

DHA 5381. Digital Illustration. (3 cr; QP-DHA major, 5334; SP-DHA major, 4334; A-F only) Focus on the integration of design knowledge with computer applications. Experience using raster- and vector-based programs for illustration.

DHA 5382. Digital Sound and Video. (3 cr; QP-DHA major, 5334 or #; SP-DHA major, 4334 or A-F only) Design solutions involving time-based media emphasizing sound and video. Explore these two components and their creative processes, and as well as electronic publishing via the Internet.

DHA 5383. Modeling and Animation. (3 cr; QP-DHA major, 5334 or #; SP-DHA major, 4334 or A-F only) Investigation of three dimensional modeling and animation in effective communication and electronic design.

DHA 5385. Internet-Based Media. (3 cr; QP-DHA major, 5334 or #; SP-DHA major, 4334 or A-F only) Design interactive presentations using computers with varying operating systems for presentation and distribution via the Internet and the World Wide Web. Focus on electronic publishing on the internet and the development of internet-based communication.

DHA 5388. Design Planning, Analysis, and Evaluation. (3 cr; QP-DHA major, 3335 or grad student or SP-DHA major, 4334 or grad student or A-F only) Experience in design planning, research, and development. Emphasis on preliminary research including theoretical, applied, and legal aspects of design projects and processes. A variety of planning and developmental models will be used. Design prototyping, testing, and analysis is included.
DHA 5399. Theory of Electronic Design. (3 cr; QP–DHA major, sr or grad student or #; SP–DHA major, sr or grad student or #, A-F only) Investigate electronic documents, media, and methods, and their relationship to communication and design. Emphasis on the development of a new understanding of the communication of information in a visual, dynamic, hyper- and multimedia-based environment.

DHA 5463. Housing Policy. (3 cr; OP–3463; SP–2401, 2463 or #, A-F only) Explore the institutional and environmental settings that make up housing policy in the United States. Examine 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 5467. Housing and the Social Environment. (3 cr; OP–3400 or SP–2401 or #, A-F only) 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; OP–1400 or SP–2401 or #, A-F only) 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; OP–3463; SP–2401, 2463 or #, A-F only) Housing issues in nonmetropolitan areas. The housing concerns of specific rural populations (e.g., low-income elderly, inexpensive 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. (4 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. (4 cr; SP–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. (4 cr; SP–1002) 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 1004. Intermediate Dutch. (4 cr; SP–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 3310. Studies in Dutch Authors. (3 cr; SP–Reading knowledge of Dutch) A single author or a particular historical period of Dutch and/or Flemish literature studied in depth. Past topics have included late 19th-century Dutch novels, colonial novels, and literature of the Golden Age. All primary literature is read in the original.

Dutch 3510. Topics in Dutch Culture. (3 cr; SP–No 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 Authors in Translation. (3 cr; SP–No knowledge of Dutch required) A single author or a particular historical period of Dutch and/or Flemish literature studied in depth. All primary and secondary literature is read in English translation.

Dutch 3993. Directed Studies. (1-5 cr [max 12 cr]; SP–#) Guided reading in or study of Dutch literature, culture, or advanced language skills.

Dutch 4001. Beginning Dutch. (2 cr; SP–#1001, passing score on GPT in another language or grad student) Meets concurrently with 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; SP–#1002, passing score on GPT in another language or grad student) 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; SP–#1003, passing score on GPT in another language or grad student) 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; SP–#1004, passing score on GPT in another language or grad student) 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 5400. Topics in Dutch Literature. (3 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.

Dutch 5993. Directed Studies. (1-4 cr [max 12 cr]; SP–#) Guided individual reading or study.

East Asian Studies (EAS)

Institute for Global Studies
College of Liberal Arts

EAS 3013. Introduction to East Asian Art. (3 cr; SP–#Arth 3013) A selective examination of representative works of art produced in China, Korea, and Japan from the Neolithic era to modern times. Nearly every major type of object and all major styles are represented.
EAS 3671. Contemporary Chinese Society: Mainland China, Hong Kong, Taiwan. (3 cr; SP–S; Geo 3671, Soc 3671; Geog 3671, Geo 3671; 4 cr in other social sciences or humanities or A-F only)
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 4467. Politics and Market in Contemporary Japan. (3–4 cr; SP–S; JAP 4467; Pol 1054 or 3051 or non-pol sci/grad student 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 weakness of the Japanese-style of capitalism.

EAS 4473. Chinese Politics. (3–4 cr; SP–S; 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; SP–S; Soc 4662; 3661 or Soc 3661 or related Asian or sociology coursework or 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.

Ecology, Evolution, and Behavior (EEB)

Department of Ecology, Evolution, and Behavior of Biological Sciences

EEB 1019. Our Changing Planet. (4 cr; SP–S; Ast 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. Emphasis on weather, climate and natural disasters, and the effect of human and natural perturbations.

EEB 3001. Ecology and Society. (3 cr; SP–I or S, not for biology majors; A-F only)
Basic concepts in ecology; organization, development, and function of ecosystem; population growth and regulation. Human impact on ecosystems.

EEB 3361. Visions of Nature: The Natural World and Its Perception. (4 cr; SP–S; Natural World and Its Perception or #)
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. Emphasis on weather, climate and natural disasters, and the effect of human and natural perturbations.

EEB 4002. Ecology of Minnesota. (2 cr; SP–S; college-level biology course; SP–college-level biology course; A-F only)
Consideration of how ecological systems are structured, work, and respond to what is done to and around them. Provides basis for understanding Minnesota’s ecosystems, and assists students in evaluating alternatives and making wise decisions regarding Minnesota’s ecology.

EEB 4014. Ecology of Vegetation. (3 cr; QP–Biol 3008 or Biol 5041 or Biol 5841, 1 qtr credits; SP–Biol 3007, 3407)
Methods of describing, sampling, and classifying vegetation; spatial and temporal variation of vegetation and ecosystem properties on landscapes; theory of structure and dynamics of terrestrial communities and ecosystems; field trips to local ecosystem types; analysis of quantitative data.

EEB 4016. Ecological Biogeography. (3 cr; QP–Biol 3008 or Biol 5041 or Biol 5841, PBio 3201; SP–Biol 3407)
Biotic regions of the world in general and North America in detail. Ecological principles of distribution, interpretations of regional and temporal patterns in distribution of vegetation, and taxonomic groups of plants and animals. Includes one weekend field trip.

EEB 4129. Mammalogy. (4 cr; QP–Biol 1106 or Biol 1806; SP–FW 4129; Biol 1001 or Biol 2012; A-F only)
Evolutionary and biogeographic history of mammals. Recognize, identify, and study natural history of mammals at the ordinal level, North American mammals at family level, and mammals north of Mexico at generic level. Minnesota mammals at specific level. Includes lab.

EEB 4134. Introduction to Ornithology. (4 cr; SP–Q; SP 4843; Biol 1106 or Biol 1806; SP–FW 4843; Biol 1001 or Biol 2012)
Lab and field identification, structure, classification, distribution, evolution, migration, habitats, habits, and identification of birds. Two weekend field trips.

EEB 4136. Ichthyology. (3 cr; QP–Biol 1106; SP–FW 4136; Biol 1001 or Biol 2012)
Fish biology, adaptations to different environments and modes of living, and environmental relationships. Lab emphasizes anatomy and identification of Minnesota fishes.

EEB 4156. Ecological Animal Physiology. (2 cr; QP–Biol 3011; SP–Biol 3211, Biol 2005 or #)
Functional adaptation of animals to their environment based upon biochemical and biophysical principles.

EEB 4601. Limnology. (3 cr; QP–Chem 1052; SP–Geo 4601; Chem 1022; A-F only)
Description and analysis of lakes and other aquatic environments beginning with lake origins and progressing through lake physics, chemistry, and biology. Interrelationships among these topics and effects of human activities.

EEB 4605. Limnology Laboratory. (1 cr; QP–Geo 5621; SP–Geo 4601; 4606 or #; A-F only)
Field and lab methods used to obtain information on environmental conditions in aquatic environments and measure the abundance of aquatic organisms, especially phytoplankton; field and lab instruments; sampling devices, microscopy, water chemistry and data analysis.

EEB 4607. Plankton Ecology. (4 cr; SP–Geo 4601; Geo 4601; A-F only)
Planktonic bacteria, algae, and animals in lakes, reservoirs, and oceans with special attention to processes that cause variations of abundance.

EEB 4609. Ecosystem Ecology. (3 cr; QP–Biol 5601 or Biol 3008; SP–Biol 3407)
Regulation of energy and elements cycling through ecosystems; dependence of the cyclical flows and numbers of species within ecosystems; effects of human-induced global changes on the functioning of ecosystems.

EEB 4631. Earth System: Geosphere/Biosphere/Atmosphere Interactions. (4 cr; QP–Geo 3202, Geo 3001; SP–Geo 4631, Biol 3407 or Geo 3301 or #; A-F only)
Effects of Earth’s climate on various time scales ranging from evolution of photosynthesis to plate tectonics to orbital variations to interannual variations. Positive and negative feedbacks from biosphere and geosphere that amplify or dampen climate change.

EEB 4814. Plant Community Ecology. (4 cr; QP–Ecology course; SP–Ecology course; A-F only)
Communities represented in Itasca Park and vicinity with emphasis on vegetation, patterns of distributions of communities, their interaction with environment and dynamic relationships, methods of community, and description and analysis.

EEB 4817. Vertebrate Ecology. (4 cr; QP–Ecology course; SP–Ecology course; A-F only)
Field studies on vertebrate populations, their relationships to local environments, habitat analysis, and ecological research methods. Work individually or in teams to investigate behavioral and ecological aspects of selected vertebrates. Course supplemented with lectures and field trips.

EEB 4834. Field Ornithology. (4 cr; QP–EEB 4134, general biology including study of zoology; SP–EEB 4134; general biology including study of zoology; A-F only)
Lab and field course in structure, classification, distribution, evolution, migration, habitats, and identification of birds. Emphasis on the breeding season, behavior and behavioral ecology of birds in the Itasca Park region. Techniques for conducting field studies. Includes lab.

EEB 4839. Field Studies in Mammalogy. (4 cr; QP–college-level biology course that includes study of animals; SP–college-level biology course that includes study of animals or #; A-F only)
Field course emphasizing techniques in study of small mammals; lectures and field projects emphasize identification, distributions, community interactions, ecophysiology, and population ecology.

EEB 4993. Directed Studies. (1–7 cr; max 7 cr) SP–#, max of 7 cr of 4993 or 4994 may count toward major requirements; S-N only)
Individual study on selected topics or problems with emphasis on selected readings and use of scientific literature.

EEB 4994. Directed Research. (1–7 cr; max 7 cr) SP–#, max of 7 cr of 4993 or 4994 may count toward major requirements; S-N only)
Laboratory or field investigation of selected areas of research.

EEB 5008. Forest Response to Quaternary Climate Change. (2 cr; QP–Biol 5041 or 5841; SP–Biol 3407, EEB 4631 or Geo 4631; EEB 5009; A-F only)
Forest responses to past climate change at the population, community, and ecosystem level. Response to natural and human disturbance, range shifts and invasions. Limitations to the speed of response to rapid climate change.

EEB 5009. Quaternary Vegetation History and Climate. (2 cr; QP–Geo 5004 or Geo 5631 or SP–Geo 4631 or Geo 4631 or #)
Reconstructing and dating changes in vegetation and climate from Quaternary pollen stratigraphy of major world biomes; evidence from other indicators of past environments; comparison with climate models.

EEB 5111. Pollen Morphology. (2 cr; QP–PBio 3201 or #; SP–PBio 3007, PBio 4321 or #)
Morphology and nomenclature of pollen grains and peridiole spores, survey of pollen and spores of major plant families, lab techniques.

EEB 5133. Quaternary Plant Macrofossils. (2 cr; QP–PBio 3201 or #; SP–PBio 4321 or 4511 or #)
Morphology of seeds, fruits, and other macroscopic remains likely to occur in Quaternary deposits, survey of fossils of major plant families, lab techniques.

EEB 5193. Population and Quantitative Genetics. (4 cr; QP–Biol 5003 or GCB 3202 course in biometry or statistics; SP–Biol 4003 or GCB 3202, intro statistics or #; A-F only)
Genetic basis of variation in populations and of evolutionary change; allelic frequency dynamics with emphasis on natural selection, additive genetic variance and heritability. Current topics related to the consequences of artificial selection and inbreeding.

EEB 5501. Analysis of Populations. (3 cr; QP–intro biology and intro statistics or #; SP–intro biology and intro statistics or #)
Factors involved in the regulation, growth, and general dynamics of populations. Data needed to describe populations, population growth, population models, and regulatory mechanisms.

Econ 1104. Principles of Macroeconomics. (4 cr; §3100, §3101, §3102; 1101, 1102 or equiv; 1 qtr calculus; SP–§3101, §3111; Math 1271) Microeconomic behavior of consumers, firms, and markets in the domestic and world economy. Demand and supply; competition and monopoly; distribution of income. Effects of economic interdependencies and global linkages on individual decisions. Use of calculus and mathematical models.


Econ 1111. Honors Course: Principles of Microeconomics. (4 cr; QP–1102, §1102, §1104; knowledge of plane geometry and intermediate algebra at level of GC 0623 and GC 0631; B avg recommended; SP–§1105, §1112; 1101 or equiv; knowledge of plane geometry and advanced algebra) Aggregate consumption, saving, investment, and national income. Microeconomic behavior of consumers, firms, and markets in the domestic and world economy. Demand and supply; competition and monopoly; distribution of income. Economic interdependencies in the global economy and effects of global linkages on individual decisions.

Econ 1112. Honors Course: Principles of Macroeconomics. (4 cr; QP–1102, §1102, §1104; knowledge of plane geometry and intermediate algebra at level of GC 0623 and GC 0631; B avg recommended; SP–§1102, §1104; 1101 or equiv; Math 1271) Aggregate consumption, saving, investment, and national income. Money, banking, and business cycles in the domestic and global economy. International trade, growth, and development. Role of the United States in the world economy, international interdependencies. Emphasis on algebra, geometry, basic logic, and proofs.

Econ 3101. Intermediate Microeconomics. (4 cr; QP–3101; 1101, 1102 or equiv; 1 qtr calculus; SP–3101) 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; QP–3101 or equiv; SP–3112; 1101 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 issues.

Econ 3105. Managerial Economics. (4 cr; QP–§3101, §8630; 1101, 1102 or equiv, 1 qtr calculus; not open to Econ majors; SP–§3101, §3111, §8650; 1101, 1102 or equiv, Math 1271 or equiv; not open to Econ majors) Theory of the firm; managerial decision problems. Demand theory. Production technology and cost concepts. Pricing and output decisions under different market structures. Investment behavior. Government regulation.

Econ 3111. Honors Course: Intermediate Microeconomics. (4 cr; QP–1101, 1102 or equiv; 1 qtr calculus; B avg recommended; SP–§1101, §3101; 1101, 1102 or equiv, Math 1271) 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 3112. Honors Course: Intermediate Macroeconomics. (4 cr; QP–§3101; 1101, 1102 or equiv; B avg recommended; SP–§3102, 1101 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; QP–§5531, 1101, 1102 or equiv, not open to Econ majors; SP–§4531, 1101, 1102 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 Anti-Trust Policy. (3 cr; QP–§5631; 1101, 1102 or equiv; not open to Econ majors; SP–§4631, 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 legal policies.

Econ 3611. Environmental Economics. (3 cr; QP–1101, 1102 or equiv; not open to Econ majors; SP–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; QP–§5721, §5721H; 1101, 1102 or equiv; not open to Econ majors; SP–§4721, §4729; 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; QP–§5829; 1101, 1102 or equiv; not open to Econ majors; SP–§5821; 1101, 1102 or equiv; not open to Econ majors) Competing views on the proper role of government in the economy. Effects of tax and spending policies; private agents’ responses to government actions; optimal policies. Applications primarily to U.S. federal government.
Econ 3951. Major Project Seminar. (2 cr; QP–3101, 3102, 3103 or equiv; SP–3101, 3102 or equiv; EngC 3027) Students produce 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]; QP–1101, 1102 or equiv [others may be in Class Schedule]; SP–1101, 1102 or equiv [others may be in Class Schedule]) Topics specified in Class Schedule.

Econ 3993. Directed Studies. (1-3 cr; QP–1101, 1102 or equiv, #; SP–1101, 1102 or equiv, #) Guided individual reading or study in areas not available in regular course offerings.

Econ 4021. Economics, Ethics, and Economic Philosophy. (3-4 cr [max 8 cr]; QP–1101, 1102 or equiv or #; SP–1101, 1102 or #; S–N only) Students need to confirm a topic of study with their faculty supervisor or with the director of undergraduate studies before beginning, otherwise credit will not be received.

Econ 4033. Current Economic Issues. (3 cr; QP–3033; 3101 or 3105 or #; SP–3033; 3101, 3102 or equiv) Current controversies over economic policies used deal with microeconomic 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; QP–3041; 3101 or 3105 or #; SP–3041; 3101, 3102 or equiv) Consider what the economic future holds, what can be done now to deal with global issues, and how to improve economic prospects of countries.

Econ 4109. Honors Course: Game Theory and Applications. (4 cr; QP–3101, 3102, 3103 or equiv; Math 1251-1252-1261, SP–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; QP–3101, 3102, 3103 or equiv, Math 1251-1252-1261 or equiv; SP–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 4162. Microeconomic Analysis. (2 cr; QP–5161; 3101) 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 8002.

Econ 4163. Microeconomic Analysis. (2 cr; QP–5162; 3101) 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 8002.

Econ 4164. Microeconomic Analysis. (2 cr; QP–5163) 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 4165. Macroeconomic Theory. (2 cr; QP–5102, 3102, Math 3251-3252 or equiv, #5113 recommended, SP–1102, 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; QP–5164; 3102) Dynamic general equilibrium models; solving for paths of interest rates, consumption, investments and prices. This seven-week course meets with 8106.

Econ 4167. Macroeconomic Theory. (2 cr; QP–5165; 3106) Dynamic 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; SP–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; QP–3101, 3102; SP–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 4199. Microeconomics. (4 cr; QP–3421; 3511; 3101 or 3105 or #; SP–3421; 3101, 3102 or equiv) Review of basic linear regression model and its variants; panel data, censored and truncated regression, discrete choice models; time series and simultaneous equation models. This seven-week course meets with 8202.

Econ 4263. Econometric Analysis. (2 cr; QP–5262; 3426) Basic linear regression model and its variants; panel data, censored and truncated regression, discrete choice models; time series and simultaneous equation models. This seven-week course meets with 8203.

Econ 4264. Econometric Analysis. (2 cr; QP–4263) Basic linear regression model and its variants; panel data, censored and truncated regression, discrete choice models; time series and simultaneous equation models. This seven-week course meets with 8204.

Econ 4301. Economic Development. (3 cr; QP–5331; 1101, 1102 or equiv; not open to Econ majors; SP–5433; 1101, 1102 or equiv; not open to Econ majors) Economic growth in low income countries. Theory of aggregate and per capita income growth. Population growth, productivity increases, and capital formation. Allocation of resources between consumption and investment and among sectors. International assistance and trade.

Econ 4307. Comparative Economic Systems. (3 cr; QP–5337; 1101, 1102 or equiv; not open to Econ majors; SP–5437; 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; QP–5341; 1101, 1102 or equiv; not open to Econ majors; SP–1101, 1102 or equiv) Economic evolution in Latin America since 1950. Issues addressed include trade liberalization, poverty, inflation, and development strategies in selected Latin American countries. Theory and applications of important issues.


Econ 4315. The Japanese Economy. (3 cr; QP–3315; 3101 or equiv; SP–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 economic issues.


Econ 4337. Comparative Economic Systems. (3 cr; QP–5307; 3101, 3102 or equiv; SP–5307; 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 4421. Economic Integration of the Americas. (3 cr; QP-3101, 3102, 3103 or equiv or #; SP-3101, 3102 or equiv)
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 4431. International Trade. (3 cr; QP-3440, 3449; 3101, 3102, 3103 or equiv; SP-3440, 3449; 3101, 3102 or equiv)

Econ 4432. International Finance. (3 cr; QP-3450, 3101, 3102, 3103 or equiv; 5431 or equiv recommended; SP-3450, 3101, 3102 or equiv; Math 1271 or equiv recommended)
Balance of payments; international financial markets; exchange rate determination and international monetary system; international investment and capital flows; financial management of the multinational firm; open economy macroeconomic policy.

Econ 4439. Honors Course: International Trade. (4 cr; QP-3450, 3454, 5429; 3101, 3102, 3103 or equiv; 1 qtr calculus; average recommended; SP-2450, 3451, 3101, 3102 or equiv; Math 1271 or equiv)

Econ 4531. Labor Economics. (3 cr; QP-3501, 3101, 3102 or equiv; SP-3501, 3101, 3102 or equiv)
Economic analysis of labor markets and their operations; population and labor force; labor market institutions; wage and employment theories; unions and collective bargaining; public policy.

Econ 4619. Honors Course: Environmental Valuation. (4 cr; QP-3101, 3103 or equiv; 1 qtr calculus; SP-3101 or equiv; Math 1271 or equiv)
Principles of benefit-cost analysis used for valuing the environment and costs of pollution; definition, measurement, and valuation of benefits and costs. Economic; growth, sustainable growth; economic, ecological and ethical issues in use of non-renewable and renewable resources, optimal rate of use. Optimal pollution control.

Econ 4623. Housing Markets and Public Policy. (3 cr; QP-3101, 3102 or equiv; 1 qtr calculus, 1 qtr econometrics; SP-3101, 3102 or equiv; Math 3121 or equiv)
Overview of developmental and individual differences in housing markets and their operations; population and labor force; labor market institutions; wage and employment theories; unions and collective bargaining; public policy.

Econ 4629. Honors Course: Urban Economics. (4 cr; QP-3101 or equiv; B avg recommended; SP-3101 or equiv)

Econ 4631. Industrial Organization and Anti-Trust Policy. (3 cr; QP-3601, 3101, 3103; SP-3601, 1469; 3101 or equiv)

Econ 4639. Honors Course: Industrial Organization and Anti-Trust Policy. (4 cr; QP-3101, 3103 or equiv, 1 qtr calculus; B avg recommended; SP-3463, 3601; 3101 or equiv)

Econ 4721. Money and Banking. (3 cr; QP-3701, 3701, 3101, 3102 or equiv; SP-3701, 3701, 4729; 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 4729. Honors Course: Money and Banking. (4 cr; QP-3101, 3102 or equiv; 1 qtr calculus; Math 2451, 3101 or equiv; recommended; SP-3701, 4721, 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 the Federal Reserve system. Monetary policy.

Econ 4731. Macroeconomic Policy. (3 cr; QP-3101, 3102 or equiv; SP-4739, 3101 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 vs. discretion; budget deficits; unemployment and inflation.

Econ 4739. Honors Course: Macroeconomic Policy. (4 cr; QP-3101, 3102 or equiv; 1 qtr calculus; B avg recommended; SP-4731, 3101, 3102 or equiv; Math 1271)
Monetary vs. fiscal policy debate in the context of the underlying macroeconomic theory controversy. Comparison of Keynesian, Monetarist, and Classical theories; rational expectations; policy ineffectiveness; time inconsistency; rules vs. discretion; budget deficits; unemployment and inflation.

Econ 4741. Business Cycles. (3 cr; QP-3101, 3102, Stat 3011 or equiv; SP-4749, 3101, 3102 or equiv; Stat 3011 or equiv)

Econ 4749. Honors Course: Business Cycles. (4 cr; QP-3101, 3102, Stat 3011 or equiv; 1 qtr calculus; B avg recommended; SP-4741, 3101, 3102 or equiv; Stat 3011 or equiv)

Econ 4751. Financial Economics. (3 cr; QP-3101 or 3105, 1 qtr statistics, 1 qtr calculus; SP-4759, 3101 or equiv; Math 1271 or equiv; Stat 3011)
Financial decision-making by households and firms under conditions of perfect competition, monopoly, and monopolistic competition.

Econ 4759. Honors Course: Financial Economics. (4 cr; QP-3752, 3751, B avg recommended; SP-4751, 3101, 3102 or equiv; Math 1271 or equiv; Stat 3011)
efficiency of financial markets. Includes theoretical concepts and empirical evidence.

Econ 4831. Cost-Benefit Analysis. (3 cr; QP-3101, 3103 or equiv; SP-3101 or equiv)
Principles for evaluation of benefits and costs of government actions and the ways government officials may use their powers; optimal policies. Applications primarily to U.S. federal government.

Econ 4991. Independent Study. (1-4 cr; SP-#, A, Q)
Students need to confirm a topic with their faculty supervisor or with the director of undergraduate studies before beginning, otherwise credit will not be received.

Econ 4993. Directed Study. (1-4 cr; QP-#, SP-#, A, Q)
Guided individual reading or study in areas not available in regular course offerings.

Econ 5151. Elements of Economic Analysis: Firm and Household. (2 cr; QP-3101 or equiv, 1 qtr calculus, 1 qtr linear algebra, grad student or #; SP-3101, 3102 or equiv; Math 1271 or equiv; Math 2433 or equiv; grad student 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; QP-3101, 3102 or equiv, 1 qtr calculus, 1 qtr linear algebra, grad student or #; SP-3101, 3102 or equiv) Decision-making by households and firms under conditions of perfect competition, monopoly, and monopolistic competition.

Economists of research and development; technical change and productivity growth; impact of technology on institutions; science and technology policy.

Econ 5821. Public Economics. (3 cr; QP-3801, 3101, 3103 or equiv; SP-3801, 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. federal government.

Econ 5312. Growth, Technology, and Development. (3 cr; QP-3101, 3102 or equiv or #; SP-3101, 3102 or equiv or #)
Economics of research and development; technical change and productivity growth; impact of technology on institutions; science and technology policy.

EdHD 3001. Exploring the Teaching Profession. (1 cr [max 4 cr]; QP- Early admit for init lic/MEd program; SP- Early admit for init lic/MEd program; S-N only)
Exploration of self as teacher, the culture of teaching, students as learners, learnings cycles’ cost. Real business theory and prediction of business cycle facts. Money in the augmented model.

Education and Human Development (EdHD)

College of Education and Human Development

EdHD 3001. Exploring the Teaching Profession. (1 cr [max 4 cr]; QP- Early admit for init lic/MEd program; SP- Early admit for init lic/MEd program; S-N only)
Exploration of self as teacher, the culture of teaching, students as learners, learnings cycles’ cost. Real business theory and prediction of business cycle facts. Money in the augmented model.

Education and Human Development (EdHD)
EdHD 5005. School and Society. (2 cr; OP-§ EdPA 5090, MEd/init lic student or CLA music ed or preteaching major or # basic computer music ed or preteaching major or # A-F only) Readings in history, philosophy, social sciences, and law, revealing diverse educational values in pluralistic American society. (3 cr; A-F only)  

EdHD 5007. Technology for Teaching and Learning. (1.5 cr; OP-§ CI 5300, EdHD 5007; MEd/init lic or CLA music ed or preteaching major or # basic computer skills; SP-SCI 5300, EdHD 5007; MEd/init lic or CLA music ed or preteaching major or # basic computer skills; A-F only) Diverse educational technology in K-12 classrooms and the issues associated with their effective use. (3 cr; SP 4021, 4023)  

EdHD 5009. Human Relations: Applied Skills for School and Society. (1 cr; OP-§ EdHD 5005; SP-§ EdHD 5005; A-F only) Addresses 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, and teaching in diverse educational settings. (3 cr; SP 5455)  

**Educational Policy and Administration (EdPA)**  

**Department of Educational Policy and Administration**  

**College of Education and Human Development**  

EdPA 3010. Special Topics for Undergraduates. (1-3 cr) Inquiry into educational policy and administration problems and issues. (3 cr)  

EdPA 3021. Introduction to the Historical Foundations of Modern Education. (3 cr; SP-§ Hum 4021) Analysis and interpretation of important elements in modern education derived from pre-classical sources: Greeks, Romans, Middle Ages, Renaissance, Reformation, Enlightenment, and Industrial Revolution. (3 cr)  

EdPA 3023. Introduction to the History of Western Educational Thought. (3 cr; SP-§ Hum 4023) Great educational classics of Western civilization: Plato, Aristotle, Quintilian, Montaigne, Milton, Locke, Rousseau, and others. (3 cr)  

EdPA 5001. Formal Organizations in Education. (3 cr) Organizational theory; issues in educational organizations; and how general theories apply to schools, colleges and universities, and a variety of other organizations. (3 cr)  

EdPA 5021. Historical Foundations of Modern Education. (3 cr; SP-§ Hum 4021) Analysis and interpretation of important elements in modern education derived from pre-classical sources: Greeks, Romans, Middle Ages, Renaissance, Reformation, Enlightenment, and Industrial Revolution. (3 cr)  

EdPA 5023. History of Western Educational Thought. (3 cr; SP-Hum 4023) Great educational classics of Western civilization: Plato, Aristotle, Quintilian, Montaigne, Milton, Locke, Rousseau, and others. (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. (3 cr)  

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. (3 cr)  

EdPA 5036. Ethics, Morality, and Values in Education. (3 cr) Application to key issues of professional practical reflection on moral education, virtues, and principles. (3 cr)  

EdPA 5041. Sociology of Education. (3 cr; SP-§ Soc 5455) Structures and processes within educational institutions; linkages between educational organizations and their social contexts, particularly related to educational change. (3 cr)  

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. (3 cr)  

EdPA 5048. Cross-Cultural Perspectives on Leadership. (2 cr; SP-§) Intensive weekend workshop introduces participants to cultural variables of leadership that influence functioning of cross-cultural groups. Methods include lectures, case studies, discussion, problem-solving exercises and simulations. (2 cr)  

EdPA 5052. Ethnic Groups and Communities: Families, Children, and Youth. (3 cr) Roles of young people in widely varied North American communities. Comparative aspects of youth commitment to society, economic value of youth, youth-adult conflict, and youth roles in the family. Well-defined analyses of contextual roles. Complexity of policy for appropriate educational and community development. (3 cr)  

EdPA 5056. Case Studies for Policy Research. (3 cr; A-F only) Qualitative case study research methods and their applications to educational policy and practice. Emphasis on designing studies that employ open-ended interviewing as primary data collection technique. Class project. (3 cr)  

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. (3 cr)  

EdPA 5064. Divergent Perspectives in Educational Policy and Practice. (3 cr) Examine varying or opposing views on 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. (3 cr)  

EdPA 5080. Special Topics: Educational Policy and Administration. (1-3 cr) Issues of educational policy and administration. (3 cr)  

EdPA 5087. Seminar: Educational Policy and Administration. (1-3 cr) Issues of educational policy and administration. (3 cr)  

EdPA 5095. Problems: Educational Policy and Administration. (1-3 cr) Issues of educational policy and administration. (3 cr)  

EdPA 5096. Internship: Educational Policy and Administration. (1-9 cr) Issues of educational policy and administration. (3 cr)  

EdPA 5101. International Education and Development. (3 cr) Introduction to comparative and international development education and contemporary theories regarding the role of education in the economic, political, and sociocultural development of nations; examination of central issues and critical issues in the field. (3 cr)  

EdPA 5102. Knowledge Formats and Applications: International Development Education Contexts. (3 cr) Analyzes the interrelationships of ‘knowledge capital’ (noetic 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. (3 cr)  

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. (3 cr)  

EdPA 5121. Educational Reform in International Context. (3 cr) Critical policy analysis of educational innovation and reform in selected countries. Use theoretical perspectives of education and development and a variety of policy analysis approaches to examine actual educational reforms and their implementation. (3 cr)  

EdPA 5124. Critical Issues in International Education and Educational Exchange. (3 cr) Analysis of comprehensive, multidimensional policy-oriented frameworks for international education found in practices of U.S. and other universities; conceptual development of international education and its practical application to programs, to employment choices in global careers, and to pedagogy. (3 cr)  

EdPA 5128. Anthropology of Learning. (3 cr; SP-§ Anth 128) Cross-cultural perspectives in examining educational patterns; the implicit and explicit cultural assumptions underlying them. Methods and approaches to cross-cultural studies in education. (3 cr)  

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. (3 cr)  

EdPA 5301. Contexts of Learning: Historical, Contemporary, and Projected. (3 cr; A-F only) Contextual understanding of education as a social institution. Education is studied as one institution among the several that constitute its dynamic context. (3 cr)  

EdPA 5303. Managing the Learning Organization. (3 cr; A-F only) Examines schools, colleges, and other human service organizations that are centered on learning. Focuses on perspectives and skills needed to manage organizations effectively. (3 cr)  

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. (3 cr)  

EdPA 5336. Laboratory in Decision Making. (3 cr) Contributions of recent research and theory to effective administration. Analysis of administrative behavior in realistic settings; relations of administration to human behavior. (3 cr)
EdPA 5352. Projective Leadership for Strategic Learning Communities. (3 cr)
Exposes participants to trends and changes facing society, culture, and education from a strategic learning community perspective; designed to help students “future the present.”

EdPA 5372. Youth in Modern Society. (3 cr)
Youth in advanced societies and as a social entity; functions and roles of youth 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.

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 5378. Experiential Learning: Theory and Practice. (3 cr; SP–WCFE 5412)
Theory and practices of learning by doing. Focuses on the educator’s personal engagement in the actual process to understand the technical, motivational, and evaluative aspects of experiential learning.

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; identification of national standards, norms and principles of youth development; conflicting expectations facing policy-makers; and search for the critical context of youth policy.

EdPA 5396. Field Experiences in PK-12 Educational Administration. (2-6 cr; S-N only)
Field experiences and/or internships arranged for students seeking licensure as PK-12 principals and superintendents. Content and credit dependent on licensure requirements and specified in individual student field experience agreements.

EdPA 5501. Principles and Methods of Evaluation. (3 cr; SP–EPsy 5243)
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)
Use and application of cost-effectiveness, cost-benefit, cost utility, and cost-feasibility in evaluation of educational programs and programs.

EdPA 5701. American Higher Education. (3 cr; A-F only)
American higher and postsecondary education in historical and contemporary perspective; special emphasis on societal and political demands on higher education system; consequent changes in various forms and functions.

EdPA 5704. Student and Faculty Issues in Higher Education. (3 cr; OP–EdPA 5201; SP–EdPA 5001)
Broad range of issues involving students and faculty in colleges and universities, including: college student development, curricular and extracurricular activities, faculty work and development, and 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 Educational Systems. (3 cr; A-F only)
Scope, administration, coordination, and evaluation of programs in college and university student affairs.

EdPA 5728. Two-Year Postsecondary Institutions. (3 cr; A-F only)
Present status, development, functions, organization, curricular and trends in postsecondary, but nonbaccalaureate, institutions.

EdPA 5732. The Law and Postsecondary Institutions. (3 cr; A-F only)
Analysis of court opinions and federal regulations affecting postsecondary educational institutions.

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] SP–AQSP–A)
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; SP–EPsy 5001; A-F only)
Principles of learning, cognition, cognitive development, classroom management, motivation, instruction, and assessment. Topics: behaviorism, cognitive and 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, handicappism, homophobia, racism, sexism, victim-blaming, violence, and so on, and presenting models for change. Students examine how and why prejudices develop.

EPsy 3132. 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 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. (3 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)
Basic 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 and instruction. Emphasis on instructional design, learning theories, experience, individual differences, evaluation, tests and measurement, and technology. Implications for curricular and instructional design in higher education, continuing education, and professional and 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; horizontal and vertical development of antisocial 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; S-N only)
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 settings. Topics include groupthink, 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 interpersonal, intergroup conflict, negotiation, mediation are discussed.

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 feedback, skills training, continuing improvement, mediation).

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. Interpersonal, interpersonal, and group dynamics are discussed.

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; QP–SP; 5601 [or other intro statistics course; A-F only]) Introduction to educational research, leading students through the basic steps involved in designing and conducting a research study. Topics include reviewing literature, problem, using different approaches to gather data, managing and analyzing data, and reporting results.

Epsy 5217. Proseminar in Educational Psychology. (3 cr; QP–SP; 5216 or 5121 or A-F only) Survey and examination of the types of research proposed or done by faculty and students in educational psychology.

Epsy 5221. Basic Principles of Educational Measurement. (3 cr; QP–SP; 5260 or equiv; SP–5261 or equiv) Fundamental concepts, principles, and methods in educational and psychological measurement. Specifically, the course will cover reliability, validity, item analysis, scores, grades, scales, test construction, and test evaluation.

Epsy 5231. Introductory Statistics and Measurement in Education. (4 cr) 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; SP–EPsy 5901) Introductory course in program evaluation; planning an evaluation study, collecting and analyzing information, reporting results; overview of the field of program evaluation.

Epsy 5246. Evaluation Colloquium: Psychological Foundations. (1 cr; SP–EPsy 5915) Optional colloquium in program evaluation; planning an evaluation study, collecting and analyzing information, reporting results; overview of the field of program evaluation.

Epsy 5251. Introductory Statistical Methods. (3 cr) Introduction to statistics with an 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 study designs, and introduction to inferential techniques.

Epsy 5253. Statistics for Preprofessional Students. (3 cr) Descriptive statistics for continuous variables, simple regression and association; indices of means, introduction to analysis of variance and multiple regression, contingency tables, and computer analysis techniques.

Epsy 5281. Introduction to Computer Operations and Data Analysis in Education and Related Fields. (3 cr; SP–S only) General, introductory computer literacy course to familiarize students with personal computers and computing resources at the U of M. Applications include electronic communications, spreadsheets, graphical presentation, and data analysis.

Epsy 5400. Special Topics in Counseling Psychology. (1-4 cr [max 8 cr]) Theory, research, and practice in counseling and student personnel psychology. Topics vary.

Epsy 5401. Counseling Procedures. (3 cr; QP–Upper div students; SP–Upper div students) 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 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, work values, and workplaces in a changing global society, with implications for career planning, development, and transitions, emphasizing personal and organizational change. For nonmajors; serve students in adult ed, HRD, IR, college student advising, and other related fields.

Epsy 5433. Counseling Women Over the Life Span. (3 cr; QP–One course in counseling or career development; SP–One course in assessment, planning, implementing educational programs for people with disabilities. Second course for students seeking to become licensed teachers in special education.

Epsy 5416. Behavior Analysis and Classroom Management. (3 cr) Introduction to the assumptions, principles, and procedures of the behavioral approach to analyzing behavior and programs for classroom management. Emphasis on specific problems, conducting observations, intervening, and evaluating behavioral change.

Epsy 5614. Foundations of Special Education II. (3 cr; QP–5601, 5608 or 5609; SP–5613, 5614; A-F only) A methods and materials course emphasizing functional approaches to promoting academic learning in students with mild to moderate mental retardation and moderate to severe mental retardation. Emphasis on preparing students for postsecondary environments.

Epsy 5616. Behavior Analysis and Classroom Management. (3 cr) Introduction to the assumptions, principles, and procedures of the behavioral approach to analyzing behavior and programs for classroom management. Emphasis on specific problems, conducting observations, intervening, and evaluating behavioral change.

Epsy 5621. Functional/Basic Academic Interventions in Mental Retardation. (3 cr; QP–5603, 5613, 5614; A-F only)

Epsy 5622. Programs and Curricula for Learners With Sensory Disabilities. (3 cr; QP–5116; SP–5616)

Epsy 5624. Biomedical and Physical Aspects of Developmental Disabilities. (3 cr; A-F only) Selected information in genetics, anatomy, physiology, and kinesiology; central and peripheral nervous system; prenatal, perinatal, and postnatal development; physically disabled children; management and educational procedures.

Epsy 5625. Education of Infants, Toddlers, and Preschool Children With Disabilities. Introduction. (2 cr; A-F only) Overview of the issues, problems, and practical applications in designing early intervention services for young children with disabilities and their families.

Epsy 5626. Seminar: Developmental Disabilities and Instructional Management. (3 cr; QP–5116, 5622; SP–5612, 5622)

Epsy 5627. Education of Students With Physical and Health Disabilities. (3 cr; A-F only)

Epsy 5635. Education of Students With Physical and Health Disabilities. (3 cr; QP–5601 or SP–5601 or SP–5601 or SP–SP; A-F only)

Epsy 5636. Education of Multihandicapped Learners With Sensory Impairments. (3 cr; QP–SP; 5613, 5614) Characteristics of learners with visual and auditory impairments; design of instructional programs to remediate or circumvent disabilities, including use of prosthetic devices; related performance affected by sensory impairments.

Epsy 5641. Foundations of Education for Individuals Who Are Deaf or 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 5644. Language Development and Programming for Deaf/Hard of Hearing Children.**
(3 cr)

**EPsy 5646. Reading and Writing Practices With Deaf/Hard of Hearing Children.**
(3 cr; OP–QP 5643, 5644 or #; SP–5644 or general ed methods in tchg reading and writing skills, or #)
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 or 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 5648. Communication Systems for Children With Disabilities.**
(2 cr)

**EPsy 5649. Models of Instructional Programming With Deaf and Hard of Hearing Students.**
(3 cr; OP–QP 5646, 5644 or #; SP–5646, 5644 or #)
Design and development of portfolios for various models of educational service delivery systems for individuals with hearing loss, emphasizing consultation skills, curriculum management and modifications, material and technology applications, and interprofessional service adaptations.

**EPsy 5656. 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 school and in ways in which their behaviors disturb others.

**EPsy 5657. Interventions for Social and Emotional Disabilities.**
(3 cr; OP–QP 5116, 5656; SP–5616, 5656; A-F only)
Developing comprehensive behavioral programs for students with social and emotional disabilities. Instructing students with social and emotional disabilities.

**EPsy 5671. Literacy Braille.**
(3 cr; A-F only)
Mastery of literal braille code including all contractions and short-form words 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; OP–QP 5671 or #; SP–5671 or #; A-F only)
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 numbered music notation, musical line drawing techniques.

**EPsy 5673. Reading and Writing for Children With Visual Disabilities.**
(2 cr; OP–QP 5671, CI 5414 or equiv, or #; SP–5671, CI 5414 or equiv, or A-F only)
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; OP–QP 5671, CI 5673 or #; SP–5671, CI 5673, 5675; A-F only)
Introduction to basic techniques to gain skills in pre-cane techniques, orientation to living environments, and adaptations for activities of daily living and independence. Introduction to mobility maps, consideration of cane, guide dog, and telescopc aids to mobility.

**EPsy 5675. Structure and Function of the Eye: Educational Implications.**
(3 cr; A-F only)
Anatomy and physiology of the eye and its relation to visual perception. Educational considerations for students with low vision studied in relation to ophthalmological and optometric evaluations and functional vision assessment.

(3 cr; OP–QP 5671, 5673, 5675; SP–5671, 5673, 5675; A-F only)
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; OP–QP 5625, 5626; A-F only)
Overview of the methods and materials available to maximize the educational outcomes for young children, birth to age 5, with disabilities and their families in home, community, and school based-settings.

**EPsy 5720. Special Topics: Special Education.**
(1-4 cr; max 12 cr total)
Lab and fieldwork approach, often assuming a product 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; OP–QP #; SP–#)
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 and the community.

**EPsy 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. Standardized and individualized tests of intelligence, achievement, socio-emotional functioning, perception, reading, mathematics, adaptive behavior, and language.

**EPsy 5849. Observation and Assessment of the Preschool Child.**
(4 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.

**EPsy 5851. Collaborative Family-School Relationships.**
(2 cr; OP–QP–Horors sr or grad student; SP–Horors sr 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.

**EPsy 5852. Early Intervention and Prevention.**
(3 cr)
Theory and research base for school-based primary and secondary prevention programs to promote academic and social competence of children and youth. Emphasis on programs and approaches promoting healthy development of children (birth to grade 12) for ongoing school success.

**EPsy 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.

**EPsy 5991. Independent Study in Educational Psychology.**
(1-6 cr)
Self-directed study in areas not covered by regular courses. Specific program of study is jointly determined by student and advising faculty member.
EE 2301. Introduction to Digital System Design. (4 cr; QP - It soph or jr or Sr; SP - IT soph or jr or Sr) Boolean algebra; combinational logic; logic simplification, sequential logic, design of synchronous sequential logic, VHDL modeling, design of logic circuits. Integral lab.

EE 2361. Introduction to Computer Architecture and Assembly Language Programming. (3 cr; QP - CSCI 3111 or CSCI 1901春运2) Basic computer organization and assembly language programming. Instruction types, data structures and addressing modes, subroutines, assembler usage, and programming techniques. Arithmetic and logical operations, floating point arithmetic, input/output, interrupts.


EE 3006. Fundamentals of Electrical Engineering Laboratory. (1 cr; QP - 3065, SP - 3005) Lab to accompany 3005.


EE 3101. Circuits and Electronics Laboratory I. (2 cr; QP - 3062; SP - 3115 or QP - 3115) Experiments in circuits and electronics.

EE 3102. Circuits and Electronics Laboratory II. (2 cr; QP - 3401, 3062; SP - 3101) Experiments in circuits and electronics; team design project.

EE 3105. Circuits and Electronics Transition Laboratory. (1.75 cr; QP - 3400; SP - 3015) For students who completed EE 1400, 3009, 3010, 3061, and 3400 but not 3401 under quarter system. In combination with EE 3400, completes the EE 3101 semester requirement.


EE 3961. Industrial Assignment I. (1 cr; QP - ECE co-op; SP - ECE co-op) Indus proj 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 4111. Analog Electronics Design With Operational Amplifiers. (4 cr; QP - 3011, 3062, 3015, 3115) Characteristics of operational amplifiers; applications of operational amplifiers including A/D and D/A converters; compensation of operational amplifiers; power amplifiers; semiconductor controlled rectifiers, applications; linear and switching voltage regulators.

EE 4231. Linear Control Systems Designed by Input/Output Methods. (3 cr; QP - Upper div IT or grad student in IT major, 3012, 5002 or #; SP - Upper div IT or grad student in IT major, 3015, 4541 or #) State space models, performance evaluation, numerical issues for feedback control. Stability, state estimation, quantitative performance, implementation, computational issues.

EE 4235. Linear Control Systems Laboratory. (1 cr; QP - 5253 or #; SP - 4231 or #R231) Lab to accompany 4231.

EE 4237. State Space Control Laboratory. (1 cr; QP - #; SP - 4233 or #R233) Lab to accompany 4235.

EE 4301. Digital Design With Programmable Logic. (4 cr; QP - 3351, CSCI 3115; SP - 2301, CSCI 2111 or CSCI 1901) Introduction to system design and simulation. Design using VHDL code and synthesis. Simulation using VHDL code.

EE 4341. Microprocessor and Microcontroller System Design. (4 cr; QP - Upper div IT or grad student, 3551, 3352; SP - Upper div IT or grad student, 2301, 2361) Microprocessor interfacing; memory design, exception handling and interrupts, parallel and serial input/output, bus arbitration control, multiprocessor systems, direct memory access (DMA). Designing dynamic RAM memory systems, special DRAM modes, interleaved memory. Advanced bus structures. Integral lab.


EE 4503. Introduction to Power System Analysis. (3 cr; QP - 3010; SP - 2011) Analysis of large power systems; 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 4741. Power Electronics. (4 cr; QP - 3011, 3111, 3062; SP - 3015, 3115, 3061) Switch-mode power electronics; switch-mode DC power supplies; switch-mode converters for DC and AC motor drives, wind/pv photovoltaic inverters; interfacing power electronics equipment with utility system; power semiconductor devices, magnetic design, electro-magnetic interference (EMI). Integral lab.

EE 4951. Senior Design Project I. (2 cr; QP - 3011, 3111, 3062; SP - 3015, 3115, 3061) Team participation in formulating and solving open-ended design problems. Oral and written presentations.

EE 4956. Industrial Assignment II. (1 cr; QP - ECE co-op; 3476; SP - ECE co-op, 3961) 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; QP - 5478; SP - ECE co-op, 4961) Industrial work assignment in ECE co-op program. Grade based on student’s formal written report covering semester’s work.

EE 4970. Directed Study. (1-3 cr; QP - CR ar may be repeated for cr; #; SP - CR ar may be repeated for cr, A) Studies of approved projects, either theoretical or experimental.

EE 4981. Senior Honors Project I. (2 cr; QP - #; SP - #) Design project for students in ECE honors program.

EE 4982. Senior Honors Project II. (2 cr; QP - #; SP - #) Design project for students in ECE honors program.

EE 5141. Integrated Sensors and Transducers. (4 cr; QP - 3063, 3111; SP - 3161, 3601) Microelectromechanical systems composed of microsensors, microactuators, and electronics integrated onto common substrate. Design, fabrication, and operation principles. Labs on micromachining, photolithography, etching, thin film deposition, metallization, packaging, and device characterization.

EE 5163. Semiconductor Properties and Devices I. (3 cr; QP - 3063, 3111; SP - 2611, 3601 or #) Principles and properties of semiconductor devices. Selected topics in semiconductor materials, statistics, and transport. Aspects of transport in n-p junctions, heterojunctions.

EE 5164. Semiconductor Properties and Devices II. (3 cr; QP - 5661 or #; SP - 2611, 3601 or #) Principles and properties of semiconductor devices. Charge control in different FETs, transport, modeling. Bipolar transistor models (Ebers-Moll, Gummel-Poon), heterostructure bipolar transistors. Special devices.

EE 5171. Microelectronic Fabrication. (4 cr; QP - IT sr or grad student; SP - IT Sr or grad student) 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; QP - 5576; SP - 5171 or #) 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;
QP—IT grad student, Math 5242, Math 5243 or # SP—IT grad student, 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; QP—IT grad student, Math 5243 or Math 5242 or SP—IT grad student, 3015, 5231 or #) Development of system design ideas; frequency response techniques in design of single-input/single-output (and MIMO) systems. Robust control concepts. CAD tools.

EE 5301. Logic Level CAD. (3 cr; QP—SP 5358, SP 4301) Theory and practice of synthesis, simulation, and test generation algorithms in digital design.

EE 5323. VLSI Design I. (3 cr; QP—SP 3351, 3062 or # SP—2301, 3115 or #) Combinational and sequential static CMOS circuits; transmission gate networks; clocking strategies and sequential circuits; CMOS process flows, design rules, structured layout techniques; dynamic CMOS, domino, DCVS; CMOS arithmetic logic units, high-speed carry chains, fast CMOS multipliers.

EE 5324. VLSI Design II. (3 cr; QP—SP 5571 or # SP—5323 or #) Performance analysis and design optimization, including parasitic effects and device sizing techniques; design of high-speed parallel shifters; CMOS memory cells, array structures and read/write circuits; self-timed circuit design; design for testability, including scan design and built-in self test; VLSI case studies.

EE 5327. VLSI Design Laboratory. (3 cr; QP—SP 5538, 5572 or # SP—4301, 5233 or # 5323 or #) Lab to accompany 5323. Complete design of integrated circuits. Designs evaluated by computer simulation. Selected designs fabricated and tested in succeeding quarter.

EE 5329. VLSI Digital Signal Processing Systems. (3 cr; QP—SP 5572 or # SP—5233 or # 5323 or #) Programmable architectures for signal and media processing; data flow representation; architecture transformations; low-power design, architectures for two’s complement and redundant representation, carry-save, and canonical signed digit; scheduling and allocation for high-level synthesis.

EE 5333. Analog Integrated Circuit Design. (3 cr; QP—SP 3062, grad student or # SP—3115, grad student or #) Analog integrated circuit design; fundamental circuits for image processing; design issues associated MOS and BJT devices; design and testing of circuits; selected topics (e.g., modeling of basic IC components, design of operational amplifier, comparator, or analog sampled-data circuit filter).

EE 5361. Computer Architecture and Machine Organization. (3 cr; QP—SP 3521, 3522, SP—2301, 2361; § CSc 5201) Introduction to computer architecture. Aspects of computer systems, such as pipelining, memory hierarchy, and input/output processing. Performance metrics. Examination of each component of a complicated computer system.

EE 5371. Computer Systems Performance Measurement and Evaluation. (3 cr; QP—SP 5852 or # SP—5361 or #) Tools and techniques for analyzing computer hardware, software, and system performance. Benchmark programs, measurement tools, performance models. Deterministic and probabilistic simulation techniques, random number generation and testing. Bottleneck analysis.

EE 5381. Advanced Computer Networks. (3 cr; QP—SP 3021, 5853, CSc 5211 or # SP—3025, 4361 or #) High performance communication network architectures, protocols and resource allocation techniques. Emphasizes performance and quantitative analysis. Current developments: integration of services, Asynchronous Transfer Mode (ATM) networks and switches, Integrated Service Digital Network (ISDN).

EE 5391. Computing With Neural Networks. (3 cr; QP—SP—3021 or Stat 3091 or # SP—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 unsupervised networks for data reduction; associative recognition and retrieval, optimization, time series prediction and knowledge extraction.

EE 5501. Digital Communication. (3 cr; QP—SP 5032, 3015, sr or grad student in IT major or # SP—4501, 3025, sr or grad student in IT major or #) Theory and techniques of modern digital communications. Communication limits; modulation and detection; data transmission over channels with intersymbol interference; optimal and suboptimal sequence detection; equalization. Error correction coding; trellis-coded modulation; multiple access.


EE 5542. Adaptive Digital Signal Processing. (3 cr; QP—SP 5111, 5702 or # SP—4541, 5531 or #) Design, application, and implementation of optimum and adaptive and IIR filters; Viterbi, Kalman and Least-Squares; linear prediction and lattice structure; LMS, RLS and Levinson-Durbin algorithms; channel equalization, system identification, biomedical, sensor array processing, spectrum estimation, and noise cancellation applications.

EE 5545. Real-Time Digital Signal Processing Laboratory. (2 cr; QP—SP 3352, 5511, EE sr or grad student in IT major or # 5501, 5702 or # 5323 or #) Real-time computing 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; QP—SP 5511, SP 4541) Pipelining; parallel processing; fast convolution; FIR, rank-order, adaptive digital filters; scaling and roundoff noise; DCT; Viterbi coders; lossless coders, video compression.

EE 5551. Multiscale and Multirate Signal Processing. (3 cr; QP—SP 5511, 5702, grad student in IT major or # SP—4541, 5531, grad student in IT major or #) Multirate digital systems, frames, continuous wavelet transform; scaling equations; discrete wavelet transform; applications in signal and image processing.

EE 5581. Information Theory and Coding. (3 cr; QP—SP 5702 or # SP—5533 or #) Source and channel models for sources and channels. Entropy, mutual information, capacity, rate-distortion functions. Coding theorems.

EE 5585. Data Compression. (3 cr; QP—IT or grad student in IT major or # SP—IT or grad student in IT major or #) Source coding in digital communications and recording; codes for lossless compression; universal lossless codes; lossless image compression; scalar and vector quantizer design; loss source coding theory; differential coding; tree codes, transform and subband coding; analysis/synthesis schemes.

EE 5560. Introduction to RF and Microwave Engineering. (3 cr; QP—SR or grad student in IT major, 3111; SP—IT or grad student, 3601) Fundamental RF and Microwave Engineering, including circuits and antennas. Introduction to RF Microwave waveguides, including planar guides, microwave circuit analysis, and synthesis using passive elements; fundamentals of antennas, dipole antennas, arrays, wire and aperture antennas.

EE 5602. RF and Microwave Circuit Chip Design. (3 cr; QP—3111, 5604; SP—3601, 5601) Fundamentals of RF/Microwave circuit design; chip design methodology, including topology, analysis, layout, and testing.

EE 5611. Plasma-Aided Manufacturing. (4 cr; QP—UPPER div IT or grad student, ME 3301, ME 3303; SP—UPPER div IT or grad student, ME 3321, ME 3322 or # ME 5361) Manufacturing using plasma processes; plasma properties as a processing medium; plasma spraying, welding and microelectronics processing; process control and system design; industrial speakers; a cross-disciplinary experience between heat transfer design issues and manufacturing technology.

EE 5621. Physical Optics. (3 cr; QP—SP 3011 or # SP—3015 or #) Physical optics principles, including Fourier analysis and related scalar and vector wave equations, diffraction theory, interference, and coherence theory. Applications discussed include diffractive optical elements, holography, astronomical imaging, optical information processing, and microoptics.

EE 5622. Physical Optics Laboratory. (1 cr; QP—SP—5625; SP—5621 or #5621) Fundamental optical techniques. Diffraction and optical pattern recognition. Spatial and temporal coherence. Interferometry applications; coherent and incoherent imaging. Coherent image processing. Fiber Optics.

EE 5624. Optical Electronics. (4 cr; QP—SP—3111; SP—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 5629. Optical System Design. (2 cr; QP—IT or grad student; SP—IT or grad student) Elementary or paraxial optics. Non-paraxial, exact ray tracing. Fourier optics and image quality. Design examples: telescopes, microscopes, diffraction-limited lenses, projectors, and scientific instruments.

EE 5653. Physical Principles of Magnetic Materials. (3 cr; QP—IT grad student 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. Physical Principles of Magnetic Recording. (4 cr; QP—IT grad student or # SP—IT grad student or #) Review of magnetics; analytical models magnetic heads; models of longitudinal and perpendicular magnetic recording and reproduction; magnetic heads, noise properties recording performance, high-speed switching and high frequency impedance; digital recording systems. Lab and demonstration experiments.

EE 5657. Physical Principles of Thin Film Technology. (4 cr; QP—IT or grad student or # SP—IT grad student or #) Physical principles of deposition, characterization, and processing of thin film materials; materials science, vacuum science and technology; physical vapor deposition techniques; properties of thin films and metallurgical/protective coatings; modification of surface films; emerging thin film materials and applications. Lab and demonstration experiments.
EHS 5021. Concepts in Emergency Health Services. (3 cr; SP–Upper div) Emergency Service System (EMS) in the United States, emphasizing basic practices generalized across systems. Components for an effective EMS, including historical perspective, medical-legal concerns, medical oversight, accountability, and scope of practice, communications and transportation, rural vs. urban issues, and disaster management.

EHS 4021. Emergency Medical System Planning and Fiscal Management. (3 cr; SP–Upper div) Planning and fiscal and process management of emergency medical systems. Regulatory requirements, EMS delivery models, contract negotiations, budgeting, and scenario planning.

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**English as a Second Language (ESL)**

*Institute of Linguistics and Asian and Slavic Languages and Literatures*

*College of Liberal Arts*

E SL 0101. TOEFL Preparation. (0 cr; QP–Nonnative English speaker. See Minnesota English Center for override; SP–Nonnative English speaker. See Minnesota English Center for override; S-N only) Describes the format of the TOEFL test. Focuses on strategies for improving skills for each section of the test.

E SL 0200. Pronunciation Workshop. (0 cr; QP–Nonnative English speaker. See Minnesota English Center for override; SP–Nonnative English speaker. See Minnesota English Center for override; S-N only) Individual attention to specific areas of spoken language including intonation, rhythm, and segmentals.

E SL 0400. Skills Enhancement. (0 cr; QP–Nonnative English speaker. See Minnesota English Center for override; SP–Nonnative English speaker. See Minnesota English Center for override; S-N only) Student will focus on specific areas of their English which need improvement.

E SL 0800. English Through Literature. (0 cr; QP–Nonnative English speaker. See Minnesota English Center for override; SP–Nonnative English speaker. See Minnesota English Center for override; S-N only) An advanced course for students who want further practice in reading, listening, speaking and writing for non-academic purposes.

E SL 0900. English Through Music. (0 cr; QP–Nonnative English speaker. See Minnesota English Center for override; SP–Nonnative English speaker. See Minnesota English Center for override; S-N only) Student will learn English vocabulary and culture through folksongs and by looking at popular music in various decades.

E SL 0100. Topics in American Culture. (0 cr; QP–Nonnative English speaker. See Minnesota English Center for override; SP–Nonnative English speaker. See Minnesota English Center for override; S-N only) Students will learn about areas of U.S. culture such as American humor, ethnic groups, lifestyles, and popular culture.

E SL 1111. Beginning Grammar. (0 cr; QP–Nonnative English speaker. See Minnesota English Center for override; SP–Nonnative English speaker. See Minnesota English Center for override; S-N only) Introduces and reviews grammatical structures with attention to meaning, use, and form.

E SL 1211. Beginning Reading/Composition. (0 cr; QP–Nonnative English speaker. See Minnesota English Center for override; SP–Nonnative English speaker. See Minnesota English Center for override; S-N only) Introduces grammatical structures with attention to meaning, use, and form.

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**Emergency Health Services (EHS)**

*University College*

EHS 3113. First Responder for Athletic Coaches and Trainers. (3 cr; AF only) Meets with Kin 3113. How to provide emergency medical care to injured amateur or professional athletes. Lecture and skills format focuses on recognizing injuries and initially stabilizing the injured athlete. Successful completion entitles students to First Responder certification. Course includes AHA CPR training.
ESL 0331. Low Intermediate Oral Skills. (0 cr; QP – Nonnative English speaker; SP – Nonnative English speaker). See Minnesota English Center for override; S-N only)
Practice in speaking in structured and semi-structured situations with special attention to basic regularities in pronunciation.

ESL 0400. Library and Research Skills. (0 cr; QP – Nonnative English speaker. See Minnesota English Center for override; S-N only)

ESL 0411. Intermediate Grammar. (0 cr; QP – Nonnative English speaker; SP – Nonnative English speaker. See Minnesota English Center for override; S-N only)
Reviews and adds to students’ skills with basic structures. Increasingly complex structures with attention to form, meaning and use. Verbal phrases; practice of structures in controlled speaking and writing activities.

ESL 0421. Intermediate Reading/Composition. (0 cr; QP – Nonnative English speaker. See Minnesota English Center for override; S-N only)
Reading for main ideas and supporting ideas with increased speed. Introductory 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; QP – Nonnative English speaker. See Minnesota English Center for override; S-N only)
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; QP – Nonnative English speaker. See Minnesota English Center for override; S-N only)
Students will learn about and participate in community service projects.

ESL 0511. High Intermediate Grammar. (0 cr; QP – Nonnative English speaker. See Minnesota English Center for override; S-N only)
Reviews and adds to students’ repertoire of structures with attention to meaning, use and form; emphasizes verbal phrase and control of grammar in writing.

ESL 0521. High Intermediate Reading/Composition. (0 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; QP – Nonnative English speaker. See Minnesota English Center for override; S-N only)
Develop fluency and accuracy in everyday situations and in academic interviews; special attention to communication strategies; prepares students for academic lectures by introducing 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; QP – Nonnative English speaker. See Minnesota English Center for override; S-N only)
Students will learn how to write business letters in English as well as how to communicate effectively with e-mail and voice mail for business purposes.

ESL 0611. Advanced Grammar. (0 cr; QP – Nonnative English speaker. See Minnesota English Center for override; S-N only)
Focuses on difficult areas of grammar and on providing students with resources to work on them. Meaning, use, and control of grammar with increased emphasis on complex sentence patterns.

ESL 0621. Advanced Reading/Composition: The Written Word. (0 cr; QP – Nonnative English speaker. See Minnesota English Center for override; S-N only)
Focuses on improving reading proficiency, including strategy development, as well as vocabulary skill building. Some focus on using reading to support academic work.

Advanced Reading/Composition: The Written Word. (0 cr; QP = 0621, S-N only)
Continuation of ESL 0621.

ESL 0641. Advanced Listening Comprehension. (0 cr; QP – Nonnative English speaker. See Minnesota English Center for override; S-N only)
Lecture comprehension with special attention to note taking, recognizing main ideas and support, and understanding relationships of ideas, implied information, and structure of speech; comprehension of information presented in a wide variety of authentic materials.

ESL 0751. High Advanced Speaking/Pronunciation. (0 cr; QP – Nonnative English speaker; see Minnesota English Center for override; S-N only)
Emphasizes 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; QP – Nonnative English speaker; see Minnesota English Center for override; S-N only)
Continued development of increased reading efficiency and comprehension; paraphrasing; summarizing text; quoting and citing sources; understanding writer’s perspective.

ESL 0771. High Advanced Composition. (0 cr; QP – Nonnative English speaker; see Minnesota English Center for override; S-N only)
Continued development; increased reading and writing efficiency; development of writing skills; understanding writer’s perspective.

ESL 0781. Fundamentals in English as a Second Language. (0 cr; QP – Nonnative English speaker; see Minnesota English Center for override; S-N only)
English for formulating hypotheses, describing experiments, and presenting results; includes reading, writing, listening, and speaking activities based on scientific and technical English.

ESL 0911. Fundamentals in English as a Second Language. (0 cr; QP – Written permission of department and satisfactory score on EPT; MBatt or TOEFL; SP – Written permission of department and satisfactory score on EPT; MBatt or TOEFL; S-N only)
Focuses on comprehension of spoken and written English. Emphasizes basic listening and speaking skills; improves listening and speaking skills; focuses on individual needs.

ESL 0912. Fundamentals in English as a Second Language. (0 cr; QP – Written permission of department and satisfactory score on EPT; MBatt or TOEFL; SP – Written permission of department and satisfactory score on EPT; MBatt or TOEFL; S-N only)
Focuses on comprehension of spoken and written English. Emphasizes basic listening and speaking skills; improves listening and speaking skills; focuses on individual needs.

ESL 0931. Developing Fluency in English as a Second Language. (0 cr; QP – Written permission from department and satisfactory score on EPT; MBatt or TOEFL; SP – Written permission from department and satisfactory score on EPT; MBatt or TOEFL; S-N only)
Focuses on comprehension of spoken and written English. Emphasizes basic listening and speaking skills; improves listening and speaking skills; focuses on individual needs.

ESL 0932. Developing Fluency in English as a Second Language. (0 cr; QP – Written permission from department and satisfactory score on EPT; MBatt or TOEFL; SP – Written permission from department and satisfactory score on EPT; MBatt or TOEFL; S-N only)
Focuses on comprehension of spoken and written English. Emphasizes basic listening and speaking skills; improves listening and speaking skills; focuses on individual needs.

ESL 0933. Developing Fluency in English as a Second Language. (0 cr; QP – Written permission from department and satisfactory score on EPT; MBatt or TOEFL; SP – Written permission from department and satisfactory score on EPT; MBatt or TOEFL; S-N only)
Focuses on comprehension of spoken and written English. Emphasizes basic listening and speaking skills; improves listening and speaking skills; focuses on individual needs.

ESL 0971. Advanced Academic Writing. (0 cr; QP – Written permission from department and satisfactory score on EPT; MBatt or TOEFL; SP – Written permission from department and satisfactory score on EPT; MBatt or TOEFL; S-N only)
Focuses on comprehension of spoken and written English. Emphasizes basic listening and speaking skills; improves listening and speaking skills; focuses on individual needs.
English: Creative and Professional Writing (EngW)

Department of English Language and Literature
College of Liberal Arts

EngW 1101. 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; SP–1101 or ∆)
For students with experience in creative writing. Exercises, experiments, assigned readings, and discussion of students’ work.

EngW 3102. Intermediate Fiction Writing. (3 cr; SP–1102 or ∆)
For students with experience in writing fiction. Exercises, experiments, assigned readings, and discussion of students’ work.

EngW 3103. Advanced Fiction Writing. (4 cr; SP–3102 or ∆)
Advanced workshop for students with considerable experience in writing fiction.

EngW 3104. Intermediate Poetry Writing. (3 cr; SP–1103 or ∆)
For students with experience in writing poetry. Exercises, experiments, assigned readings, and discussion of students’ work.

EngW 3105. Advanced Poetry Writing. (4 cr [max 16 cr]; SP–3104 or ∆)
Advanced workshop for students with considerable experience in writing poetry. Gives students an opportunity to explore new poetic possibilities and to read widely in contemporary poetry and poetics.

EngW 3106. Intermediate Literary Nonfiction Writing. (3 cr; SP–1104 or ∆)
For students with experience in writing memoir/creative nonfiction. Exercises, experiments, assigned readings, and discussion of students’ work.

EngW 3107. Advanced Nonfiction Writing. (4 cr; SP–3106 or ∆)
Advanced workshop for students with considerable experience in writing literary nonfiction.

EngW 3110. Topics in Creative Writing. (3 cr [max 9 cr]; SP–1101 or 1102 or 1103 or 1104 or ∆)
Special topics for students with experience in creative writing. See Class Schedule for topics.

EngW 3960. Writing Workshop for Majors. (3 cr; SP; Engl major; 6 cr of EngW, Jr or Sr; major adviser permission required)
Writing workshop for English majors, usually taken during the senior year. Topics specified in the Class Schedule.

EngW 5102. Advanced Fiction Writing. (4 cr; SP–A)
Advanced workshop for graduate students with considerable experience in writing fiction.

EngW 5103. Advanced Fiction Writing. (4 cr; SP–A)
Advanced workshop for students with considerable experience in writing fiction.

EngW 5104. Advanced Poetry Writing. (4 cr; SP–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; SP–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; SP–A)
Advanced workshop for graduate students with considerable experience in writing literary nonfiction.

EngW 5107. Advanced Nonfiction Writing. (4 cr; SP–A)
Advanced workshop for students with considerable experience in writing literary nonfiction.

EngW 5110. Topics in Advanced Fiction Writing. (4 cr [max 16 cr]; SP–A)
Special topics in fiction writing. See Class Schedule for topics.

EngW 5120. Topics in Advanced Poetry. (4 cr [max 16 cr]; SP–A)
Special topics in poetry writing. See Class Schedule for topics.

EngW 5130. Topics in Advanced Creative Writing. (4 cr [max 16 cr]; SP; English major or ∆)
Advanced workshop that might include work in more than one genre.

EngW 5204. Playwriting. (4 cr [max 16 cr]; SP–A)
Advanced workshop for students with experience in writing poetry and an interest in writing for the stage. Contact creative writing program for specific descriptions.

EngW 5205. Screenwriting. (4 cr; SP–A)
Advanced workshop for students with experience in writing poetry and an interest in writing for the screen. Contact creative writing program for specific descriptions.

EngW 5210. Topics in Advanced Literary Nonfiction. (4 cr [max 16 cr]; SP–A)
Special topics in essay writing, such as arts reviewing, writing about public affairs, and writing in personal voice. See Class Schedule for particular topics.

EngW 5310. Reading as Writers. (3 cr [max 12 cr])
Special topics in reading fiction, literary nonfiction and poetry. See Class Schedule for details.

EngW 5401. Introduction to Editing for Publication. (3 cr)
Beginning editing, from the nature of the editor-writer relationship to manuscript reading, author querying, rewriting, and style. Some discussion of copyediting. Students develop editing skills by working on varied writing samples.

EngW 5402. Advanced Editing. (3 cr; SP–5401, #)
For students with advanced editing competence to further advance their skills. Workshop/seminar; editing long text and fiction, children’s literature, translations and indices.

EngW 5493. Directed Study in Writing. (1-3 cr [max 18 cr]; SP–A, #)
Projects in writing poetry, fiction, drama, and nonfiction, or study of ways to improve writing.

For definitions of course numbers, symbols, and abbreviations, see inside back cover.

English: Literature (EngL)

Department of English Language and Literature
College of Liberal Arts

EngL 1001. Introduction to Literature: Poetry, Drama, Narrative. (3-4 cr; SP–Hons reg or ∆ for honors sections)
Basic techniques for analyzing and understanding literature. Readings of novels, short stories, poems and plays.

EngL 1181. Introduction to Shakespeare. (3-4 cr; SP–Hons reg [all colleges] or ∆ for honors sections)
Lecture survey of Shakespeare’s work, treating approximately 10 plays. For students in all colleges of the University.

EngL 1201. Introduction to American Literature. (3 cr; SP–Hons reg [all colleges] or ∆ for honors sections)
Discussion and writing about a chronologically or thematically based series of readings from American literature. General approaches to literary analysis and criticism including the social and historical contexts of authorship and reading, and the nature of literary artistry and conventions.

EngL 1301. Introduction to Multicultural American Literature. (3-4 cr; QP–Hons reg or ∆; SP–Hons reg [all colleges] or ∆ for honors sections)
Readings include representative works by African American, American Indian, Asian American, and Chicano/Chicana writers, chiefly from the 20th century. Study the social and cultural factors informing America’s complex literary past and present.

EngL 1401. Introduction to World Literatures in English. (3-4 cr; QP–Hons reg or ∆; SP–Hons reg [all colleges] or ∆ for honors sections)
Introduction to vital, diverse work produced in English outside the United States and Britain. Works represent different cultures, but treat concerns derived from a common post-colonial legacy.

EngL 3001. Textual Interpretation, Analysis, and Investigation. (3-4 cr; QP–Engl major or minor or premajor; for honors prereq honors reg or ∆; SP–Engl major or minor or premajor; for honors: regis, Engl major or minor or ∆)
Training in the practice of the analysis of various literary forms, with emphasis on 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; SP–Engl major or minor, 12 cr in other literature courses, or honors and CLA for honors sections)
Problems of interpretation and criticism. Questions of meaning, form, authority, literary history, social significance.

EngL 3003. 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 3004. 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 3005. Survey of American Literatures and Cultures I. (4 cr; A-F only)
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.
Removable lists include 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. 307. Shakespeare. (3-4 cr; QP-Eng: major or pre-major or #; for honors course - honors status) PL-Eng major or pre-major or #; for honors course - honors status (CLA)
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. 310. Studies in Poetry. (3-4 cr [max 9 cr]; QP-For honors - honors regis or A; SP-For honors - honors regis, CLA or A)
A special topics course that examines issues related to the reading and understanding of poetry in a variety of interpretive contexts.

Engl. 320. Studies in Narrative. (3-4 cr [max 9 cr]; QP-For honors - honors regis or A; SP-For honors - honors regis, CLA or A)
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. 330. Studies in Drama. (3 cr [max 9 cr]) 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.

Engl. 340. Studies in Film. (3 cr [max 9 cr]) Topics regarding film in a variety of interpretive contexts, from the range and historic development of American, English and Anglophone film. Recent examples: “American Film Genres,” “Film Noir,” “Chaplin and Hitchcock.” Topics and viewing times announced in Class Schedule.

Engl. 350. Studies in Literature and the Other Arts. (3 cr [max 9 cr]) Examine literature’s role in conjunction with other arts including music, the visual arts, dance, etc. Topics specified in Class Schedule.

Engl. 360. Studies in Literary and Cultural Modes. (3 cr [max 9 cr]) Modes of literary expression and representation that transcend conventional demarcations of genre and historical periods. Topics may include horror, romance, mystery, comedy, and satire.

Engl. 370. Medieval Literatures and Cultures. (3 cr [max 9 cr]) Major and representative works of the Middle Ages. Topics specified in Class Schedule.

Engl. 383. Advanced Shakespeare. (3 cr; SP-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-play texts.


Engl. 3151. Romantic Literatures and Cultures. (3 cr) 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) The literature of the British Victorian period (1832-1901) in relation to its cultural and historical contexts. Typical authors: Tennyson, the Brownings, Dickens, Arnold, Hopkins, and the Brontës.

Engl. 3171. Modern British Literatures and Cultures. (3 cr) Survey of principal writers, intellectual currents, conventions, genres and themes in Britain from 1950 to the present. Topics may include Beckett, Golding, Kingsley and Martin Amis, Murdoch, Larkin, Hughes, Heaney, Lessing, Shaffer, Stopford, Fowles, and Drabble.

Engl. 3180. Contemporary Literatures and Cultures. (3 cr) 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 to 1900. (3 cr) Poets from the Puritans to the end of the 19th century. The course attempts to comprehend the intellectual and cultural background of the poets, poetic theory, and form.

Engl. 3212. American Poetry from 1900. (3 cr) Famous and lesser-known poems from the Modernist era, the time of Frost, HD, Pound, Eliot and the Harlem Renaissance. The course attempts to comprehend the intellectual and cultural background of the poets, poetic theory and form.

Engl. 3221. American Novel to 1900. (3 cr) Novels from the early Republic through Poe, Hawthorne, Melville, and Stowe, to the writers of the end of the 19th century (e.g., Howells, Twain, James, Chopin and Crane). The development of a national literature, tension between realism and romance, and changing role of women as writers and as fictional characters.

Engl. 3222. American Novel from 1900. (3 cr) Novels from early 1900’s realism through the Modernists (e.g., Faulkner, Hemingway, Fitzgerald) to more recent writers (e.g., Ellison, Bellow, Erdrich, Pynchon). Stylistic experiments, emergence of voices from formerly under-represented groups, and novelists’ responses to a technologically changing society.

Engl. 3231. American Drama. (3 cr) Representative dramas from the 18th through 20th centuries. Topics may include the staging of national identities, the aesthetics of modern and contemporary drama, and the production concerns of mainstream, regional, and community theaters.

Engl. 3300. Topics in Multicultural American Literatures. (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 transgender 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 GLBT people to literature and culture.

Engl. 3350. Women Writers. (3 cr [max 9 cr]; SP-For honors - honors regis, CLA or A) 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. 3400. Post-Colonial Literatures. (3 cr [max 9 cr]) Varied topics in post-colonial literatures. Typical non-Western lists include Chinua Achebe, Tsitsi Dangarembga, Fadwa Faqir, Salman Rushdie; filmmaker Kudlat Tahmir; and “dub” poets Mutabaruka and Jean Binta Breeze.

Engl. 3581. Folklore. (3 cr) Folklore genres such as proverbs, prose narratives (tale and legend), foods, ways, 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. 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. 3882. Senior Paper. (1 cr; SP-English major; A; for honors section: English major, honors, A) English majors register for 1 credit while writing the required senior paper.

Engl. 3883. Honors Thesis. (1 or 3 cr; SP-Honors candidacy in English, consent of English honors advisor) Honors cum laude and magna cum laude English majors register for at least 1 credit. Honors summa cum laude English majors register for 3 credits.

Engl. 3960. Junior-Senior Seminar. (3 cr; SP-English major; cr or sp; completion of university writing requirement; at least 2 sem before graduation) Intensive study of a major literary topic, figure, period, or genre, or of an English language topic. Topics specified in Class Schedule.

Engl. 3980. Directed Instruction. (1-6 cr; SP-#; A; Q) Directed study arranged between student and advising faculty member.

Engl. 3993. Directed Study. (1-3 cr; SP-#; A; Q) for honors: CLA honors regis, #, A, Q) Guided individual reading or study.

Engl. 5001. Introduction to Methods in Literary Studies. (3 cr; SP-Senior student or #) Ends and methods of literary research, including professional literary criticism, analytical bibliography, and textual criticism.

Engl. 5002. Introduction to Literary and Cultural Theory. (3 cr; SP-Grad student or #) Approaches to practical and theoretical problems of literary history and genre.

Engl. 5120. Reading Course in American Literature. (3 cr [max 9 cr]; SP-Grad student or #) For graduate students who seek a general background or preparation for advanced study. Readings typically cover a wide historical range (e.g., the 19th century, a genre such as the novel, or a major literary movement such as Modernism).

Engl. 5130. Readings in American Minority Literature. (3 cr [max 9 cr]; SP-Grad student or #) Contextual readings of 19th- and 20th-century American Minority writers. Topics specified in Class Schedule.

Engl. 5140. Post-Colonial Literatures. (3 cr [max 9 cr]; SP-Grad student or #) Selected readings in post-colonial literatures. Topics specified in Class Schedule.

Engl. 5150. Readings in Criticism and Theory. (3 cr [max 9 cr]; SP-Grad student or #) Major works of classical criticism the English critical tradition from the Renaissance to 1920. Leading theories of criticism from 1920 to the present. Theories of fiction; narratology. Feminist criticisms. Marxist criticisms. Psychoanalytic criticisms. Theories of postmodernism.

Engl. 5210. Middle English Literature and Culture. (3 cr [max 9 cr]; SP-Grad student or #) Reading wide in the literature of the time period designed to prepare graduate students for work in other graduate courses or seminars. Attention to relevant scholarship or criticism. Topics specified in Class Schedule.
Entomology (Ent)

Department of Entomology
College of Agricultural, Food, and Environmental Sciences

Ent 3001. Insects and Insect Management. (1 cr; A-F only)
Lecture and lab study of principal orders of insects and arachnids; introduction to structure, physiology, population dynamics, and management. Course module meets in weeks 1-4 of semester.

Ent 3005. Insect Biology. (2 cr; QP-3005; SP-3001 or #; A-F only)
Lecture and lab study of biodiversity and natural history of insects; insect behaviors, functional roles in natural and managed environments, and effects of insects on human history. Required overnight field trip, see instructor for details. Course module meets in weeks 5-15 of semester.

Ent 4005. Field Crop Entomology. (2 cr; QP-3005; SP-3001 or #; A-F only)
Lecture and lab study of management of insect populations; lip histories, habits and recognition of insect pests of field and vegetable crops. Fifty specimen insect collection required. Course module meets in weeks 5-15 of semester.

Ent 4015. Ornamentals and Turf Entomology. (3 cr; QP-1800 course in biol or hort or forest resources; SP-1800 course in biol or hort or forest resources) Diagnosis and management of insect pests in landscape plants. Study of the principles of biological control, biorational pesticides, and integrated pest management.

Ent 4021. Honey Bees and Insect Societies. (3 cr; QP-Biol 1009 or #; SP-Biol 1009 or #)
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. (3 cr; QP-4021 recommended, Biol 1009 or #; SP-4021 recommended, Biol 1009 or #) Field course for students interested in honey bee management and the conservation and maintenance of other bee colonies for wild or commercial use. Field course for students interested in honey bee behavior and management.

Ent 4096. Professional Experience Program: Internship. (1-3 cr; QP-COAFES or Ent or Hort or Agro or Hort or AgrSc course, Ent or PiPa or Soil course or #; SP-COAFES or Ent or Hort or AgrSc course, Ent or PiPa or Soil course or #; A-F only) Professional experience in entomology firms or government agencies through supervised practical experience; evaluative reports and consultations with faculty advisers and employers.

Ent 4251. Forest and Shade Tree Entomology. (2 cr; QP-3005; SP-3001 or #; A-F only) Lecture and lab study of ecology and population management of forest and shade tree insects with emphasis on predispersing factors and integrated management. Required overnight field trip, see instructor for details. Course module meets in weeks 5-15 of semester.

Ent 4281. Livestock Entomology. (2 cr; QP-1005, 3005; SP-3001 or #; A-F only) Lecture and lab study of biology and management of insects, mites, and ticks that affect livestock, poultry, and companion animals. Emphasis on problem identification and problem solving. Course module meets in weeks 5-15 of semester.

Ent 5011. Insect Structure and Function. (4 cr; QP-3005 or #; SP-3005 or #; A-F only) Comparative study of insect structures and their functions with an evolutionary perspective; includes introductory physiology of digestion, respiration, and other organ systems.

Ent 5021. Insect Taxonomy and Phylogeny. (4 cr; QP-Biol 1009 or #; SP-3001 or equiv; A-F only) Identification of families and genera: insect evolution and classification of insects; techniques of collecting and curating insects; principles of phylogeny reconstruction.

Ent 5031. Insect Physiology. (2 cr; QP-5010, 1 BioC course or #; SP-5011, 1 BioC course or #; A-F only) Essential processes of insects. Nerve and muscle mechanisms, energy metabolism, respiration, nutrition and digestion, excretion, regulation and interactions of processes, sensory mechanisms, and behavior.

Ent 5301. Aquatic Insects. (3 cr; QP-3005 or #; SP-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 5375. Medical Entomology. (3 cr; QP-3005 or #; SP-3005 or #) Biology of arthropod vectors of human disease. Emphasis on disease transmission and host, vector, and pathogen interactions. Offered 1998 and alternate years.

Ent 5311. Sampling Biological Populations. (3 cr; QP-Stat 5021 or equiv; SP-Stat 5021 or equiv) Sampling plans for study of field and laboratory populations. Statistical distributions and techniques for detecting and coping with aggregation. Randomization, required sample size, and optimal allocation for common probability designs. Sequential plans for making decisions. Workbook.

Ent 5321. Ecology of Agriculture. (3 cr; QP-Agro or Hort or AnSc course, Ent or PiPa or Soil course or #; SP-Agro or Hort or AnSc course, Ent or PiPa or Soil course or #; A-F only) Ecological perspective on post-industrial agriculture; origins of agriculture, social functions, and ecology of contemporary and extinct agricultural systems. Soils, plant development, pest ecology, forage quality, animal production, and food quality as an interactive network of factors.

Ent 5341. Biological Control of Insects and Weeds. (3-4 cr; QP-Biol 1009, EEB 3001 grad student or #; SP-3001, Biol 1009, EEB 3001 or grad student; A-F only) Biological control of arthropod pests and weeds. Analysis of relevant ecological theory and case studies; biological control agents. Lab includes natural enemy identification, short experiments, and computer exercises.

Ent 5351. Insect Pathology. (2 cr; QP-5303; SP-5301) The major pathogens and microorganisms that cause diseases in insects; routes of infection of insects; lab propagation of disease agents; factors in application of disease to pest insect control with safety considerations.

Ent 5361. Aquatic Insects. (3 cr; QP-1005 or #; SP-3001 or #; A-F only) Taxonomy and natural history of aquatic insects including their importance in aquatic ecology, water resource management, recreation, and conservation. Emphasis on family-level identification of immatures and adults. Field trips scheduled to local aquatic habitats. A collection is required.
Ent 5371. Principles of Systematics. (3 cr; QP – SP – #) Theoretical and practical procedures of biological systematics. Phylogeny reconstruction including computer assisted analyses, morphological and molecular approaches, species concepts and speciation, comparative methods, classification, historical biogeography, nomenclature, use and value of museums, etc. Offered 1998 and alternate years.

Ent 5381. Lepidopterology. (2-3 cr; QP – Ent course or #; one course each in ecology and genetics recommended; SP – Ent course or #; one course each in ecology and genetics recommended) Overview of Lepidoptera with emphasis on processes and phenomena such as polymorphism, mimicry, and individual quality that are well demonstrated by this insect order.

Ent 5481. Invertebrate Neurobiology. (2-3 cr; SP – SNSc 5481) Fundamental principles and concepts underlying cellular bases of behavior and “systems” neuroscience. Particular invertebrate preparations discussed.

Ent 5900. Basic Entomology. (1-6 cr; QP – #; SP – #) For graduate students who need to make up certain deficiencies in their biological science background.

Ent 5910. Special Problems in Entomology. (1-6 cr; max 10 cr) QP – SP – # Individual field, lab, or library studies in various aspects of entomology.

Ent 5920. Special Lectures in Entomology. (1-3 cr) Lectures or labs in special fields of entomological research given by a visiting scholar or regular staff member.

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. Modes of avoiding and redressing 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; SP – SBol 1051) Current environmental issues including air and water pollution, hazardous waste, 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) QP – COAFES undergrad, # complete internship contract available in COAFES Career Services before registering; UC only; SP – COAFES undergrad, # complete internship contract available in COAFES Career Services before registering; UC only. Both an oral and written report is due based on a paid or volunteered work position, or other field experience.

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 are examined, with emphasis on preparing educators and educational programs.

FE 5200. Special Topics in Family Education. (1-4 cr; max 4 cr) Study of a topic in family education that is either not covered in available courses or that is not covered in sufficient breadth and depth to meet student needs and interests. Content varies by offering.

FE 5201. Family and Work Relationships. (3 cr; SP – WCFE 5201; 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; SP – Human sexual behavior course, family ed course; A-F only) Preparation to 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 communications 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) Examination, development, and implementation of family and consumer science curriculum in secondary schools. Emphasis on curricular perspectives from social reconstruction and cognitive processes.

FE 5303. Instructional Strategies in Family Education. (3 cr; A-F only) Theory and research relevant to methods of teaching; development of skill in using methods; emphasis on 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; SP – 5701 or A-F only) 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; SP – 5702 or A-F only) 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) QP – 5320; SP – 5702 or A-F 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 4 cr; SP – A-F only) 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; SP – #) Planned work experience focusing on educational competencies in family education settings. Nature and extent of responsibilities are defined by the position student assumes.

Family Social Science (FSoS) Department of Family Social Science College of Human Ecology

The following courses are part of the department’s Alcohol and Drug Counseling Education Certificate: 3426/5426, 3427/5427, 3428/5428, 3429/5429, 3431/5431, 3432/5432, 3433/5433, 3434/5434, 3435/5435, 3436/5436, 3437/5437, 3450/5450.

FSoS 1101. Intimate Relationships. (3 cr) Focus 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 and marriage enrichment, and marital therapy are described.

FSoS 2101. Preparation for Working With Families. (2 cr; QP – FSoS major; SP – FSoS major; A-F only) Systematic preparation for upper division education, research and field internships, and career possibilities in family social science.

FSoS 2191. Independent Study in Family Social Science. (1-4 cr; max 12 cr; SP – #) Independent reading and/or research under faculty supervision.

FSoS 3101. Personal and Family Finances. (3 cr; SP – # 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; SP – # or #) Applies family systems and other family theories to the dynamics and processes relevant to family life. Diversity issues related to gender, ethnicity, sexual orientation, and disability are integrated into the course. Divorce, single parenthood, and remarriage are covered as well as family strengths and family problems.

FSoS 3103. Family Resource Management. (3 cr; SP – # or #) Analysis of the managerial behavior of individuals and families. Emphasis on how individuals and families make decisions and solve problems through the use of interpersonal, economic, natural, and community resources to achieve central life purposes.

FSoS 3150. Special Topics in Family Social Science. (2-4 cr; max 4 cr) SP – Depends on topic, soph Review of research and scholarly thought. See Class Schedule for topics.

FSoS 3191. Independent Study in Family Social Science (1-5 cr; max 12 cr; SP – #; #) Independent reading and/or research under faculty supervision.

FSoS 3426/5426. Alcohol and Drugs: Families and Culture. (3 cr) Psychology and sociology of drug use and abuse. Topics include life-span, epidemiological, familial, and cultural data regarding use; fundamentals of licit and illicit drug use behavior; variables of gender, ethnicity, social class, sexuality, sexual orientation, and disability.
FSoS 3427/5427. Alcohol, Drugs, and the Brain. (1 cr)
The psychopharmacology of alcohol and drug use. Topics include illicit drugs, mechanisms of action in the brain, alcohol and drug taking practices, and the influence of alcohol and drugs on behavior.

FSoS 3428/5428. Assessment and Treatment of Alcohol and Drug Use Issues. (3 cr)
Assessment of alcohol and other drug use problems. Theoretical and practical approaches to diagnosis, screening, and treatment; issues of loss, trauma, family, and culture; diversity issues of gender, ethnicity, social class, therapy, and disability.

FSoS 3429/5429. Counseling Skills Practicum I. (3 cr)
Develop competency in basic counseling skills. Topical areas include counselor needs/motivations, nonverbal communication, basic and advanced empathy, identifying strengths, maintaining focus, challenging dysfunctional use of self. Emphasis on building from client strengths and learning through role-playing.

FSoS 3431/5431. Counseling Skills Practicum II. (3 cr; QP-3029, 3030 or SP-3429)
Exposure to advanced therapeutic methods and understanding the processes of change. Identifying and reinforcing or challenging core beliefs; reframing; paradox; trance and guided imagery; cognitive-behavioral, solution-focused, and narrative therapies. Non-pathologizing models of therapy emphasized.

FSoS 3432/5432. Chemical Abuse and Families: An Overview. (3 cr)
Relationships and family systems with treatment to families in which alcohol or drug use is a problem. Topics include family types, family of origin, models of family therapy, family systems theory, and alcoholism. Review of literature.

FSoS 3433/5433. Group Therapy: Theory and Practice. (3 cr)
Lecture and small group experience designed to introduce group therapy concepts. Stages of group development, affective development, group communication; education, support, and therapy groups, leadership roles and functions, critical incidents, therapeutic factors, and group processes.

FSoS 3434/5434. Gambling in America. (3 cr)
Introduction to risk-taking, gambling, and development of gambling problems. Sociological, historical, economic, and public policy perspectives. Factors contributing to gambling, among young and adults, and frameworks for assessing and treating problematic gambling.

FSoS 3435/5435. Internship in Alcohol and Other Drug Use Problems. (2-18 cr [max 18 cr]; QP-Admission to ADCEP certificate program, #SP-Admission to ADCEP certificate program)
An 880-hour rotating clinical internship designed to strengthen student competencies. Students are placed in 3 to 4 different community agencies/treatment centers. A separate registration is required for each placement.

FSoS 3436/5436. Ethical Issues in Addiction Counseling. (1 cr; QP-Admission to ADCEP certificate program, #SP-Admission to ADCEP certificate program, #)
Exploration/discussion of ethical issues and challenges in addiction counseling and therapy. Motivation-setting; values conflicts; boundary violations; client rights; professional responsibilities; issues in relationship/family therapy, group work, cross-cultural counseling; issues involving working with special populations.

FSoS 3437/5437. Supervision Group. (2 cr [max 6 cr]; QP-Admission to ADCEP certificate program, #SP-Admission to ADCEP certificate program, #)
Supervision of alcohol and drug use counseling in group format. The student presents at least one type of a client counseling session. Role-playing and extensive discussion of critical issues. Focus on non-pathologizing models of therapy. Some training tapes viewed, selected readings.

FSoS 3533/5450. Special Topics: Addiction. (1-4 cr [max 6 cr];)
Selected readings and/or projects in alcohol and drug use and problems. Evaluation of students’ mastery of the assigned study.

FSoS 4101. Sexuality and Gender in Families and Close Relationships. (3 cr; QP-30 cr or grad student in social work, behavioral health, or human service program or # SP-3102, 3103 or #)
Human ecology and human development as frameworks for examining sexuality in the context of close relationships. Diversity of sexual beliefs, attitudes, and behaviors within differing social contexts are examined. Emphasizes scientific knowledge for the promotion of sexual health among individuals, couples, and families through various stages of life.

FSoS 4102. Global and Diverse Families. (3 cr; QP-3600; SP-3102, 3103 or #)
Multiple perspectives on family dynamics of various racial and ethnic populations in the United States and other countries in the context of national and international economic, political, and social processes.

FSoS 4103. Family Policy. (3 cr; QP-SW 3101 or Pol 1001 or # SP-3102, 3103 or #)
Connections between the policies that governments enact and family life. Conceptual frameworks to identify and understand some of the influences underlying policy choices and for evaluating the consequences of such choices for diverse families.

FSoS 4104. Family Psychology. (3 cr; QP-3600; SP-3102, 3103 or #)
Processes that take place in families of origin, families of choice, and other close relationships within diverse social contexts. Emphasis on evaluating current research on family dynamics within and across generations.

FSoS 4105. Methods in Family Research. (3 cr; QP-3600; SP-3101, 3103; intro statistics course or #)
Examines the scientific method, major questions and objectives of family research, data gathering, analysis, reporting, and social context of family research.

FSoS 4150. Special Topics in Family Social Science. (2-4 cr [max 4 cr]; SP-Jr; depends on topic)
Review of research and scholarly thought. See Class Schedule for topics.

FSoS 4152. Gay, Lesbian, and Bisexual People in Families. (2 cr; SP-3102, 3103 or #)
Multiple perspectives of gay, lesbian, and bisexuals in families and their unique contributions to understanding diversity among families. Topics include homophobia, mythologies, coming-out, identity, gender, social networks, intimacy, sexuality, children, parenting, aging, AIDS, and ethnicity.

FSoS 4153. Family Financial Counseling. (2 cr; SP-3101 or # # A-F only)
Introduction to family financial management and strategies of approach of the different stages in the family life cycle.

FSoS 4154. Families and Aging. (3 cr; QP-3260 or 3600, SW 3202 or intro pol sci course or # SP-3102, 3103 or #)
Aging families from diverse socioeconomic and cultural groups are examined as complex multigenerational systems interacting within ever-changing social structures.

FSoS 4155. Parent-Child Relationships. (3 cr; QP-5200 or 5202, PsyCh 1301; SP-3102, 3103 or # # A-F only)
History, theories, research and contemporary practices of parent-child relationships among diverse families and cultures across the life span. Preparation for professionals in education, social work, and other human service occupations.

FSoS 4156. Legal-Economic Controversies in Families. (2 cr; QP-3260 or 3600 or 5202 or # # SP-3102, 3103 or #)
Interdisciplinary course for critical thinking about legal-economic controversies across the family life span. Principles of argumentation and debate are used to analyze controversies with the intention to prepare citizens for public decision making roles and political discourse about controversial family issues.

FSoS 4191. Independent Study in Family Social Science. (1-4 cr [max 12 cr]; SP-3103 or related field grad student, #)
Independent reading and/or research under faculty supervision.

FSoS 4294. Research Internship. ([1-4 cr [max 4 cr]; SP-FSoS major, #)
Directed paraprofessional work with faculty on research projects that may include research planning, proposal writing, literature review, data collection, data coding and/or cleaning, data analyses, and research reporting.

FSoS 4296. Field Study: Working With Families. (4-12 cr [max 12 cr]; QP-3261; SP-3101, # # A-F only)
Directed paraprofessional experience related to the student’s interest of study.

FSoS 5101. Family Systems. (3 cr; SP-53102; grad student or #)
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. (1-4 cr [max 6 cr]; SP-FSoS or related field grad student, #)

Finance (Fina)

Department of Finance
Curtis L. Carlson School of Management

Fina 3001. Finance Fundamentals. (2 cr; QP-Act 1050; SP-Act 2050; A-F only)
Comprehensive introduction to financial management principles. Survey of money and capital markets, the risk/return/valuation tradeoff, time value of money, financial decision-making, cash flow and capital budgeting, corporate investment, capital structure and corporate financial decisions, capital structure and capital allocation, active portfolio management versus index funds, and the valuation of new issues.

Fina 4121. Financial Markets and Interest Rates. (2 cr; QP-BFin 3000; SP-3001; A-F only)
Money and bond markets and the determination of interest rates; Federal Reserve operations; theories of the term structure of interest rates, duration and convexity; topics in bond portfolio management.

Fina 4122. Banking Institutions. (2 cr; QP- BFin 3200; SP-4121; A-F only)
The management of banking institutions including commercial banks and thrifts. Theory and practice in banking. Specific topics include asset management, liability management, and capital management. Some public policy issues in banking also considered.

Fina 4241. Corporate Financing Decisions. (4 cr; QP-BFin 3000; BFin 3100; SP-3001; A-F only)
Develops theoretical and applied understanding of financial decisions. Includes the impact of financing on real asset valuation, debt maturity choice, dividend policy, bankruptcy costs and debt holder-equity holder conflict, capital structure and corporate strategy, effect of financing decisions on managerial incentives, information conveyed by financial decisions, and primary equity markets.

Fina 4242. Corporate Investment Decisions. (4 cr; QP-BFin 3000; BFin 3100; SP-3001; A-F only)
Focuses on efficiently managing working capital and fixed assets. Topics include managing cash, receivables, and inventories; evaluating short-term financing; making capital budgeting decisions; assessing mergers and acquisitions; and reviewing and targeting performance.

Fina 4321. Portfolio Management and Performance Evaluation. (2 cr; QP-BFin 3000; SP-3001; A-F only)
Introduces the investment environment and the concepts used to manage security portfolios. Topics include an introduction to portfolio and security risk and return tradeoffs, portfolio diversification, asset allocation, active portfolio management versus index funds, and portfolio performance evaluation.
**Fisheries and Wildlife (FW)**

Department of Fisheries and Wildlife

College of Natural Resources

FW 1001. Orientation in Fisheries, Wildlife, and Conservation Biology. (1 cr; A-F only)
Survey of technical requirements and education needed for careers in fisheries, wildlife, and conservation biology. Introduction to fields of work, problems, and career opportunities.

FW 1002. Wildlife: Ecology, Values, and Human Impact. (3 cr)
Controversial issues involving specific wildlife management principles and techniques. For students without natural science background interested in natural resource topics, especially wildlife management issues.

FW 2001. Introduction to Fisheries, Wildlife, and Conservation Biology. (3 cr; QP: Biol 1201 or Biol 1009; SP: Biol 1001 or Biol 1009)
Theory and practice of fisheries and wildlife management including single species populations, ecosystem, and landscape approaches. The biota, habitat, and sociopolitical aspects of human use. Case studies explore current issues in conservation.

FW 3003. Wildlife in Agricultural Land. (2 cr)
The ecology and management of fish and wildlife in areas of intensive agriculture. Conservation and management practices for fish and wildlife on land used for agricultural purposes. Designed specifically for majors in agricultural sciences.

FW 4001. Biometry. (4 cr; QP: Math 1031; SP: Math 1031; A-F only)
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: QP: Biol 5600; SP: 4106, A-F only)
Field identification of important plants in fisheries and wildlife habitats.

FW 4108. Field Methods in Research and Conservation of Vertebrate Populations. (1 cr: QP: Biol 3008; SP: Biol 3407; A-F only)
Planning and implementation of research and management projects; collect and analyze data in groups; group and individual oral and written reports; each student keeps a field journal.

FW 4129. Mammalogy. (4 cr; QP: Biol 1106 or 3101 or SP: Biol 2012 or A-F only)
Evolutionary and biogeographic history of mammals. Recognize, identify, and study natural history of mammals at the ordinal level, North American mammals at familial level, and mammals north of Mexico at generic level. Minnesota mammals at specific level.

FW 4136. Ichthyology. (4 cr; QP: Biol 1106 or 3101; SP: Biol 2012) Fish biology, adaptations to different environments and modes of living, and evolutionary relationships. Laboratory emphasizes anatomy and identification of Minnesota fishes.

**FW 4200. Honors Seminar.** (1 cr; QP: Admission to FW honors program; SP: Admission to FW upper div honors program; A-F only)
Lectures and discussions on current topics presented by faculty and students.

FW 4291. Independent Study: Fisheries. (1-5 cr; QP: #; SP: #)
Individual field, library, and lab research in fisheries.

FW 4292. Special Lectures: Fisheries. (1-5 cr; QP: #; SP: #)
Lectures on special topics of fisheries given by a visiting scholar or regular staff member.

FW 4391. Independent Study: Wildlife. (1-5 cr; QP: #; SP: #)
Individual field, library, and lab research in wildlife.

FW 4392. Special Lectures: Wildlife. (1-5 cr; QP: #; SP: #)
Lectures on special topics of wildlife given by a visiting scholar or a staff member.

FW 4401. Introduction to Fish Physiology and Behavior. (4 cr; QP: Biol 1109; SP: Biol 1001 or 1009)
The physiology of fishes and their behavior, with an emphasis on how life in aquatic environment has influenced fish biology. Includes examination of ionic and osmotic balance, sensory systems, gas exchange, endocrinology, growth, foraging, locomotion, reproduction, orientation and migration, and toxicology.

FW 4565. Fisheries and Wildlife Ecology and Management: Field Trip. (1 cr; QP: #; SP: #)
Ten-day field trip to Wyoming and points en route during spring break emphasizing a broad range of fisheries and wildlife management issues including big game, waterfowl, and endangered species.

FW 4701. Fisheries and Wildlife Problem Solving. (2 cr; QP: FW sr or grad student or SP: FW sr or grad student or #)
Experience in problem solving, management problem identification and analysis design, information and data gathering analysis, and oral and written problem reporting. Contemporary fisheries and wildlife management issues selected for topics.

FW 4801. Honors Research. (2 cr; QP: Admission to FW honors program; SP: Admission to FW upper div honors program; A-F only)
First semester of an independent research project supervised by a faculty member.

FW 4802. Honors Research. (2 cr; QP: Admission to FW honors program; SP: Admission to FW upper div honors program; A-F only)
Continuation of 4801. Students complete honors thesis and present oral report.

FW 5051. Analysis of Populations. (3-4 cr; QP: Biol 1109 or Biol 1201, Stat 3011 or Stat 5021 or #; SP: Biol 1001 or Biol 1009, FW 4001 or Stat 3011 or Stat 5021 or #)
Factors involved in the regulation, growth, and general dynamics of populations. Data needed to describe populations, population growth, population models, and regulatory mechanisms.

FW 5411. Aquatic Toxicology. (3 cr; QP: Biol 3008 or EEB 3401; SP: Biol 3407 or EEB 4601)
Pollution assessment approaches, biological effects, fate and flow of contaminants in aquatic systems, and major types of pollutants.

FW 5455. Sustainable Aquaculture. (3 cr; QP: Biol 1106, Chem 1051, Math 3031 or #; SP: Biol 2012, Chem 1021, Math 3031 or #; A-F only)
Role of aquaculture in fisheries management, biodiversity rehabilitation, and food production around the world. Implications for the sustainability of human-environment interactions in different societies. Principles of fish husbandry.
Food Science and Nutrition (FScN)

Department of Food Science and Nutrition
College of Agricultural, Food, and Environmental Sciences and College of Human Ecology

FScN 1011. The Science of Food. (4 cr)
Physical and chemical changes occurring during common food preparation techniques are evaluated. Experiments conducted to measure changes in specific food quality attributes.

FScN 1021. Introductory Microbiology. (4 cr)
Broad introduction to the diverse world of microbes and how they impact our world in both deadly and lifesaving 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)
Fundamental concepts of nutrition, nutrient functions, human nutritional requirements, food sources, evaluating nutrition information, food safety, role of nutrition in chronic diseases, nutrition policy, nutrition and the environment.

FScN 1511. Food Animal Products for Consumers. (3 cr; SP-ApEc 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; QP-Chem 1002 or Chem 1052; QP-Chem 1022)
Introduction to the chemical and physical properties of foods; interaction, reaction, and evaluation of foods due to formulation, processing and preparation.

FScN 3612. Life Cycle Nutrition. (3 cr; QP-Chem 1052; SP-Chem 1022)
Understanding role of changes throughout the life cycle including pregnancy, lactation, childhood, adulthood, and aging. Discuss topics relevant through life cycle changes including body composition, immunity, and sports nutrition.

FScN 3614. Nutrition Education. (2 cr; QP-1612; SP-1112)
Application of theories and principles of learning, behavior change, and instructional methods to nutrition education.

FScN 3615. Sociocultural Aspects of Food, Nutrition, and Health. (3 cr; QP-1612; SP-1112)
Sociocultural aspects of regional and cultural diversity in food preferences and food behavior, food habits, demographics, lifestyles, food consumption, and expenditures. Effect of socioeconomic status, religious beliefs, age, and cultural meaning of food on food choices.

FScN 3662. Introduction to Dietetic Practice. (2 cr; QP-Chem 1612; 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; QP-Chem 3102; SP-Chem 3732 or SP-Chem 3732)
Experience in the management of a food service operation. On- and off-campus commercial and institutional food service restaurants used as laboratories. Field trips required.

FScN 3732. Food Service Operations Management. (3 cr; QP-Chem 3102; SP-Chem 3102 or SP-Chem 3102)
Knowledge and skills of planning, preparation, delivery, service, and management of foods served away from home.

FScN 3796. Field Experience in Food Service Management. (3 cr; QP-Chem 3732, admitted to Coordinated Dietetics Program; SP-Chem 3732 or SP-Chem 3732, admitted to Coordinated Dietetics Program)
Supervised field experience in food service production and management experience in a community or health care facility.

FScN 4096. Professional Experience Program: Internship. (1-3 cr; max 6 cr; QP-FScN undergrad; UC only; SP-FScN undergrad; UC only; S-N only)
Supervised practical and professional experience in food industry firms, government agencies, evaluative reports and consultations with faculty advisers and employees. Registration information in COAFES Career Services.

FScN 4103. World Food Problems. (3 cr; QP-Prot 5200; AP-Ec 5706; CAPS 5200; or jr or grad student; SP-Prot 4103; AP-Ec 4103; CAPS 4103; jr or sr or grad student)
A multi-disciplinary 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; QP-Chem 3102; BioC 3021; SP-Chem 3102; BioC 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; QP-Chem 3102; VBP 3103 or MccB 3105; SP-Chem 3102; VBP 3102 or MccB 3301 or MccB 3102)
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; QP-VBP 3103 or MccB 3105; SP-4121)
Microbiological methods for analysis of foods and the uses of microorganisms for the production of foods.

FScN 4131. Food Quality. (3 cr; QP-Chem 3102; SP-Chem 4111; SP-Chem 4121)
Management systems in the processing and distribution of foods that ensure 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; QP-3 SP-#)
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; QP-Undergrads, SP-Undergrads, #)
Individual lab or library research in an area related to food science or nutrition.

FScN 4312. Food Analysis. (4 cr; QP-Chem 3102; SP-Chem 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. Principles of Food Engineering. (4 cr; QP-Chem 3116; Math 1252; Phys 1042; SP-Chem 3102; Math 1272, Phys 1102 or Phys 1302)
Specific applications of engineering principles (e.g., heat and mass transfer, kinetics, thermodynamics) to unit operations in food production.

FScN 4332. Food Processing Operations. (3 cr; QP-Chem 3102; SP-Chem 4331)
Application and integration of engineering principles to unit operations used in food production including equipment design and effects of processing on food quality (chemical and microbiological).

FScN 4341. Sensory Evaluation of Food Quality. (3 cr; QP-Chem 3112; Math 5100; Phys 3102; SP-Chem 4113, Stat 3011)(SP-Chem 4113)
Fundamentals of sensory perception and test designs and methods used in studying sensory qualities of foods. Group project on matching use of sensory and physical properties of commercial product. Design a quality control system for microbial, sensory, and nutritional quality of selected products.

FScN 4342. Properties of Water in Foods. (4 cr; QP-Chem 3102; SP-Chem 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. (3 cr; QP-Chem 3110; Math 5135; SP-Chem 4111, 4121, 4331)
Demonstration and application of the basic concepts of food engineering and processing to the production of fluid, concentrated, and dehydrated dairy products.

FScN 4344. Technology of Fermented Dairy Products. (4 cr; QP-Chem 3110; Math 5135; SP-Chem 4111, 4121, 4331)
Integration of chemical, microbiological, and physical principles involved in the manufacture and storage of cheeses and fermented milks.

FScN 4451. Food Marketing Economics. (3 cr; QP-Arg 4451; AP-Ec 4451; AP-Ec 3001 or Econ 3103)
Consumption trends; consumer food behavior; marketing strategies; consumer survey methodology; food distribution and retailing system; food policy issues related to food marketing. Individual and group projects.
FScN 4596. Field Experience: Community Nutrition. (3 cr;QP–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 4614. Community Nutrition. (3 cr;QP–1612; SP–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 life cycle, ethnic or cultural backgrounds, and literacy levels.


FScN 4666. Medical Nutrition Therapy II. (3 cr; QP–5666;SP–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.

FScN 4696. Field Experience: Medical Nutrition Therapy I. (6 cr;QP–Second year students in Coordinated Program in Dietetics or #;SP–Second year students in Coordinated Program in Dietetics or #) Application of nutrition knowledge in the solution of problems related to disease and injury; assigned readings, discussions, and experience in medical centers and long-term care facilities. Emphasis on nutrition support of gastrointestinal, immune and respiratory disorders, and cancer.

FScN 4732. Food and Nutrition Management. (3 cr; QP–3732, Mgmt 3001;SP–3732,Mgmt 3001) Financial and human resource management applied to a variety of business and institutional settings. Field trips may be required.

FScN 4796. Field Experience in Food and Nutrition Management. (3 cr;QP–Second year students in Coordinated Program in Dietetics or #;SP–Second year students in Coordinated Program in Dietetics or #) Application of principles of food service management to problems in community, commercial, or health care facilities.

FScN 4896. Field Experience: Medical Nutrition Therapy II. (3 cr;QP–Admitted to Coordinated Program in Dietetics or #;SP–Admitted to Coordinated Program in Dietetics or #) Application of nutrition knowledge in the solution of problems related to health and disease; assigned readings, discussions, and experience in medical centers. Emphasis on pediatrics, home health care, and staff relief.

FScN 5111. Food Biotechnology. (2 cr;QP–5120; SP–4121) Genetic tools as applied to food biotechnology. Improvement of microbes used in food production by modern biotechnological approaches. Discuss need for stringent regulation of modern biotechnology as well as ethical and legal issues.

FScN 5112. Introduction to Food Law. (3 cr;QP–1102; SP–1102) 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.

FScN 5113. Physicochemistry of Food. (2 cr;QP–5110;SP–4111) Surface phenomena, colloidal interactions, liquid dispersions, gels, emulsions and foams, and functionality of food macromolecules in these systems.

FScN 5441. Introduction to New Product Development. (2 cr;QP–5110,5135;SP–4111,4331) Interactive course that introduces students to the principles of new product development, from identification and testing of new product concepts, through prototype testing, to basic process design using examples from industry.


FScN 5452. Food Packaging. (2 cr;QP–1102,3102,Phys 1042;SP–1102,3102,Phys 1102 or Phys 1302) Materials, principles, and procedures of packaging as they apply to food products. Emphasis is on consumer products, but the principles also apply to bulk and institutional foods and ingredients.


FScN 5521. Flavor Technology. (2 cr;QP–5110; SP–4111) Flavor and off-flavor development in foods. Industrial production of food flavorings and their proper application to food systems.

FScN 5531. Grains: Introduction to Cereal Chemistry. (3 cr;QP–5612, Chem 1052;SP–5102, Chem 1022) Origins, structure, biochemistry, and cellular properties of major cereal grains as they relate to primary processing (milling) and secondary processing (production of cereal products).

FScN 5561. Nutrition and Metabolism. (4 cr;QP–3612, BioC 3021, Phsl 3051;SP–3612, BioC 3021, Phsl 3051) Facilitates understanding of carbohydrate, lipid, and protein metabolism using a “systems” or “holistic” approach to emphasize how metabolic pathways interrelate.


FScN 5623. Regulation of Energy Balance. (2 cr;QP–3612, BioC 3021, Phsl 3051;SP–3612, BioC 3021, Phsl 3051) Regulation of energy balance in humans including regulation of food intake and energy expenditure.

For definitions of course numbers, symbols, and abbreviations, see inside back cover.
Introduction to the hydrologic cycle and hydrologic processes. Effects of forest management and other types of land use on water yield, stormflow, erosion, sedimentation, and water quality. Concepts, principles, and applications of watershed management.

The structure and physiological functioning of trees. Relations of tree biology to ecology and management.

An introduction to GIS focusing on natural resources. Topics include data structures; sources, collection, and quality; geodesy and map projections; spatial analyses; cartographic modeling. Laboratory exercises complement theory covered in lecture.

Lectures and discussions on current topics presented by faculty and students.

Development of environmental framework for understanding recreation and leisure behavior; contributions of several disciplines; current cultural trends; management implications for public and private management of recreational and leisure setting.

Sample survey techniques; measurement and sampling methods for forest vegetation; tree and stand growth modeling; landscape processes, characterization, and modeling. The urban forest is studied as a social as well as a biophysical resource. Emphasis on management of urban forest ecosystem to maximize benefits to people.

Field Silviculture. (3 cr; FR 5100; FR 4411)
Practice in marking for thinning, writing prescriptions for reforestation, and other management practices. Evaluation of site conditions and impact of management on site productivity and wildlife habitat. Oral and written reports, field trips. Offered at Cloquet Forestry Center.

Field Applications. (2 cr; FR 5128, 5262; FR 4426; A-F only)
Field applications of remote sensing, sampling and measurement methods to inventory, mapping and monitoring forest and other natural resources. Offered at Cloquet Forestry Center.

Field Harvesting and Road Planning: Field Applications. (2 cr; FR 4611)
Field application of best management practices, preparation and administration of timber sales, and forest road design. On-site evaluations of timber harvesting systems. Offered at Cloquet Forestry Center.

First semester of an independent research project supervised by a faculty member.

Students complete honors thesis and present an oral report.

Student selects and conducts a research project on topic of personal interest under guidance of a faculty mentor. The course is documented by an initial report and proposals of accomplishments.

The form and function of forests as ecological systems. Characteristics and dynamics of species, populations, communities, landscapes, and ecosystem processes. Examples apply ecology to forest management. Emphasis on fire ecology. One field trip and weekly recitations.

The tropical forest ecosystem. (3 cr; FR 5218 or above ecology course; SP–3xxx or above ecology course)
Ecological principles related to function, form, and development of wet and dry tropical forests at organismal, community, and ecosystem scales. Succession, productivity, biodiversity, sustainability, agroforestry, and management alternatives. Natural distribution of forest types; causes, consequences, and extent of deforestation.

Implications of global change upon wild and cultivated vegetation including forests, grasslands, and agricultural ecosystems. Responses at ecosystem, community, organismal, and physiological scales. Potential climate change; elevated atmospheric concentrations of carbon dioxide, ozone, and other trace gases; acid deposition; and other pollutants.

Forest and Wetland Hydrology. (3 cr; FR 5114 or SP--Basic hydrology course or #)
Current topics, problems, and methods associated with forest and wetland hydrology. The hydrologic role of forest vegetation in snow and rainfall regimes. Analytical methods and models to evaluate effects of vegetation management in uplands and wetlands on the amount and timing of water flow.

Forest and Measurements: Field Experience. (2 cr; FR 4411, 4412; A-F only)
Forest plant identification, forest community description and community dynamics, mapping forests, tree and stand measurement. Taught in Isaszaga State Park.

Advanced Topics in Assessment and Modeling of Forests. (3 cr; FR 5218 or equiv, NRES 5210 or equiv, Stat 5021 or equiv; SF 4218, Math 1272; Stat 5021; A-F only)
Recently developed mathematics, computer science, and statistics methodologies applied to forest resource functioning, management, and use problems.

Role of Renewable Natural Resources in Developing Countries. (1 cr; FR 4501–SR or grad student or #; SF 4325, 4326, 5500; A-F only)
International perspectives on important resource issues, including integration of natural resource, social, and economic considerations. Overviews of issues and case studies.

Advanced Forest Management Planning. (2 cr; FR 5270 or # SP 4471; A-F only)
Strengths and weaknesses of modeling tools used in forest planning. Emphasis on problem sets and applications ranging from stand-level management to regional timber supply analyses and landscape-level planning. Review of recent literature and practical problems with implementation.

Fundamentals of Natural Resource Education. (1-2 cr)
For elementary teachers and others with instructor permission. Focus on understanding the forest community, the tools used by foresters, and awareness of effective forest management practices. Forestry-related indoor and outdoor activities which can be translated for classroom use.

Advanced Remote Sensing. (3 cr; FR 5262 or # SP 4426)
Provides fundamental and working knowledge of biophysical-quantitative remote sensing and its applications to monitoring environmental and natural resources. Includes experience working with digital remote sensing data, models, and image processing.

Colloquium in Natural Resources. (1-3 cr; FR–Variety with topic–SP–Variety with topic)
Colloquium in specialized topics in natural resources.

French (Fren)

Department of French and Italian

College of Liberal Arts

Fren 0001. Reading French in the Arts and Sciences. (0 cr)
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 1002. Beginning French. (4 cr; SP-1001 or equiv) Basic listening, speaking, reading, and writing skills. Emphasis on communicative competence. Some cultural readings.


Fren 1022. Accelerated Beginning French. (4 cr; SP-Two or more yrs high school French) For students who have studied French in high school or at community colleges and who do not place high enough on placement exam to enter 1003. An accelerated review of Fren 1001 followed by the material covered in Fren 1002.

Fren 3014. French Phonetics. (2 cr; SP-1004 or equiv) Articulatory description of the sounds of French, phonetic transcription, and remedial practice to improve pronunciation.

Fren 3015. Advanced French Grammar and Communication. (4 cr; SP-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 3016. Advanced French Composition and Communication. (4 cr; SP-3015 or equiv or #) Advanced study of grammar in context; emphasis on writing for varied communicative purposes, reading for style and content, translation.

Fren 3018. French Oral Communication. (3 cr; SP-3015) Intensive work in oral expression and listening comprehension in French, incorporating a wide variety of cultural topics.

Fren 3019. French Diction and Speaking. (2 cr; SP-3015) 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 3022. The Language and Culture of Business in France. (3 cr; SP-3101) Advanced study of French with particular emphasis on making a commercial telephone call in French, or on business correspondence with French-speaking companies.

Fren 3101. Introduction to French Literature. (4 cr; SP-3015 or equiv) Close critical analysis of poetry, prose fiction, and plays. Introduction to literature and methods of literary analysis.

Fren 3110. Medieval Stories. (3 cr; max 9 cr; SP-3010) Reading and discussion of major forms of the medieval tale (comic, bawdy, moralizing, fantasy, historical) in modern French translation. Exploration of their relationship to the development of French culture, especially urbanization, class relations, marriage, role of Church.

Fren 3117. The Unruly Subject(s) of Classicism: Writing, History, Power in Ancient Régime France. (3 cr; SP-3010 or equiv) The formation of subjectivity in the literature and culture of 17th- and 18th-century France. Aesthetics of classicism, consolidation of state power, and representations of the individual in theater, novel, and prose.

Fren 3172. The Court Society: Literature, Culture, Spectacle. (3 cr; SP-3010) Examines the court and salon society in 17th-century France. The production of taste, sociability, and national identity is considered in literature, painting, architecture, and the plastic arts.

Fren 3181. Mapping Enlightenment in 17th- and 18th-Century French Prose. (3 cr; SP-3010) The themes, values, and critical strategies of the social and intellectual movement designated by the term Enlightenment. The legacy of the Enlightenment project will also be evaluated.

Fren 3251. French Poetry. (3 cr; SP-3101) The historical, political, and social contexts of the evolution of French poetry from its origins to the modern era. While studying primarily lyric poetry, epic and dramatic poetry may also be considered when appropriate.


Fren 3280. The Indispensables: French Texts to 1789. (3 cr; max 9 cr; SP-3010) Emphasizes the teaching of French in France. Literature will be studied in relation to the Francophone world. Grammar review and elaboration.

Fren 3321. Producing the Bourgeois Subject: The Sense of Self in 18th-Century French Literature. (3 cr; SP-3010) 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 3323. Literature of Revolution and Uproar. (3 cr; SP-3010) A study of the political and social upheavals of the French Revolution and the 18th-century cultural revolution.

Fren 3324. Legal Issues in French Novels Since the Revolution. (3 cr; SP-3101) The importance of legal issues in French novels. Analyze the impact of lawyers, judges, witnesses, the police, etc. on individual and interpersonal relationships. Examine how novelists short-circuit the legal system and create alternative ways of settling disputes.

Fren 3368. Coming of Age. (3 cr; SP-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 3371. Writing Crisis in (Post) Modern Times. (3 cr; SP-3101) An analysis of the political and social upheavals of the French Revolution and the 18th-century cultural revolution.


Fren 3401. Québecois Literature. (3 cr; SP-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; SP-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; SP-5501, 3014, 3105) Linguistic study of contemporary French word forms (inflectional and derivational morphology); introduction to French syntax (linguistic study of grammar) and characteristic syntactic constructions.

Fren 3521. History of the French Language. (3 cr; SP-3015, Ling 3001 recommended) Examination of the historical, political, and social contexts of the evolution of French poetry from its origins to the modern era. While studying primarily lyric poetry, epic and dramatic poetry may also be considered when appropriate.

Fren 3601. French Civilization and Culture I. (3 cr; SP-3015) Roman occupation of Gaul to 1715.

Fren 3602. French Civilization and Culture II. (3 cr; SP-3015) 1705 to present.

Fren 3650. Topics in French/Francophone Cultures. (3 cr; max 9 cr; SP-3015) Focus on aspects of French and/or Francophone cultures in various historical, social, political, and geographical contexts.

Fren 3701. Reading Libertinage: Dangerous Lessons in Translation. (3 cr; SP-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 3706. Quebec Literature and Film in Translation. (3 cr; SP-Not for majors) 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 3801. 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.

Fren 4101. Seminar in French Studies. (3 cr; SP-Completion of all pre-requisite requirements for major or permission of director of undergraduate studies) 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; SP–3502 or #) Toward an integrated selection from French syntax, pragmatics, discourse analysis, or sociolinguistics.  
Fren 4970. Directed Readings. (1-4 cr; max 9 cr; SP–#) Designed to meet unique requirements agreed upon by a faculty member and a student. Individual contracts are drawn up listing contact hours, number of cr, writing and other work required. Each contract will vary.  
Fren 5251. Promenades Poétiques: The Subject in Motion. (3 cr; SP–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 5261. The Returns of Tragedy. (3 cr; SP–3111 or above) Tragedy as dramatic form in relation to social order, myth and history, and theatre.  
Fren 5271. “To Change or not to Change?” Speculations on (Post) Modern French Texts. (3 cr; SP–3111) The meaning and purpose of the notion of “change” in French novels. Explore how a multiplicity of causes produces major changes in an individual’s 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; SP–# for undergrad) 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 5479. Post/Colonial Francophone Literatures. (3 cr; SP–3111 or above) Francophone literature from North Africa, Africa, and the Caribbean of the colonial and/or post-colonial era in the light of relevant literary and cultural theories.  
Fren 5501. Structure of French: Phonology. (3 cr; SP–§3501; Ling 3001 or 5001, grad student, #) Advanced study of the sound system of contemporary French.  
Fren 5502. Structure of French: Morphology and Syntax. (3 cr; SP–§3502; 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; SP–§3531; Ling 3001 or 5001, grad student) Explores variation in the use of French associated with factors such as medium (oral/written), style (formal/informal), region, social and economic groups.  

**General College (GC)**

**General College**

**BC**—Base Curriculum  
**TC**—Transition Curriculum  
**CE**—Commanding English

**GC 0622. Geometry: Programmed Study.** (0 cr; QP–0621 or equiv; SP–[4 cr equiv], 0721 or GC, math placement, #/BC) Basic geometric concepts and introductory logic: proof, measurement, angles, polygons, plane geometric figures, three-dimensional figures, relations among angles, and constructions. Programmed study: students complete course requirements in time frame established by instructor. (UC only.)  
**GC 0643. Mathematics: Programmed Study.** (0 cr; SP–4 cr equiv, # BC–A–F only) 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 test. (UC only.)  
**GC 0712. Introduction to Algebra Part I.** (0 cr; QP–0611 or 0615 or equiv; SP–[4 cr equiv], 0616, 0721, §1435; GC math placement; BC–A–F only) Learning and using behaviors that increase the probability of success in math courses. Properties, concepts, and procedures of arithmetic fractions, percents, unit conversions, and simple geometric figures. Signed numbers, equations, inequalities, and algebraic word problems.  
**GC 0713. Introduction to Algebra Part II.** (0 cr; SP–[4 cr equiv], §0617, 0618, 0721, §1435; #0712 instructor BC–A–F only) Continuation of 0712. Learning and using behaviors that increase the probability of success in math courses. Rectangular grids, exponents, polynomials, factoring, rational expressions, linear modeling, and algebraic work problems. 0712 and 0713 combined cover the content of 0721.  
**GC 0721. Introductory Algebra.** (0 cr; QP–0611 or 0615 or equiv; SP–[4 cr equiv], §0616, 0617, 0621, §1435; GC math placement; BC–A–F only) Concepts and procedures of elementary algebra: equations, inequalities, exponents, polynomials, factoring, rational expressions, graphs, word problems. Content roughly equivalent to 9th-grade algebra but pace, difficulty, and level of abstraction geared for college. Preparation for intermediate algebra (GC 0731).  
**GC 0731. Intermediate Algebra.** (0 cr; QP–C or above in 0625 or 0621 or equiv; §0616, §0631, §1443, §1444, §1445, §1446; C or better in 0721 or GC math placement; BC–A–F only) Absolute value, systems, linear, quadratic, rational, exponential, and logarithmic functions, radicals, conic sections, sequences, series, Binomial Theorem. Content equivalent to 11th-grade algebra but pace, difficulty, and level of abstraction geared for college. Preparation for precalculus.  
**GC 1041. Developing College Reading.** (2 cr; SP–CE enrollment, # BC) Comprehension and study strategies for reading college-level textbooks. Previewing a textbook for content and organization, underlining and making margin notes, outlining, anticipating test questions, and interpreting technical vocabulary. For nonnative speakers of English only. Paired with a designated content course.  
**GC 1042. Reading in the Content Area.** (2 cr; SP–CE enrollment, & BC) Practice reading skills and strategies for a content area. Previewing and predicting content and organization, note taking, outlining, anticipating test questions, and interpreting technical and sub-technical vocabulary. For nonnative speakers of English only. Paired with designated content course.  
**GC 1051. Introduction to College Writing: Workshop.** (2 cr; SP–#1407; #1421 or #1422, BC) For nonnative speakers of English enrolled in GC 1421 or GC 1422. Develop language editing strategies through review of linguistic features of standard written English and focus on style and language in writing. Small-group activities and in-group or individual conferences.  
**GC 1076. Career Planning: Strategies for Exploration.** (1 cr; BC) Identify educational and career goals: self-assessment, vocational inventories, and workbook activities. Through discussion, students learn about the world of work and their place in it.  
**GC 1081. Academic Development Seminar: Supplemental Instruction in Social Sciences.** (1 cr; SP–specific content course, adviser approval after one 1081–1085 regis; BC–A–F only) Introduces students to successful methods of study in social science courses: note taking, exam preparation, and time management. Includes specific writing tasks, critical thinking, research methods, and essay and presentation styles associated with disciplinary content.  
**GC 1082. Academic Development Seminar: Supplemental Instruction in the Sciences.** (1 cr; SP–specific content course, adviser approval after one 1081–1085 regis; BC–A–F only) Introduces students to successful methods of study in science courses, including note taking, exam preparation, and time management. Specific problem solving techniques, augmented problem sets, writing tasks, and presentation styles associated with disciplinary content.  
**GC 1083. Academic Development Seminar: Supplemental Instruction in the Humanities.** (1 cr; SP–specific content course, adviser approval after one 1081–1085 regis; BC–A–F only) Introduces students to successful methods of study in humanities courses: note taking, exam preparation, and time management. Specific writing tasks, critical thinking skills, research methods, and essay and presentation styles associated with disciplinary content.  
**GC 1084. Academic Development Seminar: Supplemental Instruction in Mathematics.** (1 cr; SP–specific content course, adviser approval after one 1081–1085 regis; BC–A–F only) Introduces students to successful methods of study in mathematics courses, including note taking, exam preparation, and time management. Necessary math background, specific problem-solving techniques, and the application of mathematical concepts associated with disciplinary content.  
**GC 1085. Academic Development Seminar: Supplemental Instruction in Composition.** (1 cr; SP–specific content course, adviser approval after one 1081–1085 regis; BC–A–F only) Introduces students to successful methods of study in composition courses, including note taking, exam preparation, and time management. Specific writing tasks, research methods, and essay and presentation styles associated with disciplinary content.

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**French and Italian (Frt)**

**Department of French and Italian**

**College of Liberal Arts**

**Frt 3802. Cinema and Realism.** (3 cr) Examines French poetic realism, relating it to two other periods of realist film, Italian Neorealism and American film noir. Taught in English. Knowledge of French helpful but not necessary.  
**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 5257. Passionate Beings: Literary and Medical Problematics in Italy and France from 1800 to the Present.** (4 cr) Sith and medical representations of the passions in France and in Italy from 1800 to the present. Texts range from theatrical works to medical treatises on the passions as well as for exploring notions of subjectivity, responsibility, order. Taught in English.  
**Frt 5999. Teaching of French and Italian: Theory and Practice.** (3 cr) Theoretical and practical aspects of language learning and teaching applied to French and Italian. Includes history of foreign languages teaching in 20th-century United States. Taught in English.
GC 1086. Freshman Seminar. (2 cr; SP, BC; AF only) Awareness of roles, identity, needs, and interactions with diverse cultural groups. Expectations, resources, and challenges associated with transition into college. Speakers, journals/portfolios, technology, reading and writing assignments, and classroom exercises and experiences.

GC 1111. Science in Context: Weather and Climate. (4 cr; BC) Basic scientific principles and concepts are applied in the context of the atmosphere and its weather and climate. Learn how familiar types of weather happen, forecast weather, and predict regional climates.


GC 1131. Principles of Biological Science. (4 cr; QP–0611 or 0615 or equiv; SP–0711 or equiv or 0711; BC) Biodiversity and classification, genetics, evolution, ecology, life cycles and reproduction, cell theory, and chemical bases for life from a “how-we-know” perspective; relevancy to modern life. Inquiry-based, collaborative lab. (3 lect, 2 lab hrs per wk)

GC 1132. Essentials of Human Anatomy and Physiology. (3 cr; QP–0611 or 0615 or equiv; SP–0711 or equiv; BC) Organized by organ systems (e.g., urinary, reproductive) the course examines both health and disease. Active learning: lecture materials and activities via Internet. (UC or IDL only.)

GC 1133. Nature Study. (3 cr; TC) Natural history for students with little or no training in biology. Minnesota plants and animals examined in the field from viewpoint of informed amateur naturalist. Life cycles and natural habitat associations, field observation and identification techniques, popular and scientific literature.

GC 1135. Human Anatomy and Physiology. (4 cr; QP–0621 or equiv; SP–0721 or equiv; BC) Organized by organ systems (e.g., urinary, reproductive) the course examines both health and disease. Access to many instructional materials and activities via Internet.

GC 1137. Biological Science: The Human Body Laboratory. (4 cr; BC) Course; completion of GC 1132 under quarter system; offered for a limited number of semesters; BC) Lab experience - Form and function of gross anatomy and histology: development of structures; histological identification; and interpretation. Laboratory. (3 cr; BC only)

GC 1141. Principles of Chemistry. (3 cr; QP–0621 or equiv; SP–0721 or equiv; BC) Problem-solving techniques. Classification of matter, elements, atomic and molecular structure, compounds, molar calculations, chemical bonding, empirical formulas, chemical reactions, stoichiometry, bond energy and enthalpy, gases and gas laws, solutions, solution concentrations, acids, bases, qualitative equilibrium.

GC 1171. Physical Geology. (4 cr; BC) Development of common land features (valleys, mountains, rivers, lakes) and processes responsible for their origin and change. Types of surface materials, Movements inside Earth and their effects on its surface. Lab: mineral and rock analysis, topographic map reading, landform identification, landscape interpretation.

GC 1172. Historical Geology. (4 cr; BC) Development of earth’s physical and chemical features through time, with changing patterns of life as a response. Problem-solving, logical deductions from facts stressed. Lab: identification and interpretation of rocks, fossils, geologic maps, ancient environments, and geographies. (3 lect, 4 lab hrs per wk)


GC 1211. People and Problems. (4 cr; BC) Explore social problems that arise in our diverse society. Sociology is the chief, but not exclusive, source of concepts and theories used to analyze problems such as unemployment, social inequality, violence, and the environmental crisis (15 hours in community involvement/service).

GC 1212. Minnesota History. (4 cr; TC) Minnesota geography, resources, exploration, settlement, ethnicity, economics, and politics related to the Upper Midwest, the nation, and Canada. Researching and writing family or local history as part of the larger history of this region and nation.


GC 1232. U.S. Government and Politics. (4 cr; BC) Structure and process. How government institutions address the demands made on them are examined in the following topics: history and foundations of government structure; institutions of power; links between people and government; government and social welfare, economic, military, and foreign policies.

GC 1235. Law in Society. (4 cr; BC) How social science concepts and research affect legal responses to social conflict. History and philosophy of American law; interaction of social and legal institutions; effect of beliefs and social conditions on how law addresses family, criminal, employment, and environmental issues.

GC 1251. World History: Since 1500. (4 cr; BC) Political, economic, social, diplomatic, and intellectual aspects of major world cultures. Awareness of growing interdependence of peoples and international perspectives of events that affect students’ lives. Classroom simulations, lecture, and discussion.

GC 1280. Psychology and Everyday Life. (3 cr; BC) Using psychological research and theory for effective living. Establishing positive relationships, managing stress, maintaining physical and mental health, leadership, gender roles, and work roles. Readings, writing assignments, and class discussion. Development of appropriate study strategies for social science courses.

GC 1281. General Psychology. (4 cr; BC) Individual instruction and computer technology help students develop as independent learners. They survey major psychological theories, concepts, and methods. Satisfies introductory psychology requirement for degree programs in management, education, and agricultural marketing and serves as prerequisite for advanced study.

GC 1285. Introduction to Cultural Anthropology. (4 cr; BC) Human culture viewed as integrated system of learned and shared knowledge that guides behavior of all members of a given society. Anthropological perspective examines generalizations about existence of cultural diversity by analyzing and comparing the human condition in many contemporary cultures.

GC 1294. Economics in Contemporary Society. (4 cr; BC) Presents students with basic knowledge of economic concepts used to understand current events and government policies. Supply and demand, GDP, federal budget, fiscal and monetary policies, taxation, poverty, inflation, economic growth, unemployment, and international trade.

GC 1311. Art: General Art. (3 cr; SP–S3311 BC) Visual and performing arts produced in diverse American and international cultures. Slides, videos, interactive exercises, and audiovisual presentations. Students practice one of the arts in lab. Informal and critical writing.


GC 1364. Literature of the American Immigrant Experience. (3 cr; BC) Interdisciplinary, team-taught course explores how multicultural arts and literature deal with themes of identity and community. Lectures, discussions, interactive exercises, and audiovisual presentations. Students practice one of the arts in lab. Informal and critical writing.

GC 1336. Images of Women in Literature. (4 cr; BC) Diversity of 20th-century American women writers. Focuses on feminist re-interpretations 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 1367. Contemporary Literature: International Perspectives. (4 cr; BC) Readings in fiction, poetry, drama, and autobiography from contemporary writing not originating in the United States. The focus will be comparative. Extensive written assignments, both formal and informal, as well as lecture and discussion.

GC 1371. Reading Short Stories. (3 cr; BC) The current short story format from diverse communities within North America, Africa, the Caribbean, and Europe. Emphasis on the written literature inspired by oral “storytelling,” storytelling as “theater,” and storytelling as communal endeavor.

GC 1421. Writing Laboratory: Basic Writing. (3 cr; BC) Develop academic reading, writing, and research skills. Students participate in a variety of activities. Assignments, receive extensive one-on-one assistance, and work on computers. Clear and effective expression emphasized through writing and revision.

GC 1422. Writing Laboratory: Communicating in Society. (3 cr; SP—1421 or equiv; SP—1422, 1424; 1421 or equiv; BC) Proficiency in the conventions of academic writing, reading, and research skills through expository writing, reading, and discussion. How people communicate in society, perceive events and ideas, and how they think and write about them. Extensive use of computers as tools for writing and research.

GC 1423. Writing Laboratory: Community Service Writing. (3 cr; SP—1421 or equiv; SP—1422, 1424; 1421 or equiv; BC) Writing description, research, and analysis based on work in community setting, and on readings and 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; SP—1421 or equiv; SP—1422, §1423, 1421 or equiv; BC) Proficiency in academic writing, reading, and research. Multicultural, thematic content. Extensive experience with computers as tools for writing and research.

GC 1454. Statistics. (4 cr; QP—0631 or equiv; SP—C in 0731 or equiv; TC) Problem solving and decision making through collection, analysis, and interpretation of data. Organization and presentation of data, summary statistics, sampling, probability, distributions, estimation, correlation, hypothesis testing, contingency tables, chi-square. Uses graphs and computers.

GC 1456. Functions and Problems of Logic. (3 cr; QP—0631 or equiv; SP—1442, 0731 or equiv; 0731; TC) Functions (set theory) for evaluating the validity of arguments (Venn diagrams, truth tables, formal proofs). Translate English statements into the symbolic system and develop skills working with abstract formal tools to understand the structure and complexity of valid reasoning.

GC 1461. Oral Communication in the Public Sphere. (3 cr; BC) Communication, ethics, and citizenship in interpersonal, group, and public contexts as well as understanding communication theory and experience through use of diverse verbal and nonverbal communication patterns and strategies. Individual and group activities including public presentations.

GC 1464. Group Process and Discussion in a Multicultural Society. (3 cr; BC) Nature of groups, how they form and 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 and nonverbal communication patterns and strategies.

GC 1481. Creativity Art Laboratory: Experiences in the Media. (3 cr; BC) Learn about art by discussing, reading, writing about, and creating it. Explore artistic thinking by making art that reflects personal and cultural identity. Multicultural art works explored through slides and videos. Develop critical skills to analyze, interpret, and evaluate artwork.

GC 1483. Music Laboratory. (3 cr; BC) Students read, write, perform, and compose music. Fundamentals of music literacy, including notation, rhythm, and metric symbols, key signatures, scales, musical textures, formal structure, and basic harmony. Open to students with or without music training.

GC 1485. Creativity: Photography I. (3 cr; BC) Conceptual, technical, and historical aspects of photography (as well as hands-on experience with camera control, film development, enlarging, and printing in black-and-white photography lab. Individual and group critiques of student portfolios. Additional lab time required. Students must have a camera (35mm with adjustable controls preferred).

BC 1511. Introduction to Business and Society. (4 cr; BC) Role of business in the economic and social life of the nation, referencing the symbiotic relationship between business activity and the broader aspects of society. Environmental, social, and cultural diversity, economic systems, ethics, management, marketing, accounting and finance, and legal issues.

GC 1513. Principles of Small Business Operations. (3 cr; TC) Fundamentals of starting up, purchasing, owning, and operating a small business. Researching business opportunities, assessing competition, seeking financing, organizing and planning internal matters, and developing operating strategies.

GC 1534. Practical Law. (4 cr; TC) American legal process covering common everyday legal matters including courts, crimes, personal injury, contracts, consumer transactions, property ownership and insurance, debtor-creditor relations, banking, bankruptcy, and intellectual property. 

GC 1540. Accounting Fundamentals I. (3 cr; TC) Students learn to “keep books.” Make accounting entries from business transactions in journals, post to ledger accounts, complete the accounting cycle, and prepare and interpret financial statements.

GC 1571. Introduction to Microcomputer Applications. (4 cr; QP—0621 or equiv; SP—§1573, §1574; 0721 or intro algebra or equiv; TC) Hands-on word processing, data manipulation, and data analysis. Word processing—enter, edit, and format text; spreadsheets—calculate data, do calculations, and make decisions based on data; database management—manipulate and filter sets of data. No computer experience necessary. Students may use Macs or Windows for homework.

GC 1573. Introduction to Word Processing. (2 cr; QP—0621 or equiv; SP—§1571, 0721 or equiv) Hands-on course covering elements of word processing using Microsoft Word. Homework assignments and exam done on computer. Enter, edit, and format text; paragraphs and sections, styles, headers and footers, footnotes, tables; work with files. Students may use Macs or Windows for homework. Covers first half of 1571 content.

GC 1574. Introduction to Spreadsheets. (2 cr; QP—0621 or equiv; SP—§1571; 0721 or equiv) Introduction to spreadsheet programs (Excel). Hands-on computer intensive class where students enter, edit, and format text and numbers; use formulas and functions; create IF/THEN/ELSE decision logic; create charts; and filter databases. Homework and exams done on computer. Students may use Macs or Windows for homework. Covers second half of 1571 content.

GC 1575. Introduction to Computers and the Internet. (4 cr; QP—0621 or equiv; SP—0721 or intro algebra or equiv; BC) Hands-on computer literacy covering the latest developments in hardware (microprocessor, memory, storage), software, operating systems and applications, the Internet (World Wide Web, e-mail, Telnet, FTP), and multimedia capabilities. No computer experience necessary.

GC 1721. Marriage, Family, and Personal Fulfillment. (4 cr; TC) Psychological, social, and biological aspects of marriage and family living. Helping students gain understanding of, and self-awareness concerning, such aspects as dating, mate selection, getting married, having children, and sexuality. Adjustments outside of traditional marriage and family.

GC 1814. American Indian Literature. (3 cr; BC) Federal Indian law. History of native legal issues from pre-European contact to present times in conjunction with applicable cultural norms practiced by various tribes.


GC 1851. Multicultural Relations. (3 cr; BC) Nature of historical and contemporary multicultural relationships within American society. Intercultural, interethnic, interracial, and cross-cultural relationships from historical and contemporary perspectives. Develop tools to think about complex issues faced as diverse human beings.

GC 1901. Freshman Seminar: Environmental Issues. (3 cr; SP—1902, 1903, 1904; 24 sem cr or fewer) Reading, discussion, critical analysis, and writing about environmental issues. Intensive, small group setting designed for first-year students.

GC 1902. Freshman Seminar: Cultural Diversity. (3 cr; SP—1901, §1903, §1904; 24 sem cr or fewer) Reading, discussion, critical analysis, and writing about cultural diversity topics. Intensive, small group setting designed for first-year students.

GC 1903. Freshman Seminar: Citizenship and Public Ethics. (3 cr; SP—1901, §1902, §1903; 24 sem cr or fewer) Reading, discussion, critical analysis, and writing about citizenship and public ethics topics. Intensive, small group setting designed for first-year students.

GC 1904. Freshman Seminar: International Perspectives. (3 cr; SP—1901, §1902, §1903, 24 sem cr or fewer) Reading, discussion, critical analysis, and writing about international perspectives topics. Intensive, small group setting designed for first-year students.

GC 1990. Special Topics. (1-8 cr; SP—§; TC) Various topics related to instructor’s areas of expertise.

GC 1993. Directed Study. (1-8 cr; SP—§; TC) Student initiated project in consultation with faculty mentor. Student determines what they want to learn, sets goals, designs a course of study, and finds an appropriate faculty member to work collaboratively with them.

GC 1996. Internship. (1-8 cr; SP—§; TC) Teaching internships to teach skills, techniques, and research in disciplinary content associated with college teaching. Community internships teach goals and functions of public community agency and exploration of career goals. Internships supervised by faculty mentor and site supervisor.

GC 2283. The Psychology of Human Development. (4 cr; QP—1281 or Psy 1001; SP—1281 or Psy 1001, 1421 or EngC 1011; CE) Bio/social, cognitive, and psychosocial development of individuals over the life span. Writing intensive and includes computer assisted instruction, video, and small group discussion.
Genetics and Cell Biology

Department of Genetics and Cell Biology

College of Biological Sciences

GCB 3022. Genetics. (3 cr; QP–Biol 5003; Biol 1009 or 1202; not for biology majors; SP–Biol 4003; Biol 1002 or 1009; not for biology majors)
Mechanisms of heredity, their implications for biological populations, and applications to practical problems.

GCB 4015. Genetics Laboratory. (2 cr; QP–Biol 3022 or Biol 5003 or Biol A 4332 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.

GCB 4025. Cell Biology Laboratory. (2 cr; QP–Biol 5004; SP–Biol 4004) Experimental approaches to cell structure, function, and replication, including microscopy, autoradiography, cell fractionation, and molecular and chemical analyses.

GCB 4111. Histology: Cell and Tissue Organization. (4 cr; QP–Biol 5004 or SP–Biol 4004 or #) Structure and function of vertebrate tissues and organs. Lectures combine electron microscopy, light microscopy, physiology, and cell biology of higher animals. Labs concentrate on light microscopy of mammalian tissues.

GCB 4134. Endocrinology. (3 cr; QP–Biol 3011 or Biol 3111 or Biol C 3201 or Biol C 5331 or SP–Biol 3211 or Biol/Bot 3021 or Biol/C 4331 or #) Survey of structure and function of invertebrate and vertebrate endocrine systems.

GCB 4143. Human Genetics. (3 cr; QP–Biol 5003 or Biol 1009 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.

GCB 4161. Developmental Biology. (4 cr; QP–Biol 5003, Biol 5004; SP–Biol 4003, Biol 4004) Mechanisms that govern development from gametogenesis through fertilization, embryogenesis and postembryonic development, and mechanisms of morphogenesis and differentiation. Classical and molecular approaches in a variety of model organisms including genetic models such as bacteriophage, yeast, Drosophila, C. elegans, Arabidopsis, zebrafish, and the mouse.

GCB 4993. Directed Studies. (1-7 cr [max 7 cr] QP–#; SP–#; 10 cr max of 5970 or 5990 may count toward major; SP–#; 7 cr max of 4993 and/or 4994 may count toward major; S; N only) Individual study on selected topics or problems with emphasis on selected readings and use of scientific literature.

GCB 4994. Directed Research. (1-7 cr [max 7 cr] QP–#; SP–#; 10 cr max of 5970 or 5990 may count toward major; SP–#; 7 cr max of 4993 and/or 4994 may count toward major; S; N only) Laboratory or field investigation of selected areas of research.

GCB 5034. Intermediate Molecular Genetics. (3 cr; QP–Biol 5003, Biol 5004; SP–Biol 4003, Biol 4004) Molecular genetics of prokaryotes and eukaryotes concentrating on characterization and regulation of expression of genes, and techniques used to study gene expression. For advanced bioscience undergraduates and for graduate students not majoring in molecular genetics.

GCB 5036. Intermediate Cell Biology. (3 cr; QP–Biol 5004 or SP–Biol 4004 or #) Current literature in cell biology with overview of discussed topics. Selected scientific papers illustrate new concepts in, and experimental approaches to cell organization and function. Topics vary but include membranes, secretion, endocytosis, the cytoskeleton, and the nucleus.

Geographic Information Science (GIS)

Department of Geography

College of Liberal Arts

GIS 5571. Introduction to Arc/Info. (3 cr; SP–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 mapping.

GIS 5572. Advanced Arc/Info. (3 cr; SP–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; SP–GeoG 5561 or equiv, GeoG 5511 or equiv, status in MGIS program or #) Introduction to desktop mapping systems such as ArcView, MapInfo and MapXtreme. Emphasizes the application of these systems to the display and analysis of geographical data.

GIS 5574. GIS and the Internet. (1.5 cr; SP–GeoG 5561 or equiv, GeoG 5511 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; SP–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.

GIS 5576. Raster-Based GIS. (1.5 cr; SP–GeoG 5561 or equiv, status in MGIS program or #) Introduction to raster-based geographic information systems. Focuses on raster data sets and the use of grid-based models. Practical experience is offered using a widely-available raster GIS package.

GIS 5577. Spatial Data Administration. (2 cr; SP–GeoG 5561, GeoG 5563 or equiv, status in MGIS program, familiarity with computer operating systems or #) Theory and application for the administration of geographic databases including the topics of quality assurance, development planning and management, maintenance, access and distribution, and documentation.

Geography (GeoG)

Department of Geography

College of Liberal Arts

GeoG 1301. Introduction to Human Geography. (4 cr) Geography of population and the principal ways of life; capacity of earth for future population.

GeoG 1403. Biogeography of the Global Garden. (4 cr) The geography of biodiversity and productivity, from conspicuous species to those that cause human disease and economic hardship. The roles played by evolution and extinction, fluxes of energy, water, biochemicals, and dispersal. Experiments demonstrating interactions of managed and unmanaged biotic with the hydrologic cycle, energy budgets, nutrient cycles, the carbon budget, and soil processes.

GeoG 1425. The Atmosphere. (3 cr; SP–Soil 1425) Pre-calculus introduction to the nature of the atmosphere and its behavior. Topics include atmospheric composition, structure, stability, and motion; precipitation processes, air masses, fronts, cyclones and anticyclones; general weather patterns; meteorological instruments and observation; weather map analysis; weather forecasting.

GeoG 1426. The Atmosphere Laboratory. (1 cr) Lab offered in conjunction with 1425. Topics include weather observation; meteorological instrumentation; statistical analysis of weather observations; data map analysis and weather forecasting.

GeoG 1502. Maps, Visualization and Geographical Reasoning. (4 cr) Fundamental issues related to the acquisition, storage, manipulation, analysis, display and interpretation of spatially-referenced data. Emphasis on mathematical analysis of these data and interpretation of cultural and physical patterns critical to the development of geographical reasoning.


GeoG 3001. Geographic Inquiry and Human Development. (3 cr) Principles of geographic inquiry applied to understanding development. Climate formation; vegetation, soils; natural resources; cultural systems; production systems; demographic change; settlement and communications systems; cultural diffusion; political systems, nations, geopolitics; flows of goods, people, money; contrasting development visions; development inequalities.

GeoG 3101. Geography of the United States and Canada. (3 cr; SP–Soil 3101) Analysis of the ways in which the aspirations and abilities of diverse groups of people interact with the complexities of the natural environment to produce the contemporary pluralistic cultures and regional differentiation of the United States and Canada.

GeoG 3102. Geography of the United States and Canada. (3 cr; SP–Soil 3101) Analysis of ethical dilemmas and policy issues that arise as a result of the diverse ways in which different groups of people interact with the complexities of the natural environment in various regions of the United States and Canada.

GeoG 3111. Geography of Minnesota. (3 cr) The evolution of Minnesota and its current geographical characteristics. The state is a unique political entity that possesses similarities with other states because of the homogenizing influence of the federal government.

GeoG 3141. Africa. (3 cr) Regional differentiation of human groups and environments; culture contact, and problems of underdeveloped countries south of the Sahara.
Geog 3161. Europe: A Geographic Perspective. (3-4 cr) Comparative analysis and explanation of Europe's physical, economic, political, and urban landscapes; European integration; transformation of Eastern Europe; German language discussion group in conjunction with the course for 1 extra cr.

Geog 3181. Russia and Environments. (3 cr; SP–§5181) Physical and environmental geography of Russia and former Soviet republics. Legacy of central planning on regional economies, city systems and city structure. Economic and cultural links among regions and republics. Conflicts rooted in religion, ethnicity and tradition. Relations with nearby states and regions. Physical environmental problems.

Geog 3211. East Asia. (3 cr; SP–§5211, §EAS 3211) Physical and human geography of Japan, mainland China and Taiwan, North and South Korea; population pressure, economic and urban development, and international relations.

Geog 3215. Geography of China. (3 cr; SP–§5211, §5211, §5215) Physical, human, and historical geography of greater China; mainland China and Taiwan; demographic transition; national minorities, economic and urban development, and international relations.

Geog 3331. Geography of the World Economy. (3 cr) Geographical distribution of resources affecting development; location of agriculture, industry, services; geography of communications; agglomeration of economic activities, urbanization, regional growth; international trade; changing global development inequalities; impact of globalizing production and finance on the welfare of nations, regions, cities.

Geog 3355. Environmental Quality. (3 cr) The quality of the human environment depends on 1) how humans make decisions about how to act, 2) how they act, and 3) how they evaluate both. In the United States, this process is best described as "disjointed incrementalism" in which governments, organizations, and individuals play distinct and important roles.

Geog 3361. Land Use, Landscapes, and the Law. (3 cr) Landscapes are political statements. They reflect how individuals, organizations, and governments have exercised the legal rights that they possess to produce goods and provide services.

Geog 3371. Introduction to Urban Geography. (3 cr) Character, distribution, and development of cities in present-day world. Internal and external locational relationships.

Geog 3373. Changing Form of the City. (3 cr; SP–§1973 or 3371 or Hist 3901 or Hist 3902 or UrbS 3104 or §) Urban origins, ancient cultures and cities, the medieval city, rediscovery of planning, colonial cities, industrialization and urban expansion, speculative cities, utopian cities, planning triumphs and disasters, cities as reflections of society, culture, and the past.

Geog 3374. The City in Film. (4 cr; SP–§5374) Cinematic portrayal of changes in 20th-century cities worldwide including social and cultural conflict, political and economic processes, changing gender relationships, rural versus urban areas, and population and development issues (especially as they affect women and children).

Geog 3375. Minority Settlement in America. (3 cr) Comparative analysis of minorities in American cities, including migration patterns, residential patterns, socioeconomic characteristics, public and private community enterprises, and class in urban structure.

Geog 3378. Third World Underdevelopment and Modernization. (3 cr) Processes underlying socioeconomic change in the Third World. Evolving global economy and internal spatial and socioeconomic conditions. Theories of modernization, development, and underdevelopment.

Geog 3379. Environmental Development in the Third World. (3 cr; SP–§5200 or A–F only) Explains the economic, political, and cultural processes that have led to the division of the world into development corridors and the social consequences of these relations. The course is divided into three parts: basic analytical concepts about historical geography of capitalist development, geographically and historically specific cases of underdevelopment, and the likelihood of social and environmental sustainability.

Geog 3381. Population in an Interacting World. (4 cr) Comparative analysis and explanation of trends in fertility, mortality, internal and international migration in different parts of the world; world population problems; population policies; theories of population growth; impact of population growth on food supply and the environment.

Geog 3401. Geography of Environmental Systems. (4 cr; A–F only) Examination of quantitative patterns, dynamics, and interactions of atmospheric, hydroscopic, geomorphic, pedologic, and biologic systems as the context for human population, development, and resource use patterns.

Geog 3411. Geography of Health and Health Care. (3 cr; SP–§5411) Application of human ecology, spatial analysis, political economy, and other geographical approaches to analyze problems of health and health care. Topics include distribution and diffusion of disease; impact of environmental, demographic, and social change on health; distribution, accessibility, and utilization of health practitioners and facilities.

Geog 3421. Introduction to Plant and Animal Geography. (3 cr) World distributions of plants and animals; biological and ecological background; the geographical picture; the paleoecological record.

Geog 3511. Principles of Cartography. (4 cr; SP–3 cr in geog or §) History and development of U.S. academic cartography, coordinate systems and map projections, data classification and map generalization, methods of thematic symbolization, and cartographic design. A series of computer-based lab exercises will apply conceptual lecture material to the creation of thematic maps.

Geog 3531. Numerical Spatial Analysis. (3 cr) Introduction to theoretical and applied aspects of geographical quantitative methods with a focus on spatial analysis. Emphasis placed on the analysis of geographical data for spatial problem solving in both the human and physical areas of the discipline.

Geog 3551. Principles of Geographic Information Science. (4 cr; SP–3 cr in geog or §) Introduction to study of geographic information systems (GIS) for geography and non-geography students. Topics include GIS application domains, data models and sources, analysis methods and output techniques. Lectures, readings and hands-on experience with GIS software.


Geog 3671. Contemporary Chinese Society: Mainland China, Hong Kong, Taiwan. (3 cr; SP–§EAS 3402 or Soc 3671, 1301 or Soc 1001 or equiv in other social sciences or humanities or A–F only) With a focus on post-1949 mainland China, Taiwan, and Hong Kong. Asia is introduced to the Chinese family, dating and marriage, rural and urban societies, population, work and occupation, socioeconomic development and inequalities, and impacts of post-1978 reforms.

Geog 3900. Topics in Geography. (3 cr [max 9 cr]; SP–Sr or grad student, A) Special topics and regions. Course offered by visiting professors in their research fields.

Geog 3985. Senior Project Seminar. (4 cr) Designed for juniors and seniors to complete the research and writing of an independent project required of all undergraduate geography majors.

Geog 3992. Directed Reading. (1-8 cr [max 12 cr]; SP–§, A–F, J) Guided individual reading.

Geog 3993. Directed Studies. (1-8 cr [max 12 cr]; SP–§, A–F, J) Individual guided research.

Geog 4001. Modes of Geographic Inquiry. (4 cr) Examination of competing approaches to the study of geography. Environmental determinism; regional tradition; scientific revolution; behavioral geography; modeling and quantification of the state and scale; geographic interpretation and qualitative approaches; feminist and postmodern geographic; ecological thought and complexity; geographic ethics.

Geog 4121. Latin America. (3 cr) Interplay of natural environment and history in shaping contemporary Latin America. Political ecology of natural resources, food supply and distribution, urbanization and the informal economy, migration and population, and the role of the state and international agencies in domestic economies.

Geog 4382. Contemporary Immigrant America. (3-5 cr) Analysis and explanation of contemporary immigration trends; immigration policies; immigrant rights; immigrant integration and adaptation; ethnic group formation; ethnic identities; ethnic neighborhoods and communities; second generation; immigrant women; ethnic conflict; xenophobic reactions. Community Service Learning component for 2 extra cr.

Geog 5143. Geography of West Africa. (3 cr) West Africa from Senegal to Cameroon; social geography of resource use, population, settlement, economic development, and international relations.

Geog 5145. Development in Africa. (3 cr; SP–§Afr 5145) Economic, political, and social development in Africa from independence to the present. Emphasis on reordering colonial landscapes, bases for North-South relations, big power intervention, and participation in the world economy.

Geog 5181. Russia and Environments. (3 cr; SP–§5318) Physical and human geography of Russia and former Soviet republics. Legacy of central planning on regional economies, city systems and city structure. Economic and cultural contrasts with region and republics. Conflicts rooted in religion, ethnicity and tradition. Relations with nearby states and regions. Physical environmental problems.

Geog 5211. East Asia. (3 cr; SP–§3211, §EAS 3211) Meets concurrently with Geog 3211 (see description). Open to graduate students in East Asian Studies and other disciplines who wish to study the region from a geographical perspective. An additional research paper is required from the 5211 students.

Geog 5215. Geography of China. (3 cr; SP–§5215) Meets concurrently with Geog 3215 (see description). Open to graduate students in East Asian Studies and other disciplines who wish to study the region from a geographical perspective. An additional research paper is required from the 5215 students.


Geog 5371. American Cities: Population and Housing. (4 cr; SP–SP–§PA 5201; A–F only) Emergence of North American cities; residential building cycles, density patterns; metropolitan housing stocks, supply of housing services; population and household types; neighborhood-level patterns of housing use; housing prices; intrarurban migration; housing submarkets inside metro areas; emphasis on linking theory, method, case studies.
Grading: Evaluation is based on written examinations and assignments, combined with classroom participation. Course grade is determined by performance on these components.

Equipment: A computer with internet access is required for assignments and projects. Students are encouraged to use software such as GIS for data analysis and visualization.

Further Information: For more details about the course content, requirements, and evaluation methods, please refer to the course syllabus provided at the beginning of the semester.
GeoE 4121. Computer Applications in Civil Engineering II. (3 cr; QP—CE or Geo upper div; 3020, Math 2231 or Math 3240, CE 4301 or Geo upper div; student in IT; 3301, Math 2243, Math 2263; A-F only) Advanced application of computer tools and methods in solving partial differential equations resulting from the mathematical formulation of civil engineering problems. The major tools used will be Spreadsheet and Visual Basic programming. Methods covered could include: finite differences, boundary element, finite element and control volume finite element.

GeoE 4301. Soil Mechanics II. (3 cr; QP—Upper div IT or grad IT major, 5302 or SP—Upper div or grad student in IT; 3311, CE 3311, or A-F only) Traction and stress. Mohr-Coulomb failure criterion. Experiments on strength and angle of internal friction. Earth pressure theories; rigid and flexible retaining walls. Bearing capacity of shallow foundations. Stability of slopes.

GeoE 4311. Rock Mechanics II. (3 cr; QP—IT or grad IT major, 5302 or SP—Upper div or grad student in IT; 3311, CE 3311, or A-F only) Failure mechanisms in rock masses. Elasto-plastic solutions applied to underground excavations. Design of linings and support systems; rock-support interactions. In situ stresses and excavation shape. Instrumentation and monitoring.

GeoE 4341. Engineering Geostatistics. (3 cr; QP—Stat 3301 or #—Upper div or grad student; SP—GeoE, CE, or Geo upper div or grad student, Stat 3301 or #—A-F only) Problem solving and decision making in civil and geological engineering using applied statistics. Emphasis on spatially correlated data, e.g. geologic site characterization, and spatial sampling design.

GeoE 4351. Groundwater Mechanics. (3 cr; QP IT or grad student, 3400 or #—SP—Upper div or grad student; CE 3300, or #—A-F only) Basic equations. Simple confined and unconfined flows, two-dimensional flow in the vertical plane, and transient flow. Flow from rivers and lakes toward wells. Determination of streamlines and pathlines in two and three dimensions. Introduction to contaminant transport. Elementary computer modeling.

GeoE 4352. Groundwater Modeling. (3 cr; QP IT or grad student, 5425, or #—SP—upper div or grad student in IT; 4351, CE 4351, or #—A-F only) Principle of analytic element method. Mathematical and computer modeling of simple and multiple aquifer systems. Application to actual field problems. Theory and application of contaminant transport models, including capture zone analysis.

GeoE 5311. Experimental Geomechanics. (3 cr; QP IT upper div or grad student; 5603 SP#—Upper div or grad student; 4301, CE 4301, or #—A-F only) Machine stiffness; closed-loop testing. Small-strain testing. Measurement of deformation; strain gages, LVDT’s, accelerometers, and associated circuits. Direct and indirect testing. Material behavior: experiments on anisotropic, damaged, and fluid-filled solids.

GeoE 5321. Geomechanics. (3 cr; QP—CE 3300, CE 3301, SP#—Upper div or grad student; 4301; CE 4301 or #—A-F only) Review of elasticity theory and solution of some elastic boundary value problems relevant to geomechanics. Wave propagation in unbounded elastic media. Elements of fracture mechanics and applications. Elements of poroelasticity and applications.

GeoE 5331. Geomechanics Modeling. (3 cr; QP—CE 5301; SP#—Upper div or grad student, 4301 or CE 4301; A-F only) Soil and rock response in triaxial testing: drained and undrained behavior; elastic and plastic properties. Modeling stresses, strains, and failure in geomechanics problems.

Geology and Geophysics (Geo)

Department of Geology and Geophysics

Institute of Technology

Geo 1001. The Dynamic Earth: An Introduction to Geology. (4 cr) Physical processes that shape the Earth: volcanoes, earthquakes, plate tectonics, glaciers, and rivers. Through lectures, labs, and field experience, students gain a better understanding of our planet in the context of current environmental issues and global change.


Geo 1003. Dinosaurs Evolution, Ecology, and Extinction: Introduction to the Mesozoic World. (3 cr) Dinosaurs and the Mesozoic Era are used to introduce evolution, plate tectonics, climate change, and Earth systems. Overview of the history of dinosaur interpretations illustrates the principles and social aspects of scientific investigation.


Geo 1006. Oceanography. (4 cr) How various processes in the ocean interact. Marine biology, waves, tides, chemical oceanography, marine geology, and human interaction with the sea. Labs include study of the oceans celebrates, manipulation of oceanographic data, and discussion using videos showing unique aspects of ocean research.

Geo 1008. Faces of the Earth. (3 cr) History of pre-17th century ideas of geology in China, Middle East and Europe. Evolution of modern geology from travelers’ tales, cosmology, mapmaking, minerals, volcanoes, and earthquakes. Plate tectonic hypothesis and modern geologic phenomena. Relations between humans and nature.


Geo 1011. Volcanoes of the Earth. (3 cr) Nonmathematical introduction to volcanoes, their origin and distribution on Earth and through time; theory of plate tectonics, origin of magma and the Earth’s interior, volcanic eruptions, types of eruptions and hazards, and impact on climate, vegetation, and society.

Geo 1019. Our Changing Planet. (4 cr; QP#—Ast 1019; #EB 1019; SP#—Ast 1019, #EB 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.

Geo 1081. Conspiracies, Fraud, and Deception in Earth History. (1 cr) Famous cases of geological deception from three centuries are presented in the intellectual context of their time and demonstrate the prevailing power of scientific reasoning.

Geo 2001. Earth Materials. (3 cr) Study of the most common rocks and minerals and the geologic setting focusing on properties of these materials as a basis for identification and use in industry and society.

Geo 2002. Climate Change and Human History. (3 cr) Causes of long- and short-term climate change; frequency and magnitude of past climate changes and their geologic records. Relation of major climate changes to development of agrarian societies and shifts in power among various kingdoms and city-states. Emphasis on the last 10,000 years.

Geo 2003. Geohazards. (3 cr) Geologic hazards associated with earthquakes and volcanoes; emphasis on how society confronts the dangers posed by these natural phenomena. Geologic and geophysical nature of earthquakes and volcanoes; fundamental causes of these phenomena; prediction and risk assessment; public policy issues.


Geo 2005. Earth Resources. (3 cr) Geologic aspects of energy and material resources. Resource size, life-times and environmental consequences of resource use including issues of international, citizenship and public ethics associated with resource production, distribution and use.

Geo 2006. Planets of the Solar System. (3 cr) Recent accomplishments of the space missions; diversity and common characteristics of planetary formation; surface processes and interior dynamics; meteoritic impacts and comets; other solar systems and the possibility of life.

Geo 2111. Honors: Earth Science. (4 cr; QP §—1001; IT Honors Curr or IT Honors Office consent; SP §—1001; IT Honors Curr or IT Honors Office consent; A-F only) Application of physics and chemistry to the structure and dynamics of the Earth.

Geo 2201. Geodynamics I: The Solid Earth. (3 cr; QP—Phys 1251, Phys 1252; SP—Phys 1203) Dynamics of the solid Earth, particularly the tectonic system. Seismology, internal structure of the Earth, Earth’s gravity and magnetic fields, paleomagnetism, global plate tectonics, and tectonic systems, field trip.

Geo 2301. Mineralogy. (3 cr; QP#—1001, Chem 1051, Math 1252 or #—SP—Chem 1021, Math 1271 or #) Crystallography, crystal chemistry and physics. Physical and chemical properties, crystal structures and chemical equilibria of the major mineral groups, Lab includes crystallographic, polarizing microscope, X-ray powder diffraction exercises, hand-specimen mineral identification.

Geo 2302. Petrology. (3 cr; QP#—3401 or #—SP#—2301 or #) Magmatic and metamorphic processes, with an emphasis on plate tectonic interpretation of rock sequences.


Geo 3093. Problems in Geology and Geophysics: Junior. (1-4 cr; max 6 cr; QP—A-S; A-F only) Geologic or geophysical problems studied independently under the direction of a faculty member.

Geo 3202. Geodynamics II: The Fluid Earth. (3 cr; QP—SP#—2201) Dynamics of the Fluid Earth, mainly surface processes and convection.

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Geo 401. Geochronology and Earth History. (3 cr.; QP–3301; SP–2303)
Modern high precision techniques for quantifying geologic time. Litho-, bio-, and chrono-stratigraphic correlation techniques for reconstructing geologic history.

Geo 3870. Modeling Workshop. (1 cr [max 2 cr]; QP–Geo or Geophys or GeoEng major or #; SP–Geo or Geophys or GeoEng major or #)
Modeling of geologic or geophysical systems.

Geo 3880. Laboratory Workshop. (1 cr [max 2 cr]; QP–Geo or Geophys or GeoEng major or #; SP–Geo or Geophys or GeoEng major or #)
Geologic or geophysical lab study.

Geo 3890. Field Workshop. (1 cr [max 2 cr]; QP–Geo or Geophys or GeoEng major or #; SP–Geo or Geophys or GeoEng major or #)
Including analysis of individual structural components and relationship to plate tectonics. Changes over geologic time in the nature of orogenic processes.

Geo 4093. Principles of Geology and Geophysics: Senior. (1-4 cr [max 12 cr]; QP– #; SP– #)
Topics in geology and geophysics investigated in a seminar format.

Geo 4095. Introductory Field Geology. (4 cr; QP–3202, #; SP–3202, #; A-F only)
Geologic mapping on topographic maps and aerial photos; field identification of igneous, sedimentary and metamorphic rocks; measurement of stratigraphic sections; study of structural and geomorphic features.

Geo 4010. Undergraduate Seminar: Current Topics in Geology and Geophysics. (1-4 cr; QP–3202, #; SP– #)

Geo 4911. Advanced Field Geology. (4 cr; QP–3111, #; SP–3911, #; A-F only)
Geologic mapping; study of igneous, metamorphic, and sedimentary rocks; structures and surficial features; problem solving. Paper required.

Geo 4912. Field Geophysics. (4 cr; QP–3111 or #; SP–3911 or #; A-F only)
Modern techniques in geophysics, magnetic, seismic reflection and refraction, electrical resistivity and electromagnetic methods. Attention to near-surface and upper-crustal problems, concentrating on proper field design and methods. Interpretational methods include preliminary “rule of thumb” methods as well as quantitative computer modeling.

Geo 4917. Field Hydrogeology. (4 cr; QP–5641, #; SP–5701, #)

Geo 5001. Earth Systems Science for Teachers. (4 cr; QP–1101; 1 cr chemistry or physics; education degree; SP–1109; education degree)
Solid Earth, hydrosphere, atmosphere, and biosphere and their interactions over some natural cycles of material and energy. Consequences of the natural cycles for land-water-atmosphere-life environments and Earth’s habitability. Human impact on natural cycles and evidence for global environmental changes. Required project designed to enhance ability to teach earth systems to K-12 students.

Geo 5002. Earth History for Teachers. (4 cr; QP–5100; education degree; SP–5102; education degree)
Evolution of life on Earth. Interrelationships of plate tectonics, climate change, and organic evolution leading to present ecosystem. Impact of hominid evolution on Earth systems and geological processes on human society. Required project designed to enhance ability to teach Earth history to K-12 students.

Geo 5003. Dinosaur Evolution for Teachers. (3 cr; QP–5103; education degree; SP–5103; education degree)
Dinosaurs and Mesozoic Earth used to introduce evolution, plate tectonics, climate change, and Earth systems. History of theories about dinosaurs illustrates principles and social aspects of scientific investigation. Required project designed to enhance ability to teach dinosaur evolution to K-12 students.

Geo 5006. Oceanography for Teachers. (3 cr; QP–5100; education degree; SP–5100; education degree)
How various processes in the ocean interact. Marine biology, waves, tides, chemical oceanography, marine geology, and human interaction with the sea. Labs include study of live marine invertebrates, manipulation of oceanographic data, and discussion using videos showing unique aspects of ocean research. Required design of modules for presenting course material to elementary or secondary school students.

Geo 5108. Principles of Environmental Geology. (3 cr; QP–Geo core courses through 5201 or equiv or #; SP–Geology majors: core curriculum through 5401 or #; nonmajors: 1001 or #)
Human impact on geological environment and effect of geologic/geologic processes on human life from an ecosystems and biogeochemical cycles perspective. Geologic limits to resources and carrying capacity of Earth. Land use planning, environmental impact assessment, ecoregional world models. Field project and trip.

Geo 5201. Time-Series Analysis of Geological Phenomena. (3 cr; QP–Math 3221 or #; SP–Math 2263 or #; A-F only)
Time-series analysis of linear and nonlinear geological and geophysical phenomena. Examples drawn from ice age cycles, earthquakes, climatic fluctuations, volcanic eruptions, atmospheric phenomena, thermal convection and other time-dependent natural phenomena. Modern concepts of nonlinear dynamics and complexity theory applied to geological phenomena.
Geo 5202. Geological Thermomechanical Modeling. (3 cr; QP–Math 3261 or #; SP–Math 2263 or #; A-F only) Concept of heat and mass transfer processes in Earth’s crust and mantle. Quantitative study of thermomechanical phenomena. Emphasis on analytical and modern numerical techniques.


Geo 5301. Aqueous Environmental Geochemistry. (3 cr; QP–Chem 5501 or #; SP–Chem 3501 or #) General principles of solution chemistry with application to geology, including solution-mineral equilibria, redox processes in natural waters, geochemistry of hydrothermal fluids, and environmental geochemistry.

Geo 5302. Isotope Geology. (3 cr; QP–3301 or #; SP–2303 or #; A-F only) Theory and uses of radioactive, radiogenic, and stable isotopes in geology. Radioactive dating, geothermometry, and tracer techniques in geologic processes.

Geo 5353. Electron Microprobe Theory and Practice. (2-3 cr; QP–3401. 1 yr chemistry and physics or #; SP–2301. 1 yr chemistry and physics or #) Theory and practice of characterizing solid materials with electron beam instrumentation, including the reconstruction of X-ray data to chemical compositions.

Geo 5502. Advanced Structural Geology. (3 cr; QP–5201 or #; SP–4501 or #) Analysis of structures and fabric of deformed rocks. Determination of states of stress and strain in rocks and evolution of these with time. Deformation mechanisms. Extensive reading in journal literature. Field trips.

Geo 5601. Advanced Sedimentology. (4 cr; QP–5653 or #; SP–4602 or #) Modern techniques of sedimentary basin analysis focusing on interactions among the lithosphere, atmosphere, and hydrosphere. Sedimentary facies of modern and ancient systems, petrology of clastic and carbonate deposits, tectonic and paleoclimatic interpretations, paleocurrent analysis, diagenetic effects on subsurface fluid flow, and volcanic sedimentation.

Geo 5602. Depositional Mechanics. (3 cr; QP–5651, Math 3261 or SP–4602, Math 2243 or #) Elementary mathematical theories of sediment transport applied to quantitative interpretation of sedimentary rocks.


Geo 5703. Regional Geomorphology. (2 cr [max 6 cr]; QP–5201 or #; SP–4501 or #) Geology of a particular region of the country, emphasizing its geomorphology. One-week field trip to the area is taken during spring break. May be taken for cr more than once if regions are different.

Geo 5704. Glaciology. (3-4 cr; QP–Math 3261 or #; SP–Math 2263 or #) Theories of ground ice and flow. Internal structures and strain flow in glaciers and ice sheets. Geomorphic features produced by glaciers. Reading assignments and problems.

Geo 5705. Limnogeology and Paleoclimate. (3-4 cr; QP–5601 or EEB 5601; SP–1001, 4601 or #) Systems study of modern and ancient lakes of the world as archives of environmental history, as natural resources, as biogeochemical and physical process models, and as basins in geologic history. Includes many case studies and examines aquatic signatures for interpreting paleoclimate.

Geo 5713. Tracers and Karst Hydrogeology. (3-4 cr; QP–4561, SP–5701, #) Karst hydrogeology and application of tracers to determine source, age, and mixing parameters of water in various natural reservoirs. Physical and chemical principles and processes operating in karst hydrogeology; use of natural and synthetic chemical and isotopic tracers, and pathways of mixing water through hydrologic cycle.

Geo 5802. Scientific Visualization. (3 cr; QP–CSci 3101 or CSci 3102 or CSci 3113 or SP–CSci 1107 or CSci 1113 or #) Visualization hardware and software; three-dimensional computer representation of scientific data, modeling, user interface techniques, output, commonly used algorithms, animation, case studies and examples.

German (Ger)

Department of German, Scandinavian, and Dutch College of Liberal Arts

Ger 0221. Reading German. (0 cr) Designed to teach only a reading knowledge of basic German. No prior knowledge of German is required. Vocabulary, reading strategies, and grammar for recognition are emphasized.

Ger 0222. Reading German. (0 cr; SP–0221) This course gives experience in intensive reading of German scholarly texts and enables graduate students to satisfy departmental requirements for an advanced degree. Reading grammar and discipline-specific vocabulary are emphasized.

Ger 1001. Beginning German. (4 cr) Emphasis on working toward novice-intermediate low proficiency in all four language modalities (listening, reading, speaking, writing). Topics include everyday tasks and goals of German language media. Introduction to German literature between 1720-1810, Enlightenment and Weimar Classicism in German literature from 1890 to present in historical, critical texts.

Ger 3017. Advanced Communication Skills. (3 cr; SP–3101) Focuses on learning strategies for immersion students to process and understand academic language in texts and lectures in the FLIP courses.

Ger 3021. Business German. (3 cr; SP–3012 or equiv) Provides basic knowledge of German economy and business culture. Practice of language used in business field. Reading and discussion of German business documents, preparation of formal letters and reports.

Ger 3104. Reading and Analysis of German Literature. (4 cr; SP–3012) Introduction to literary analysis; readings from drama, prose, and lyric from the 15th century to the present.

Ger 3105. Professional German. (3 cr; SP–3012) Introduces students to process and understand academic language in texts and lectures in the FLIP courses.

Ger 3106. Techniques of Translation. (3 cr; SP–3012) Theory and practice of translation from and to German in a variety of genres. Idiomatics, stylistics, and cross-cultural aspects of translation will be highlighted.

German literature from 1890 to present in historical, critical texts.
Ger 3460. Women Writers in German Literature. (3 cr; SP–3104) A literary and historical investigation of selected German women writers from the theoretical perspectives of feminist theory, gender studies, and cultural studies/genre. Approaches may be thematic, generic, or chronological.

Ger 3490. Topics in German Literature. (3 cr; SP–3104) Intensive exploration of specific authors, literary genres, or other literary topics not covered in period courses.

Ger 3501. Contemporary Germany. (3 cr; SP–3102) Social, political, and cultural developments in Germany from 1945 to the present.

Ger 3510. Topics in German Studies. (3 cr; SP–3012) One topic in depth dealing with the culture or civilization of German-speaking countries.

Ger 3511. German Civilization and Culture: Middle Ages to 1700. (4 cr) Survey of representative cultural-historical events in Germany from early Germanic times to 1700.

Ger 3512. German Civilization and Culture: 1700 to the Present. (4 cr) Survey of representative cultural-historical events in Germany from 1700 to the present.

Ger 3520. Topics in Austrian/Central European Culture. (3 cr; SP–3012) Study of culture, politics, and economy in Austria and Central Europe. Focus on comparative analysis of cultural and political developments in Central European countries. Topics vary.

Ger 3531. Selected Writings in German Intellectual History. (3 cr; SP–3104) Philosophical writings on culture, history, and art. Authors include Lessing, Schiller, Kant, Hegel, Marx, Nietzsche, and Freud.

Ger 3593. Directed Studies: German-Speaking Countries. (4 cr [max 12 cr]; SP–3012, ∆) Preparation for research abroad during semester before departure. Written and oral reports upon return.

Ger 3601. German Medieval Literature. (3 cr; SP–No knowledge of German required) Literary investigation of the greatest works of medieval German poetry. Readings in English. Majors will be required to write a paper with use of secondary sources in English and German.

Ger 3604. Introduction to German Cinema. (3 cr) An introduction to the study of German cinema, with a focus on the relation between German film and German history, literature, culture, and politics.

Ger 3610. German Literature in Translation. (3 cr; SP–No knowledge of German required; cr toward major or minor requires reading in German) In-depth study of authors or topics from various periods in German literature. Requires no knowledge of German.

Ger 3631. Jewish Writers and Rebels in German, Austrian and American Culture. (3 cr; SP–No knowledge of German required; cr toward major or minor requires reading in German) Investigation of literary and cultural modes of writing used by Jews in Germany, Austria, and America to deal with problems of identity, anti-Semitism, and assimilation. Focus on 20th century. All readings (novels, poetry, stories) in English.

Ger 3634. German Women and Cultural History: Constructing Selves in Narrative Texts. (3 cr; SP–No knowledge of German required; cr toward major or minor requires reading in German) Examination of narrative texts by German women writers against a background of the cultural history of Germany during the 20th century. Focus on personal narrative texts, both written and pictorial, and readings in literary and cultural theory and history. All readings in English.

Ger 3641. German Folklore. (3 cr; SP–No knowledge of German required; cr for major or minor by arrangement with instructor) Literary and cultural investigation of the main folklore genres: charms, legends, folktales, and ballads; their composition, origin, and role in society with a strong emphasis on their international character. Readings in English. Majors required to write a paper with use of secondary sources in English and German.

Ger 3642. The Grimms' Fairy Tales, Feminism, and Folklore. (3 cr; SP–No knowledge of German required; cr toward major or minor requires reading in German) Exploration of the Grimms' fairy tales and investigation of how various folklore types and gender stereotypes developed and became classical models for children and adults. The genre of the literary fairy tale in Germany, Europe, and North America. Comparisons of original literary versions with contemporary tales. All readings in English.

Ger 3701. History of the German Language. (3 cr; SP–1004) Change in grammar and lexicon, 750 A.D. to present.

Ger 3702. Beginning Middle High German. (3 cr; SP–1004) Middle High German grammar. Selected literary texts.

Ger 3703. Introduction to Old High and Low German. (3 cr; SP–3702 or #) Biographies, charms, heroic poetry, and miscellany from the 9th and 10th centuries.

Ger 3704. German Dialects. (3 cr; SP–1004) Contemporary regional dialects recorded on tape and written in texts. Synchronic and diachronic analysis.

Ger 3705. Characteristics of the Germanic Languages. (3 cr; SP–3703, Ling 3601 or Ling 5601) German and North Sea Germanic; West, North, and East Germanic; Proto-Germanic and Indo-European.

Ger 3993. Directed Studies. (1-4 cr [max 12 cr]; SP–3012, ∆) Guided individual reading or study.

Ger 4040. German Play: Oral Interpretation and Performance of German. (3 cr) Dramatic reading of German play for pronunciation; preparation and rehearsal for production and performance of German play.

Ger 4521. The German-Americans: Literary and Linguistic Aspects. (3 cr) Study the contribution made by German immigrants to American culture, especially in Minnesota. Language and literature study is supplemented by field trips in Minnesota.

Ger 4621. German Cinema to 1945. (3 cr; SP–3xxx film course or #) The beginnings of German cinema at the end of the 19th century and the early 20th century. Its "golden age" during the Weimar Republic (1919-1933), including Expressionism and "New Objectivity." Its subordination to the ideological and entertainment needs of the Nazi state in the Third Reich (1933-45).

Ger 4622. German Cinema Since 1945. (3 cr; SP–3xxx film course or #) German cinema during the first years of postwar occupation and then in each of the two postwar German states, East and West Germany, from 1949-1990, and finally in the unified Germany from 1990 on. Includes films of DEFA, "New German Cinema," feminist cinema, German comedies of the 1980s and 1990s, etc.

Ger 5011. Advanced Conversation and Composition. (3 cr; SP–3012) Designed to help graduate and advanced undergraduate students achieve high proficiency in writing and speaking professional and academic German.

Ger 5016. Advanced Translation: Theory and Practice. (3 cr; SP–3016 or #) Translation theory, related issues in stylistics, philosophy of language; sample translations; student production of translations with methodological commentary.

Ger 5017. Analysis of German. (3 cr; SP–1004, Ling 3001 or Ling 5001 or #) Phonology, morphology, and syntax of standard German.

Ger 5410. Topics in German Literature. (3 cr; SP–3104 or equiv) Topic may focus on a specific author, group of authors, genre, period, or subject matter. Topics specified in Class Schedule.

Ger 5510. Topics in Contemporary German Culture. (3 cr; SP–3104 or equiv) A single topic of contemporary German culture explored in depth.

Ger 5610. German Literature in Translation. (3 cr; SP–No knowledge of German required; cr toward major or minor requires reading in German) Study in depth of authors or topics from various periods in German literature. Requires no knowledge of German.

Ger 5630. Topics in German Cinema. (3 cr; SP–3xxx film course or #) Topics chosen may focus on specific directors, genres, film production or reception, and/or other formal, theoretical, historical, or political issues.

Ger 5711. History of the German Language I. (3 cr; SP–3012) Historical development of German from the beginnings to 1450.

Ger 5712. History of the German Language II. (3 cr; SP–5711) Historical development of German from 1450 to 2000.

Ger 5721. Introduction to Middle High German. (3 cr) Introduction to Middle High German language and literature. Study of grammar through formal description of Middle High German phonology, morphology, and syntax. Normalized MHG texts will be read.

Ger 5722. Middle High German: Advanced Readings. (3 cr; SP–5721) Acquisition of fluency in reading Middle High German normalized as well as non-normalized texts, both poetry and prose.

Ger 5731. Old High German I. (3 cr) Study of the monuments of Old High German. Detailed investigation of Old High German in comparison with the other Germanic languages.

Ger 5732. Old High German II. (3 cr; SP–5731) Study of the monuments of Old High German. Detailed investigation of Old High German in comparison with the other Germanic languages.

Ger 5734. Old Saxon. (3 cr) Study of the poetry of Old Saxon. Detailed investigation of Old Saxon in comparison with the other Old Germanic languages.

Ger 5740. Readings in Philology. (3 cr) Philological analysis of a chosen text in any medieval Germanic language.

Ger 5771. Early New High German. (3 cr) Read and analysis of Early New High German texts. Formal description of Early New High German phonology, morphology, syntax.

Ger 5781. Varieties of Modern German. (3 cr; SP–5101) Lexical, syntactic, and phonological variations explored in depth. Theories of dialectology and sociolinguistics.

Ger 5801. German Script Since 1500: Readings. (3 cr) Handwriting and printed book scripts will be read, 1500-2000.

Ger 5993. Directed Studies. (1-4 cr [max 12 cr]; SP–3012, ∆) Guided individual reading or study.
Department of German, Scandinavian, and Dutch (GSD)

GSD 3451. Major Project in German and Scandinavian. (4 cr)
Students prepare their major project in a seminar setting under supervision of a faculty member.

GSD 5103. Teaching of Germanic Languages. (4 cr)
Second language acquisition theory, methods, testing, and technology applicable to teaching of modern Germanic languages.

Graduate School

Gero 5105. Multidisciplinary Perspectives on Aging. (3 cr)
Sociological, psychological aspects of aging; theories of aging; death and bereavement; issues and problems of older adults in America; human services and their delivery systems (health, nutrition, long-term care, education); public policy and legislation; environment and housing; retirement.

Greek (Grk)

Department of Classical and Near Eastern Studies

College of Liberal Arts

Grk 1001. Beginning Classical Greek I. (4 cr)
Introduction to classical Greek.

Grk 1002. Beginning Classical Greek II. (4 cr; SP-1001 or equiv)
Continuing work on Greek grammar and syntax; readings from classical Greek authors including Herodotus and Aristophanes.

Grk 1111. Honors Course: Beginning Classical Greek. (3 cr; SP-1112. Regs in honors program or high ability as indicated by HS transcript)
Intensive Classical Greek covering material normally taught over two semesters. Students must also register for 1112 when taking this class.

Grk 1112. Honors Course: Classical Greek. Recitation. (3 cr; SP-1112. Regs in honors program or high ability as indicated by HS transcript)
Drills and composition exercises to help students learn classical Greek. Students must also register for 1111 when taking this class.

Grk 3111. Intensive Classical Greek. (3 cr; SP-$1001-1002,1111,3112; previous exper in another foreign language desirable)
Intensive introduction to classical Greek covering two semesters of material in one semester. Undergraduates in this course must also register for 3112 when taking this class.

Grk 3112. Intensive Classical Greek. Recitation. (3 cr; SP-$1001-1002,1112,3111; previous exper in another foreign language desirable)
Drills and composition exercises to help students learn classical Greek. Students must also register for 3111 when taking this course.

Grk 3113. Attic Authors. (4 cr; SP-1002 or 1111 or 3111 or 3 yrs high school Greek or Δ) Selections from classical Attic authors.

Grk 3114. Ionic Authors. (4 cr; SP-3113 or Δ) Students progress from intermediate to advanced Greek reading while exploring the world of Herodotus and Homer.


Grk 3310. Advanced Undergraduate Greek: Oratory. (3 cr [max 9 cr]; SP-3114 or 3 yrs HS Greek or Δ) One or more appropriate authors studied during each course offering.

Grk 3320. Advanced Undergraduate Greek: Tragedy. (3 cr [max 9 cr]; SP-3114 or 3 yrs HS Greek or Δ) Advanced reading in Greek tragedy.

Grk 3330. Advanced Undergraduate Greek: Comedy. (3 cr [max 9 cr]; SP-3114 or 3 yrs HS Greek or Δ) Advanced reading in Greek comedy.

Grk 3340. Advanced Undergraduate Greek: History. (3 cr [max 9 cr]; SP-3114 or 3 yrs HS Greek or Δ) Advanced readings from the Greek historians; traditions of Greek historiography.

Grk 3350. Advanced Undergraduate Greek: Philosophy. (3 cr [max 9 cr]; SP-3114 or 3 yrs high school Greek or Δ) Read one or more works of Plato or Aristotle in the original Greek and find out what they really mean. Texts vary with each offering.

Grk 3360. Advanced Undergraduate Greek: Religious Texts. (3 cr [max 9 cr]; SP-3114 or 3 yrs high school Greek or Δ) Reading and discussion of religious texts from Greek antiquity. Selections vary with each course offering.

Grk 3370. Advanced Undergraduate Greek: Epic. (3 cr [max 9 cr]; SP-3114 or 3 yrs high school Greek or Δ) Reading of classical Greek epic on an advanced level.

Grk 3380. Advanced Undergraduate Greek: Lyric. (3 cr [max 9 cr]; SP-3114 or 3 yrs high school Greek or Δ) Selections from the Greek lyric poets.

Grk 3390. Greek Literature: Romance. (3 cr [max 9 cr]; SP-3114 or 3 yrs high school Greek or Δ) Selections from the Hellenistic Romances of Chariton, Longus, et al.

Grk 3400. Advanced Undergraduate Greek: Later Greek Authors. (3 cr [max 9 cr]; SP-3114 or 3 yrs high school Greek or Δ) Selected topics in later Greek literature, especially Byzantine prose.

Grk 3450. Advanced Undergraduate Greek: Classical Authors. (3 cr [max 9 cr]; SP-3114 or 3 yrs high school Greek or Δ) Selected topics in classical Greek literature; topics specified in Class Schedule.

Grk 3951. Major Project. (4 cr; SP-3111. Latin or Greek major, three 3xx Greek courses or #) Research project using documents and other sources from the ancient world. Students select project in consultation with a faculty member who directs the research and writing.

Grk 3960. Honors Course: Advanced Undergraduate Greek Reading. (3 cr [max 12 cr]; SP-Regis in honors program or high ability as indicated by transcript) Student attends Greek 33xx, 3440, 3450 and does additional work for honors cr.

Grk 3993. Directed Studies. (1-4 cr)
Grk 5012. Prose Composition. (3 cr)
Moving step by step through Ancient Greek grammar, starting with simple sentences and progressing to complex ones. Course ends with students translating short passages of modern English prose into Greek.

Grk 5013. Advanced Composition. (3 cr; SP-5012 or #) Detailed study of Greek-to-Greek verse composition and/or the writing styles of individual Greek authors.

Grk 5032. Text Criticism. (3 cr; SP-3114) Theory and practice. Elements of palaeography and manuscript study. Basic tools for analyzing a textual apparatus with some independence; constructing a critical edition of a literary text.

Grk 5121. Biblical and Patristic Greek. (3 cr; SP-3114 or 3120) Septuagint, Philo, Josephus, New Testament, Apostolic Fathers, and other patristic literature to 5th century C.E. Reading and discussion of selected texts in the major genres.

Grk 5310. Greek Literature: Oratory. (3 cr [max 9 cr]) One or more appropriate authors studied in a given course.

Grk 5320. Greek Literature: Tragedy. (3 cr [max 9 cr]) Reading of Greek tragedy on advanced level.

Grk 5330. Greek Literature: Comedy. (3 cr [max 9 cr]) Advanced readings in Greek comedy.

Grk 5340. Greek Literature: History. (3 cr [max 9 cr]) Advanced readings from the Greek historians; traditions of Greek historiography.

Grk 5350. Greek Literature: Philosophy. (3 cr) Read one or more works of Plato or Aristotle in the original Greek and find out what they really mean. Selections vary with each offering.

Grk 5360. Greek Literature: Religious Texts. (3 cr [max 9 cr]) Reading and discussion of religious texts from Greek antiquity, such as the Homeric Hymns, cultic verse, aretology, sacred tales, oracle texts.

Grk 5370. Greek Literature: Epic. (3 cr [max 9 cr]) Reading of classical Greek epic on an advanced level.

Grk 5380. Greek Literature: Lyric. (3 cr [max 9 cr]) Selections from the Greek lyric poets.

Grk 5390. Greek Literature: Romance. (3 cr [max 9 cr]) Selections from the Hellenistic Romances of Chariton, Longus, et al.

Grk 5440. Greek Literature: Later Authors. (3 cr [max 9 cr]) Selected topics in later Greek literature, especially Byzantine prose.

Grk 5450. Greek Literature: Classical Authors. (3 cr [max 9 cr]) Selected topics in classical Greek literature; topics specified in Class Schedule.

Grk 5621. Greek Palaeography. (3 cr) Analysis of various hands used in Greek manuscripts with attention to date and provenance; history of the transmission of Greek literature.

Grk 5715. Introduction to the Historical-Comparative Grammar of Greek and Latin. (3 cr; SP-# or 2 yrs college Latin) Historical and comparative Grammar of Greek and Latin from their Proto-Indo-European origins to the classical norms.

Grk 5716. History of Greek. (3 cr; SP-Grk/Lat 5715 or equiv, 2 yrs Greek) Reading and formal analysis of documents illustrating the evolution of the Greek language from Mycenaean to modern times.

Grk 5933. Directed Studies. (1-4 cr [max 18 cr]; SP-#,Δ,Ω) Guided individual reading or study.

Grk 5994. Directed Research. (1-12 cr [max 18 cr]; SP-#, Δ, Ω) Supervised original research on topic chosen by student.

Grk 5996. Directed Instruction. (1-12 cr [max 20 cr]; SP-#, Δ, Ω) Supervised teaching internship.

Department of Classical and Near Eastern Studies

College of Liberal Arts

Hebr 1001. Beginning Hebrew I. (4 cr; SP-Students with previous study should take 1012) For beginners whose goal is biblical or post-biblical Jewish studies, or modern Israeli Hebrew. Leads to speaking, listening comprehension, reading, and writing Hebrew with emphasis on communication proficiency. Cultural materials are incorporated.
Readings in medieval Hebrew philosophical texts including Sa’adia Gaon, Judah Halevi, Maimonides, and others.

Hebr 3123. Medieval Hebrew Literature II. (3 cr; SP- 3012 or #) Medieval Hebrew religious and secular poetry. Representative poets from the Middle Ages: Yana'i, Kalir, Ibn Gabirol, Halevi, others.

Hebr 3131. Talmudic Texts. (3 cr; SP- 3012 or 3016 or #) Study of a tractate of Talmud Babli and Yerushalmi, Mishnah, Tosefot. Literary critical methods and attention to Talmudic Aramaic. Redactional and historical problems.

Hebr 3200. Topics in Biblical Studies: A Book of the Bible. (3 cr [max 9 cr]; SP- 3012 or qualified fr or # ability to speak Hebrew not required) Scientific study of a book of the Bible. Both modern scholarly methods and research, and medieval exegesis are utilized. Analysis of selected text.

Hebr 3201. Readings in Biblical Hebrew I. (3 cr; SP- 3002, 1105 or # ability to speak Hebrew not required) Study text of the Hebrew Bible and learn to use basic research tools and commentaries. Close reading of narrative biblical texts. Develop reading fluency and familiarity with methods of research in biblical studies.

Hebr 3202. Readings in Biblical Hebrew II. (3 cr; SP- 3002, 1105, 3001 or # ability to speak Hebrew not required) Study text of the Hebrew Bible and learn to use basic research tools and commentaries. Close reading of narrative biblical texts. Develop reading fluency and familiarity with methods of research in biblical studies.

Hebr 3301. Modern Hebrew Prose (Survey of Hebrew Essays and Journals). (3 cr; SP- 3016 or #) Works from 19th- and 20th-century Hebrew essayists. Jewish nationalism, literary criticism, social and political issues, religion, and philosophy. Readings from encyclopedia articles and journals.

Hebr 3302. Modern Literary Prose and Poetry. (3 cr; SP- 3016 or #) Close reading of contemporary poetry, prose, fiction, and plays. Methods of literary analysis. Established writers and new writers, particularly women. Themes include: human relations, disintegration of traditional society, militarism, alienation, genocide, Jewish and Arab. Entirely in Hebrew.

Hebr 3951. Major Project. (4 cr; SP- Hebr major, three 3xxx Hebrew courses or #) Research project using primary and secondary sources. Students select project in consultation with a faculty member who directs the research and writing.

Hebr 3980. Directed Instruction. (1-4 cr; SP- #) For students interested in courses in Hebrew education. Observe and discuss classes. Gradually increased participation in preparing and presenting instructional materials to a beginning Hebrew class. Evaluation of materials, teaching techniques, Seminars with instructor and staff on language teaching issues.

Hebr 3990. Topics in Hebrew Studies. (1-4 cr [max 12 cr]; SP- #, ∆) Historical, linguistic, literary, religious, or humanistic study of Hebrew society and culture. Approach and method of study varies with topic.

Hebr 5992. Directed Readings. (1-4 cr [max 12 cr]; SP- 3012 or #) Guided individual reading or study.

Hindi (Hindi)

Institute of Linguistics and Asian and Slavic Languages and Literatures
College of Liberal Arts


Hndi 3131. Intermediate Hindi. (4 cr; SP- 3102 or #) Development of reading, writing, speaking, and listening skills. Grammar review, some basic compositions and oral presentations.

Hndi 3132. Intermediate Hindi. (4 cr; SP- 3121 or #) Development of reading, writing, speaking, and listening skills. Grammar review, some basic compositions and oral presentations.

Hndi 4161. Advanced Hindi. (4 cr; SP- 3132 or #) Continued emphasis on the development of communication skills, i.e., the ability to comprehend both written and spoken texts, and to speak, read, and write in Hindi beyond the intermediate level.

Hndi 4162. Advanced Hindi. (4 cr; SP- 4161 or #) Continued emphasis on the development of communication skills, i.e., the ability to comprehend both written and spoken texts, and to speak, read, and write in Hindi, beyond the intermediate level.

Hndi 5710. Topics in Hindi Language, Literature, and Culture. (4 cr) Topics in Hindi literature or the linguistic structure of Hindi.

Hndi 5990. Directed Research. (3-5 cr; SP- ∆, ∆) Directed Research. (3-5 cr; SP- ∆, ∆) Guided individual reading or study of modern Hindi texts.

History (Hist)

Department of History
College of Liberal Arts


Hist 1012. World History: The Age of Global Contact. (4 cr; SP- 1018) Case study approach to world history from 1450 to 1920s. Comparisons of and connections among various cultures. Emphasis on analyzing primary documents to show how historical knowledge is produced. Course is web-enhanced.


Hist 1018. World History: The Age of Global Contact. (3 cr; SP- 1012) Case study approach to world history from 1450 to 1920s. Comparisons of and connections among various cultures. Emphasis on analyzing primary documents to show how historical knowledge is produced. Course is web-enhanced.

Hist 1026. Introduction to Western Civilization from Its Origins to ca. 1500. (3 cr; SP- 1013) Course covers the development of western civilization from its origins in the ancient Middle East to Europe in 1500. Topics include law, religion, governments, history of ideas, and social organization.
Hist 1027. Introduction to European Civilization II: 1500 to Present. (3 cr; SP—§1027) European civilization has played a dominant role in world history for the past five centuries. This course deals with broad chronological periods and themes to examine that role from the early sixteenth century to the present.

Hist 1031. Survey of Western Civilization from Its Origins to 1500. (3 cr; SP—§1026) The development of western civilization from its origins in the ancient Middle East to Europe in 1500. Topics include law, religions, governments, history of ideas, and social organization.

Hist 1032. Introduction to European Civilization II: 1500 to Present. (4 cr; SP—§1027) European civilization has played a dominant role in world history for the past five centuries. This course deals with broad chronological periods and themes to examine that role from the early sixteenth century to the present.


Hist 1302. U.S. History: 1880 to Present. (4 cr; SP—§1308) Modern America from 1880 to the present.

Hist 1307. U.S. History to 1880. (3 cr; SP—§1301) America to 1880.

Hist 1308. U.S. History: 1880 to Present. (3 cr; SP—§1302) Modern America from 1880 to the present.

Hist 1462. Introduction to East Asia in Modern Times 1600-2000. (4 cr) Formation and decline of early modern Asian empires; Western imperialism and Asian nationalism; social revolution, economic modernization, and cultural change in China, Japan, Korea, and Vietnam between 1600-2000.

Hist 3051. Ancient Civilization: Near East and Egypt. (3 cr) A broad survey of ancient Near Eastern and Egyptian history and culture from the prehistoric to the rise of Persia around 550 B.C.

Hist 3052. Ancient Civilization: Greece. (3 cr) A broad survey of ancient Greek culture and history from the third millennium B.C. to the death of Alexander the Great in 323 B.C.

Hist 3053. Ancient Civilization: Rome. (3 cr) A broad survey of the culture and history of Rome from its origins to the decline and fall of the Roman Empire in the third and fourth centuries A.D.

Hist 3101. Introduction to Medieval History. (3 cr) Europe from the decline of Rome to the early Renaissance: politics, institutions, society, economy, and culture of the Middle Ages.


Hist 3152. British History from the 17th Century. (4 cr) Civil War, Revolution and constitutional settlement; industrialization and growth of democracy; rise and decline of British Empire.

Hist 3244. History of Eastern Europe. (3 cr) History of the peoples of the region from their origins to modern times, culture and society in the Middle Ages; Golden Age of Eastern Europe; loss of independence; nationalism and formation of national states; Fascism and World War II, Jews in Eastern Europe; communist and post-communist periods.

Hist 3281. European Intellectual History: the 18th and 19th Centuries. (3 cr) The first of a two-semester course dealing with logical, philosophical, and methodological issues in the historical, social, and natural sciences from the late 17th to the mid-19th century. Readings are from original sources.

Hist 3282. European Intellectual History: The Late 19th and 20th Centuries. (3 cr) Second semester of fundamental texts dealing with issues in logic, philosophy, and the methodologies of the historical, social, and natural sciences from the late 19th century to the present. Readings are from original sources.

Hist 3347. Women in Early and Victorian America: 1600-1890. (3 cr) The varied experiences of American women 1600-1900. Topics include women’s involvement in the dispossession of native peoples, westward expansion, slavery, industrialization, reform, revolution, and transformations in family life and sexuality.

Hist 3348. Women in Modern America. (3-4 cr) History of women in the United States from 1890 to the present. Explores women’s changing roles in politics, the labor force, the family, and popular culture.

Hist 3401. Early Latin America to 1825. (4 cr; A-F only) Native American and colonial periods to 1825, with emphasis on social, cultural, and economic aspects.

Hist 3402. Modern Latin America 1825 to Present. (4 cr) National and contemporary period 1825 to present, with emphasis on social, cultural, political, and economic change.

Hist 3421. The World and the West 1400-1900. (3 cr; SP—One sem of world history or Western civilization recommended; A-F only) Survey of the Western world’s economic, religious, and cultural interaction between the peoples of Europe and the peoples of Africa, the Americas, and Asia, with reference to perceptions of alien cultures by both sides.

Hist 3422. World History in the 20th Century. (4 cr; A-F only) Analyzes the major events in 20th-century global history in comparative or cross-cultural context. The decline of Western imperialism, the rise of total war and totalitarianism, nationalism and nation-building are among the key topics.

Hist 3425. History of Modern Mexico. (3 cr) Mexico from independence to the present: struggles for land, liberty, and equality; ethnicity, gender, and class; economic growth, nationalism, and globalization; urbanization, immigration, demographic transition.

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

Hist 3428. History of Relations Between United States and Mexico: 1821 to Present. (3 cr; United States and Mexico relations in the 19th and 20th centuries. Examine 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.

Hist 3431. History of Africa to 1800. (4 cr) A survey of African history from earliest times to 1800. Focuses on socioeconomic, political, and cultural development in pre-colonial Africa from ancient Egypt through the era of the trans-Atlantic slave trade.

Hist 3432. History of Africa Since 1800. (4 cr) Provides a general survey of modern African history from the early 19th century to the present. Focuses on socioeconomic, political, and cultural development in Africa from the trans-Atlantic slave trade through the post-colonial era.

Hist 3441. Chicana/o History to 1900. (3 cr) History of the Mexican people from the 16th through the 19th centuries. Historical theories of colonialism, expansion, economy, assimilation, migration, and settlement; race, class, gender, political, social, and cultural interaction and conflict.

Hist 3442. Chicano History: 1900 to Present. (3 cr) Migration, repatriation, the Bracero program, contemporary Chicano/a politics, the Chicana/o movement, work, society, and culture. Lecture format with 2-3 videos/movies on selected topics. A wide range of reading from texts and articles.

Hist 3451. Asia in the Ancient World. (3 cr; A-F only) Comparative approach to the birth of civilization in Asia; the role of ancient wars, imperialism and genocide; ethnocentric violence as against violence of the universal empire; culmination, decline, and fall of classical Asian civilizations.

Hist 3461. Introduction to East Asia I: The Imperial Age. (4 cr) Comparative survey of early history of China, Japan, Korea, and Vietnam; early Chinese thought; diffusion of Confucianism, Buddhism, and other values throughout East Asia; political and social history of region to 1600.

Hist 3462. Introduction to East Asia in Modern Times 1600-2000. (4 cr) Formation and decline of early modern Asian empires; Western imperialism and Asian nationalism; social revolution, economic modernization, and cultural change in China, Japan, Korea, and Vietnam between 1600-2000.

Hist 3464. China in the Song, Yuan, and Ming Dynasties. (3 cr; SP—§5464, §5465) 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.

Hist 3465. China in the Ming and Qing Dynasties. (3 cr; §SP—§5467, §5468) 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.

Hist 3467. State and Revolution in Modern China. (3 cr; SP—§5467, §5468) 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.

Hist 3468. Social Change in Modern China. (3 cr; SP—§5468, §5469) Opium War and opening of Treaty Ports in 19th century; missionary activity and cultural influence; changes in education system; women’s movement; early industrialization; socialism and collectivization after 1949; industrialization of Taiwan; PRC’s entry into the world trading system.

Hist 3471. 20th-Century Japan: 1910s to 1990s. (3 cr) World War I and Japan’s emergence as an industrial society; world power in the 1920s; rise of militarism, World War II in the Pacific; political reform, economic resurgence, and cultural change in the postwar era.

Hist 3473. Family, School, and Work in Modern Japanese History. (3 cr; SP—§5473, §5474) Impact of economic, social, and cultural change on males and females in the family, the education system, and the employment system from the 17th through the 20th centuries.

Hist 3474. The Rise of Modern Japan: 1850s to 1900s. (3 cr; SP—§5475) The Meiji Revolution from Commodore Perry to the eve of World War I; origins of constitutional monarch, industrial economy, Western influences, modern cultural change.

Hist 3481. Ancient and Medieval India. (3 cr; A-F only) The history of India; origins of civilization along the Indus River, Indo-European intrusion, rise of the Indus-Gangetic civilization, response of Buddha to violence, Mauritian empire, classical civilization of India, rise of Hinduism.

Hist 3485. History of Southeast Asia. (3 cr; A-F only) Origins of civilization, rise of empires such as Angkor, dynasties of Hinduism, Buddhism, Islam, and
Christianity, West European intrusion through the imperialist era, rise of nationalism, and the establishment of nation-states.

Hist 3488. Genesis of Modern India. (3 cr; AF only) Spans the rise of the Moghul empire in the 1520s to the demise of the British empire in 1947, including the present day India, Pakistan, and Bangladesh.

Hist 3489. 20th Century India. (3 cr; AF only) India under British hegemony in 1914 through Mahatma Gandhi and his nationalist movement; World War II; the British departure; creation of India and Pakistan; Nehru; Indira and Rajiv Gandhi.

Hist 3491. Islamic Civilization. (3 cr) Islamic legacy in the classical age (800-1400) in the sciences—natural and medical—mathematics, philosophy, and literature, and their transmission to Europe.

Hist 3505. Survey of the Middle East. (3 cr) Peoples, lands, and cultures of the Middle East. Historical survey from earliest civilizations to the present.

Hist 3541. Islam in the Catholic Age. (3 cr) The Rise of Islam in an Arabian setting. Roles of the prophet, the orthodox and Umayyad caliphs. Development of Islamic state and empire, organizations, institutions, and states of Muslims and non-Muslims.

Hist 3542. Medieval Islam. (3 cr) Islamic dynasties, Umayyads of Spain, Shiites, assassins, Abbasid Caliphate’s disintegration and rise of Seljuk Turks. Sunnism re-emerges. IlKhanids.


Hist 3544. Arab World 1920 Until the Present. (3 cr) Arab world since independence; the struggle for liberation, political stability, development and unification; political structure and conflicts; impact of Arab-Israeli conflict.

Hist 3547. The Ottoman Empire. (3 cr) Funding of Ottoman society and state to empire, 1300 to end of empire in 1920. Lands, institutions, peoples, legacy, impact on the modern world.

Hist 3608. History of the Catholic Church in the Middle Ages. (3 cr; SP-Intro course in European history before 1500 recommended) Religious beliefs of Latin Christianity as officially taught and as popular folk religion; organization of the church and its implantation in lay society; relations between Latin Christendom and its neighbors, Orthodoxy and Islamism.

Hist 3609. Military History of Medieval Western Europe. (3 cr) Concept and conduct of war in Western Europe in the Middle Ages and the relation between the military and society.

Hist 3611. Medieval Cities of Europe: 500-1500. (3 cr) Evolution of Western European cities from the late Roman town to the early Renaissance city-state.

Hist 3615. Women in European History: 1500 to the Present. (3 cr) Women’s history and gender relations in modern European history. Methods and primary sources for women’s history and the implications of inclusion of women in historical study.

Hist 3616. France in the Middle Ages. (3 cr) Politics, society and culture in medieval France from the end of the Carolingians to the end of the Hundred Years War.

Hist 3618. The Dark Ages Illumined: Medieval Europe to 1050. (3 cr) Origins of medieval Europe. Germanic and Viking invasions, feudalism, manorialism, Islam, the papacy, monasteries, intellectual developments.

Hist 3619. Chivalry, Crisis, and Revival: Medieval History 1050-1300. (3-4 cr) Chivalry and courtly love, crusades, revival of towns and trade, monasteries, religious developments, Black Death, famine, and wars.

Hist 3621. Renaissance Italy: 1200-1550. (3 cr; SP-Intro course in European history before 1500 recommended) The political and cultural history of the city-states of northern and central Italy, 1200-1550, with an emphasis on Florence and Venice; readings include Dante and Machiavelli.

Hist 3623. Germany in the Age of Reformation. (3 cr; SP-General course in European history before 1500 recommended) History of religious reform movements—Lutheran, Calvinist, and Catholic—in the context of German politics, society, and culture; emphasis on primary source readings (written during the period).

Hist 3626. France From the Late 16th Century Through Napoleon: 1594-1815. (3 cr) The evolution of French government, economy, and society in a broad context: monarchical power and its disintegration; Louis XIV at the apex of the Old Regime; the Enlightenment; the French Revolution; and the rise and fall of Napoleon Bonaparte.

Hist 3632. History of Germany; Reforma- tion to Unification: 1500-1871. (3-4 cr) The Reformation era; warfare and demographic catastrophe of the early 1600s; life in town and country; absolutism; Baroque culture; family life and its transformation; economic crisis; Revolution of 1848; the military path to unification.

Hist 3633. 20th-Century Germany: The Unmastered Past. (3-4 cr) Unifying the nation; industrial development and political instability; bourgeois culture; growth of socialism; World War I and Revolution; Weimar Era; Depression; Nazi seizure of power, the Hitler state; World War II and the Holocaust; Cold War and two Germanies; reunification.

Hist 3634. The Emergence of Ethnic Conflict: Eastern Europe and Byzantium to Circa 1500. (3-4 cr) Byzantine and Eastern European history from the 6th century to ca. 1500. Major topics include Byzantium, the medieval Balkans, the rise of the Ottoman empire in Europe, and the West Slavic-Hungarian lands till the Renaissance.

Hist 3636. Conquest, Colonization, and Centralization: The History of European Russia Circa 700 to Circa 1700. (3 cr) Major topics include the Khazar, Rus’, and Bulgar states, Mongol conquest and rule, Muscovite Russia, Ukraine in the 16th-17th centuries, and the Crimean Khanate.

Hist 3637. Modern Russia: From Peter the Great to the Present. (3 cr) Political, social, cultural, and commercial forces which have shaped modern Russia. Emphasis will be on modernization, attempts at reforms in the imperial and Soviet period, and the dissolution of empires.

Hist 3641. Anglo-Saxon England: From King Arthur to William the Conqueror. (3 cr) History of medieval England from the end of Roman rule to the Norman Conquest. All aspects of society examined to provide a broad picture of the creation of Anglo-Saxon England and the Celtic Frontiers.

Hist 3642. Knights, Peasants, and Bandits in Medieval England. (3-4 cr) Social history of medieval England from 1066 to 1500. Peasants, nobility, and bourgeoisie, including their economic institutions, living conditions and entertainment. Legal and illegal ways of coping with economic and social change resulting from plague and wars.

Hist 3651. England Under the Tudors: 1485-1603. (3-4 cr) Henry VIII and the English Reformation. The early Tudor period, 1485-1547; the reign of Henry VIII and his break with the papacy.

Hist 3652. England Under the Stuarts: 1603-1689. (3 cr) History of England from the accession of James I (1603) to the Glorious Revolution (1689), including political, social, religious, military, and intellectual history.

Hist 3671. Modern Britain: 1783-1867. (3 cr) Britain from the end of the American Revolution to the mid-Victorian age; industrialization and reform.

Hist 3672. Modern Britain Since 1867. (3 cr) Britain from the mid-Victorian age to the present; the growth of democracy, the height and depth of world power.

Hist 3681. Irish History. (3 cr) History of Ireland, primarily modern, with emphasis on politics and Anglo-Irish relations.

Hist 3703. European Cities: 1300-1800. (3 cr; SP-Background in European civilization of late Middle Ages) The historical experience of selected cities in early modern Europe set within the context of ideas about urban formation and development. Key cities are Venice, Florence, Antwerp, Madrid, Seville, Amsterdam, Paris, and London.

Hist 3704. Daily Life in Europe: 1300-1800. (3 cr) Living conditions and daily life in Europe before the Industrial Revolution. Topics include marriage and family, life at court, nobles, peasantry, disease, farming, livestock-raising, urban life, the middle classes, manufacturing, trade, piracy, witchcraft, war, crime, and social deviance.

Hist 3707. Social History of Modern Europe. (3 cr) Transformation from traditional agrarian to modern society, 18th to 20th centuries. Social change; history of the family, marriage and sexuality; the roots of nationalism and racism.

Hist 3712. Economic History of Modern Europe. (3 cr) The long-term rise and transformation of the European economy. Main themes are emergence of capitalism and the spread of modern economic growth up to World War I; growth, instability, and structural change in the 20th century.

Hist 3714. Medieval Spain. (3 cr) Development of the medieval kingdoms of Spain from Roman times to ca. 1500. Major social, economic, and cultural developments. Christians, Jewish, and Muslim interaction. Role of Spain in the beginning of European expansion.

Hist 3715. Modern Spain: 1500 to the Present. (3 cr) Ferdinand and Isabella, the Bourbon dynasties, the 20th-century Civil War and Franco regime, and into the present. Readings, lectures, films, slides, and music will provide a comprehensive view of a vibrant people and their modern history.

Hist 3721. 20th-Century Europe From the Turn of the Century to the End of World War II: 1900-1945. (3 cr; SP-55721) The social, political, and cultural changes and conflicts in Europe from the late 19th century to the end of World War II. The background to WWI, its impact, revolution, the failure of interwar stability, fascism, WWII and its consequences.

Hist 3722. 20th-Century Europe From the End of World War II to the End of Cold War: 1945-1991. (3 cr) The social, economic, political, and cultural impacts of WWII upon Europe; the division of Europe, communist regimes in Eastern Europe, cooperation in Western Europe, impacts of modernization and the end of the Cold War in 1990.


Hist 3747. The Habsburg Empire: 1740-1815. (3 cr) The evolution of Habsburg rule in Central Europe from the reforms of Maria Theresa to imperial collapse in 1815. Economic and social transformation; the revolutions of 1848; political modernization; the rise of nationalism and anti-Semitism; the fin de siecle; World War I.
Hist 3748. Austria in the 20th Century. (3 cr) Austria from the Paris Peace Treaties to the present. Political instability, social conflict, and economic stagnation between the World Wars; Nazi rule and World War II; the economic miracle, consensus politics, and neutrality after 1945; post cold war Austria.

Hist 3767. Eastern Orthodox History. (3 cr) Development of the orthodox church in Byzantium, the Islamic Near East, the Slavic world and in the diaspora; impact of orthodoxy on political and cultural institutions, interaction with other Christian and non-Christian communities; orthodoxy spirituality and aesthetics.

Hist 3775. History of the European Jews from the Middle Ages to the Present. (3 cr) Social, economic, and cultural history of the Jewish past; interactions with other peoples; history and causes of anti-Semitism; Zionism and assimilation; Chassidism and socialism.

Hist 3797. History of Population. (3 cr) History of births, deaths, migration, population size, and population characteristics. Evidence from Europe, the United States, and Latin America with comparative material from Africa and Asia. Methods of historical population analysis and research of historical population data.

Hist 3800. Topics in Early American History. (3 cr) For advanced undergraduates majors and nonmajors. Focus on intensive exploration of particular topics in early American history such as economic history, demographic regimes, social history, intellectual history, regions, slavery, religion, and witchcraft in colonial America.

Hist 3801. The People of Early America: 16th to 18th Centuries. (3 cr) Multicultural approach to early American history focusing on the interactions of Africans, Europeans, and American Indians who came together to create a new world in North America during the 16th, 17th and 18th centuries.

Hist 3809. The Revolution, the Constitution, and the Beginnings of American Politics. (3 cr) The culture and structure of late colonial politics; regionalism and connections between society and politics; the imperial crisis and independence; military history of the Revolution; origins of national politics and the constitution.

Hist 3812. The Civil War and Reconstruction. (3 cr) United States from 1848 to 1877. Causes of sectional crisis; Southern secession; Lincoln and emancipation; military history; impact of war North and South; Reconstruction to change the Southern life and transform the status of African Americans.

Hist 3821. United States in the 20th Century to 1945. (3 cr) American politics and society in the progressive era, the 1920s, the Great Depression and World War II, Economic reform at home, the challenges of world war abroad, and social change affecting the status of women and racial minorities.

Hist 3822. United States in the 20th Century Since 1945. (3 cr) American politics and society in the postwar era, the diplomacy of the Cold War, the civil rights movement, the Vietnam War, cultural clashes in the 1960s, Watergate, the conservative resurgence and the end of the Cold War.


Hist 3852. U.S. Labor in the 20th Century. (3 cr) The development of a working class from the preindustrial to an industrial age. Responses of American workers through labor organization, slave resistance, and political reform. The Knights of Labor, the formation of the AFL, and the challenges of Marxism.

Hist 3861. European American: From Immigrants to Ethnicity: 1790-1890. (3 cr; A-F only) Conditions which contributed to the mass exodus from northern/western Europe during this century as well as the attraction of the United States. Major theme will be how immigrants shaped and in turn were shaped by America.

Hist 3862. European Americans: 1890-1990. (3 cr; A-F only) From the 1890s, immigrants came predominantly from southern/eastern Europe. A central theme is the role of immigrants in the transformation of America from a rural agricultural to an urban industrial society.

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

Hist 3871. American Indian History: Pre-Contact to 1830. (4 cr) Introduction to American Indian history from ancient native America to the removal era. Focuses on the social, cultural, political, and economic diversity of Native American peoples and Native American experiences with European colonialism.

Hist 3872. American Indian History: 1830 to the Present. (4 cr) Focus on the impact of Federal Indian policy on American Indian cultures and societies, and on American Indian culture change.

Hist 3881. History of American Foreign Relations to 1914. (3 cr) American involvement in world affairs from 1760-1914 including political, economic, social and, cultural relations by individuals, groups, governmental, and nongovernmental agencies focusing on nation building, creation of continental and commercial empires, hemisphere hegemony, cultural expansion, and wartime diplomacy.

Hist 3882. History of American Foreign Relations: 1914 to Present. (3 cr) American involvement in world affairs 1914 to present. Political, economic, social, and cultural activities by individuals, groups, and governmental and nongovernmental agencies, participation in international organizations, commercial and cultural imperialism, and war and Cold War diplomacy.


Hist 3900. Topics in Medieval and Modern European History: (1-4 cr; max 16 cr) Selected topics in medieval and modern European history not covered in regular courses. To be taught as staffing and demand exist.

Hist 3910. Topics in U.S. History. (1-4 cr; max 16 cr; SP-Jr or Sr or #) Selected topics in U.S. history not covered in regular courses. To be taught as staffing and demand exist.

Hist 3920. Topics in African History. (1-4 cr; max 16 cr; SP-Jr or Sr or #) Selected topics in African History not covered in regular courses. To be taught as staffing and demand exist.

Hist 3930. Topics in Ancient History. (3 cr; max 12 cr) Selected topics in Near Eastern, Egyptian, Greek, and Roman History.

Hist 3940. Topics in Asian History. (1-4 cr; max 16 cr; SP-Jr or Sr or #) Selected topics in Asian history not covered in regular courses. To be taught as staffing and demand exist.

Hist 3950. Topics in Latin American History. (1-4 cr; max 16 cr; SP-Jr or Sr or #) Selected topics in Latin American history not covered in regular courses. To be taught as staffing and demand exist.

Hist 3951. Senior Honors Seminar. (4 cr; SP-History honors candidate) Intended for History honors majors in their junior year, the course is run as a seminar, with emphasis on readings and discussion. Weekly sessions focus on selected topics relating to historical method and historiography.

Hist 3960. Topics in History. (1-4 cr; max 16 cr; SP-Jr or Sr or #) Selected topics in history not covered in regular courses and covering more than one geographic area/time period. To be taught as staffing and demand exist.

Hist 3961. Major Paper. (4 cr; SP-A-F only) Required of History majors, usually taken in senior year. Research papers on topics students choose; work largely with primary sources. Faculty guidance in sections limited to 15 students. Sign up in Undergraduate Studies Office two semesters in advance.

Hist 3980. Supplemental Writing in History. (1 cr; [max 4 cr]; SP-Must be attached to a 3-cr 3xxx or 5xxx course taken simultaneously; A-F only) May be attached, by agreement of instructor and students, to any 3xxx or 5xxx course to make a writing-intensive experience.

Hist 3990. Historical Internship. (1-4 cr) Internships with a historical society, government or community historical organization. Arranged through and supervised by the department.

Hist 3993. Directed Study. (1-16 cr; max 16 cr; SP- #, A, F only) Guided individual reading or study. Open to qualified students for one or more semesters.

Hist 3994. Directed Research. (1-16 cr; max 16 cr; SP- #, A, F only) Qualified students work on a tutorial basis.

Hist 4071. History of Rome to 78 B.C. (3 cr; SP-An appropriate introductory course is recommended) Intensively examine the political, institutional, and socioeconomic history of Rome from its origins to the death of Sulla in 78 B.C. The influence of strengths and weaknesses that led to the rise and fall of the Republic are the primary theme.

Hist 4072. History of Rome: 78 B.C. to A.D. 117. (3 cr; SP-An appropriate introductory course is recommended) Intensively examine the political, institutional, and socioeconomic history of Rome from the death of Sulla in 78 B.C. to the death of Trajan in A.D. 117.

Hist 4073. History of Rome: A.D. 117 to 641. (3 cr; SP-An appropriate introductory course is recommended) Intensively examine the political, institutional, and socioeconomic history of Rome from the death of Trajan in A.D. 117 to the death of Theodosius in A.D. 395. Explores one historical question—the decline and fall of the Roman Empire.
Hist 4135. Vikings, East Slavs, Turks, and Finns: European Russia in the Early Middle Ages. (3 cr; A-F only)
An analysis of the Turkic nomads, East Slavic agriculturists, and Finnic foragers who inhabited early medieval European Russia and the Kazhar, Bulgar, and Rus'/Viking states which came to rule them.
Hist 4136. Reformer, Paranoïd, or Divine-Right Monarch: Ivan the Terrible and His Bloody Reign, 1533–1584. (4 cr; A-F only)
Does Tsar Ivan IV (1530–1584) deserve his epithet of Terrible? Examine the various interpretations of Ivan and critically examine the primary sources for his reign. Attempt to determine Ivan’s guilt in a simulated trial.
Hist 4271. The Viking World: Story, History, and Archaeology. (3 cr)
Viking society and expansion of Viking influence abroad. Viking impact on Western Europe; interactions with Slavic lands; settlement of North Atlantic islands; and Western Europe’s impact on Scandinavian lands. Analyzes archaeological, historical, linguistic, and numismatic evidence.
Hist 4272. Medieval Scandinavia: Ideas, Resources, Institutions, and Their History. (3 cr)
Examination of the economic, mental, political, and social landscapes and structures of Scandinavia in the 12th through 15th centuries, as well as of the principal events.
Economic, mental, political, and social landscapes and structures of Scandinavia in the 16th through 18th centuries. Constitutional and institutional developments in the process of state formation. Competition between Denmark and Sweden for hegemony in Scandinavia and the Baltic.
Hist 4274. Modern Scandinavia: The 19th and 20th Centuries. (3 cr)
Economic, political, and social landscapes and structures of Scandinavia in the 19th and 20th centuries with emphasis on migration, industrialization, democratization, domestic politics, international relations, the Scandinavian welfare state, and European integration.
Hist 4521. Proseminar: Nationalism in Japan. (3 cr)
Controversy and color expression and interpretation regarding Japanese aggression and war guilt in the Pacific War, including such issues as the responsibility of the Emperor and the American use of atomic weapons.
Hist 4900. Topics in Medieval and Modern European History. (1-4 cr [max 16 cr]; SP-Jr or Sr or grad student or #)
Selected topics in medieval and modern European history not covered in regular courses. Taught as staffing permits.
Hist 4910. Topics in U.S. History. (1-4 cr [max 16 cr]; SP-Jr or Sr or grad student or #)
Selected topics in U.S. history not covered in regular courses. Taught as staffing permits.
Hist 4920. Topics in African History. (1-4 cr [max 16 cr]; SP-Jr or Sr or grad student or #)
Selected topics in African history not covered in regular courses. Taught as staffing permits.
Hist 4930. Topics in Ancient History. (1-4 cr [max 16 cr]; SP-Advanced undergrad or grad student; A-F only)
Selected topics in Ancient history not covered in regular courses. Taught as staffing permits.
Hist 4940. Topics in Asian History. (1-4 cr [max 16 cr]; SP-Jr or Sr or grad student or #)
Selected topics in Asian history not covered in regular courses. Taught as staffing permits.
Hist 4950. Topics in Latin American History. (1-4 cr [max 16 cr]; SP-Jr or Sr or grad student or #)
Selected topics in Latin American history not covered in regular courses. Taught as staffing permits.
Hist 4960. Topics in History. (1-4 cr [max 16 cr]; SP-Jr or Sr or grad student or #)
Selected topics not covered in regular courses. Taught as staffing permits.
Hist 4970. Historical Internship. (1-12 cr [max 12 cr]; S-N only)
Internship with a historical society, government or community historical organization. Arranged through and supervised by the department.
Hist 5011. Quantitative Methods for Historical Research. (4 cr; SP- #)
Basics of quantitative historical data collection, measurement, and analysis.
Hist 5035. The Germ Theory and Modern Medicine. (3 cr; SP-History of medicine or of science course recommended for undergrads)
A study of the development of the modern germ theory of disease and of its applications in medicine and public health. Emphasis will be placed on developments between 1860 and 1950.
Hist 5045. The Modern Medical Profession. (3 cr; SP-History of medicine or of science course recommended for undergrads)
A comparative history of the medical professions in the United States and in select northern European nations. Analyze the process of professionalization and the role the profession has played in western industrial societies since 1800.
Hist 5061. History of the Greek World from Earliest Times to 400 B.C. (3 cr)
Trace the history of the Greeks from their initial appearance in Greece in the Bronze Age to the close of the 5th century B.C. Special attention will be devoted to the polis, military development, and intellectual change.
Hist 5062. History of the Greek World: 400 to 30 B.C. (3 cr)
Trace the history of the Greeks from the end of the Peloponnesian War through the decline of the polis, the rise of Macedon and Alexander the Great, the fragmentation of Alexander’s empire in the Hellenistic World and the eventual Roman take over of that world.
Hist 5111. Proseminar in the History of Medieval Europe. (3 cr; SP-Advanced undergrads of exceptional ability or graduate students; A-F only)
Examination of basic scholarly bibliography for medieval Western European history. Aim is to help students to prepare for M.A. and Ph.D. examinations.
Hist 5115. Medieval Latin Historians. (3 cr; SP-Reading knowledge of Latin)
Writing of history in Western Europe during the Middle Ages. Focus on idea of history, philosophy of various historians, techniques of research by medieval historians and chroniclers, history as literature, and value of medieval histories to modern research scholars. Latin texts only.
Hist 5246. Imperial Russia: Formation and Expansion of the Russian Empire in the 18th and 19th Centuries. (3-4 cr)
Interaction with Europe and Asia; attempts at modernization and reform; emancipation of the serfs and rise of revolutionary movements.
Hist 5250. 20th-Century Russia: The Collapse of Imperial Russia, the Revolutions, and the Soviet Regime. (3 cr)
Analysis of the factors that led to the collapse of the tsarist regime; discussion of the 1917 revolution, the evolution of the Soviet regime and the collapse of Soviet communism. Emphasis on the role of nationalities and the rise of the Commonwealth of independent states.
Hist 5274. Southeastern Europe: Ottoman Empire and Successor States. (3 cr [max 3 cr])
The legacy of empires; 18th-century background; rise of Balkan nationalism; the Eastern Questions in the 18th and 19th centuries; the Balkans in the 20th century; population movements or exchanges; ethnic conflict in the Communist and Post-Communist periods.
Hist 5276. Intellectual and Cultural History of Modern Greece. (3 cr)
Literary and cultural contributions of modern Greece. The modern Greek experience seen through Greek historical and cultural monuments. An attempt at self-definition.
Hist 5294. Social History of Russia and Eastern Europe Through the 19th Century. (3 cr)
Lives of peasants and workers, nobles and merchants. Topics include family, marriage, sexuality; culture and tradition; transformation from an agricultural to a modern society.
Hist 5295. Social History of Russia and Eastern Europe From the Late 19th Century to the Present. (3 cr)
Major developments in 20th-century U.S. criminal justice. The influences of ideology, culture, and social science on defining crime and on crime control policies and practices.
Hist 5337. Criminal Justice in the United States: 1900–2000. (4 cr; SP-Jr or Sr or #)
Case study and seminar approach to historical research and interpretation. It offers teachers and other scholars a chance to survey a particular topic in Minnesota history and to write their own historical narrative based on primary source research.
Hist 5436. Social History of African Women: 1850 to the Present. (3 cr; SP- # for undergrads)
Explore the historical forces which have shaped African women’s everyday lives and the ways in which these women have been active agents in the making of their own histories.
Hist 5446. Problems in West African History. (3 cr; SP- # for undergrads)
This problem-centered course explores several of the major historiographical, methodological, and theoretical debates in West African history. Core topics include state formation, trade, slavery, Islam, gender, and colonialism.
Hist 5464. China in the Song, Yuan, and Ming Dynasties. (3 cr; SP-#3464; EAS 3464)
China during the Song (976-1279), 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.
Hist 5465. China in the Ming and Qing Dynasties. (3 cr; SP-#3465; EAS 3465)
Examine 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.
Hist 5467. State and Revolution in Modern China. (3 cr; SP-#3467; EAS 3467)
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.
Hist 5468. Social Change in Modern China. (3 cr; SP-#3468)
Opium War and opening of Treaty Ports in 19th century; missionary activity and cultural influence; changes in education system; women’s movement; early industrialization; socialism and collectivization after 1949; industrialization of Taiwan; PRC’s entry into the world trading system.
Hist 5473. Family, School, and Work in Modern Japanese History. (3 cr; SP-3473)

Hist 5501. Medieval Europe and the World. (3 cr; A-F only)

Hist 5756. Proseminar in Medieval Spain. (3 cr; SP-9 A-F only)


Hist 5631. Proseminar: Comparative Early Modern History. (3 cr; SP-Hist grad student or A-F only)

Hist 5650. Proseminar: Early Modern Europe. (3 cr; SP-Hist grad student or A-F only)

Hist 5651. Proseminar in Tudor England: 1485-1603. (3 cr; SP-A-F only)

Hist 5652. Proseminar in Stuart England: 1603-1689. (3 cr; SP-A-F only)

Hist 5715. Readings in European Women's History: 1450-1750. (3 cr; A-F only)

Hist 5735. European Women's History; 1750 to the Present. (3-4 cr; SP-9)

Hist 5740. Topics in Modern German History. (3-4 cr [max 12 cr] SP-9 A-F only)

Hist 5754. Modern Greece; Mid-18th Century to Present: Greek Nationalism and Establishment of the Greek State. (3 cr; A-F only)

Hist 5761. Proseminar—Imperial Russia. (3 cr; SP-Knowledge of Russian or German or French) Western and Russian historiography on crucial issues of imperial Russia. Political institutions; culture and society; modernization and reforms; new interpretations.

Hist 5777. Proseminar in Habsburg Central Europe. (3 cr; SP-9) Central Europe under Habsburg rule from the reforms of Maria Theresa to imperial collapse. Continuity and change in society; economic and political modernization; the rise of national consciousness and anti-Semitism; politics and culture in the fin de siecle; the Empire and World War I.

Hist 5794. Proseminar in European Economic History. (3 cr; SP-9)

Hist 5801. Seminar in Early American History. (3 cr; A-F only)

Hist 5841. Proseminar in American Economic History. (3 cr; SP-9 A-F only)

Hist 5857. Proseminar: Readings in the History of American Women. (3 cr; A-F only)

Hist 5861. History of American Immigration. (3 cr; SP-9 A-F only)

Hist 5864. Proseminar: African-American History. (3 cr; SP-9 A-F only)

Hist 5865. Proseminar: African-American History. (3 cr; SP-9 A-F only)

Hist 5871. Readings in U.S. Intellectual History: 19th-20th Centuries. (3 cr; SP-9)

Hist 5881. American Foreign Relations to 1895. (3 cr; SP-9)

Hist 5882. American Foreign Relations Since 1895. (4 cr; SP-9)

Hist 5890. Problems in American Indian History. (3 cr; SP-9)

Hist 5900. Topics in European/Medieval History. (1-4 cr [max 16 cr]; SP-Grad student or advanced undergrad with #)

Hist 5901. Latin America Proseminar: Colonial. (3 cr; SP-9)

Hist 5902. Latin America Proseminar: Modern. (3 cr; SP-9)

Hist 5910. Topics in U.S. History. (1-4 cr [max 16 cr]; SP-Grad student or advanced undergrad with #)

Hist 5930. Topics in Ancient History. (1-4 cr [max 16 cr]; SP-Grad student or A-F only)

Hist 5940. Readings in historical literature on immigration to the United States. Emphasis on recent works distinguished by new research methodologies and interpretations.

Hist 5962. History of American Immigration. (3 cr; SP-9 A-F only)

Hist 5965. Proseminar: African-American History. (3 cr; SP-9 A-F only)

Hist 5981. American Foreign Relations 1895– Present. The second half of the graduate sequence in African-American history is oriented primarily toward thinking about and performing independent research.

Hist 5987. Offerings vary in thematic and chronological focus.

Hist 5990. Topics in U.S. History Not Covered in Regular Courses. (1-4 cr; SP-9)

Hist 6031. Proseminar in Spanish and Portuguese History. (3 cr; SP-9 A-F only)

Hist 6311. Readings in modern English and Spanish, and practical experience with Spanish manuscript documents from the period.

Hist 6361. Proseminar: Comparative Early Modern History. (3 cr; SP-Hist grad student or A-F only)

Hist 6501. Medieval Europe and the World. (3 cr; SP-A-F only)

Hist 6865. Proseminar: African-American History. (3 cr; SP-9 A-F only)

Hist 6920. Topics in African Social History. (3 cr; SP-9 A-F only)

Hist 6930. Topics in Ancient History. (1-4 cr [max 16 cr]; SP-Grad student or A-F only)

Hist 6981. American Foreign Relations 1895– Present. The second half of the graduate sequence in African-American history is oriented primarily toward thinking about and performing independent research.

Hist 6987. Offerings vary in thematic and chronological focus.
History 5931. Topics in Comparative Third World History. (3 cr; SP–#; A-F only)
Recurring topics in Third World History. Topics specified in Class Schedule.

History 5932. African Historiography and Methodology. (3 cr; A-F only)
Recent analysis of several major themes in the historiography of pre-colonial and colonial Africa and the methods used by African historians to reconstruct the African past.

History 5933. Seminar in Ancient History. (3 cr; SP-Previous coursework in Greek or Roman history, #; A-F only) Seminar on a selected topic in ancient history.

History 5940. Topics in Modern Chinese History. (1-4 cr max 16 cr; SP–#; A-F only) Possible topics include cultural, economic, intellectual, political, and social history.

History 5941. Readings in Chinese Documents. (3 cr; SP–Reading knowledge of Chinese) Readings in Chinese on a topic to be selected by the instructor. Depending on the topic and the time period, readings may involve a mixture of modern and classical Chinese or may be entirely in modern Chinese. Consult instructor for more information.

History 5942. Topics in the History of Medicine. (3 cr; SP–Prior history of medicine or history of science course recommended for undergrads) An exploration of topics central to the history of medicine. Emphasis on mid-18th century to the present. Topics vary yearly.

History 5950. Topics in Latin American History. (1-4 cr max 16 cr; SP-Grad student or advanced undergrad with #; A-F only) Selected topics in Latin American history not covered in regular courses. Taught as staffing permits.

History 5960. Topics in History. (1-4 cr max 16 cr; SP-Grad student or advanced undergrad with #; A-F only) Selected topics in history not covered in regular courses. Taught as staffing permits.

History 5962. Expansion of Europe. (3 cr; A-F only) A research seminar on the actions of Europeans in the wider world from 1350 to 1790. Based on documents in the James Ford Bell Library.

History 5964. Comparative Economic History. (3 cr; SP–#) Theoretical approaches guide cross-cultural examinations of major issues in the economic history of East Asia, Europe, and the New World. Agrarian structures in economic development, markets, the state and economic development, and the industrial revolution.

History 5970. Advanced Research in Quantitative History. (4 cr max 16 cr) Students will carry out publishable-quality research on a quantitative historical topic.

History 5993. Directed Study. (1-16 cr max 16 cr; SP–#; A-F only) Qualified senior and graduate students may register for work on tutorial basis. Guided individual reading or study.

History 5994. Directed Research. (1-16 cr max 16 cr; SP–#; A-F only) Qualified senior and graduate students may register for work on a tutorial basis.

History of Medicine (HMed)

HMed 3001. Health Care in History I. (3 cr)
Introduction to the intellectual and social history of European and American medicine and health care from classical antiquity through the 18th century.

HMed 3002. Health Care in History II. (3 cr)
Introduction to the intellectual and social history of European and American medicine and health care in the 19th and 20th centuries.

HMed 5002. Public Health Issues in Historical Perspective. (3 cr; SP–History of medicine or history of science course recommended)

HMed 5035. The Germ Theory and Modern Medicine. (3 cr; SP–History of medicine or history of science course recommended)
Study of the development of the modern germ theory of disease and of its applications in medicine and public health. Emphasis on developments between 1860 and 1950.

HMed 5045. The Modern Medical Profession. (3 cr; SP–History of medicine or history of science course recommended)
Comparative history of the medical professions in the United States and in select northern European nations. Analyze the process of professionalization and the role the profession has played in western industrial societies since 1800.

HMed 5200. Early History of Medicine to 1700. (3 cr; A-F only) Paleopathology, primitive medicine, medicine in ancient and classical civilizations, transmission of Greek medicine through Islam to the Latin West, medieval medicine, revival of anatomy; discovery of the circulation of the blood, of the lacteal vessels, the lymphatic system, and the capillaries; new concepts of disease and treatment in the 17th century.

HMed 5201. History of Medicine from 1700 to 1900. (3 cr)
Founding of hospitals, medical teaching at Leyden and Edinburgh, anatomical teaching and the rise of surgery and pathological anatomy; inoculation for smallpox and discovery of vaccination; discovery of perspiration and malarial ascertainment; anatomical definition of diseases; discovery of anesthesia; epidemiology and public health; germ theory of disease; antiseptic surgery; rise of bacteriology; discovery of diphtheria antitoxin.

HMed 5202. History of Medicine in the Twentieth Century. (3 cr) Rise of immunology; recognition of nutritional deficiency diseases; discovery of vitamins; campaign for pure water and pasteurized milk; battle against tuberculosis; World War I; diphtheria immunization; campaign to control malaria; isolation of insulin; discovery of sulfa drugs, penicillin, and other antibiotics; blood transfusion and control of fluid and electrolyte balance, World War II; polio vaccines; heart surgery; immune deficiency diseases; organ transplantation; impact of Medicare and managed health care; AIDS; resurgence of infectious diseases; effects of increased life expectancy.

HMed 5210. Seminar: Emergence of Modern Medicine. (3 cr; A-F only)

HMed 5211. Seminar: Emergence of Modern Medicine. (3 cr; A-F only)

HMed 5940. Topics in the History of Medicine. (3 cr; SP–History of medicine or history of science course recommended for undergrads) Exploration of topics central to the history of medicine. Topics vary yearly. Emphasis on mid-18th century to the present.

History of Science and Technology (HSci)

Program in History of Science and Technology Institute of Technology

HSci 1714. Technology and Western Civilization: To the Industrial Revolution. (4 cr; QP–$3711, $3712; SP–$3714) History of technology in its cultural context from earliest times to the Industrial Revolution. Neolithic Revolution, Bronze and Iron Ages, ancient civilizations, Greece, Rome, Middle Ages, and Renaissance.

HSci 1715. Technology and Western Civilization: Since the Industrial Revolution. (4 cr; QP–$3713; SP–$3715) Relations of technology to culture since the Industrial Revolution. Diffusion of Industrial Revolution, modes of adaptation by different cultures, and social impact.

HSci 1814. Introduction to History of Science: Ancient Science to the Scientific Revolution. (4 cr; QP–$3811, $3812; SP–$3814) Development and changing nature of the sciences are placed in their cultural context. Babylonian and Greek science; decline and transmission of Greek science; Scientific Revolution (1500-1700) from Copernicus to Newton.

HSci 1815. Introduction to History of Science: Modern Science. (4 cr; QP–$3813; SP–$3815) Development and changing nature of the sciences are placed in their cultural context. Newton and new mechanics; new chemistry; investigation of species; new experimental biology; atomic and nuclear physics; relationships among science, technology, society, and politics.

HSci 3211. Biology and Culture in the 19th and 20th Centuries. (3 cr; SP–$2911, $2912; SP–$2913) Changing conceptions of life and aims and methods of biology; changing relationships between biology and the physical and social sciences; broader intellectual and cultural dimensions of developments in biology.

HSci 3242. The Darwinian Revolution. (3 cr; QP–$3522, Biol 1009, Biol 1101 or #; SP–$3524, Biol 1009 or Biol 1101 or #) Development of evolutionary thought in the 19th and 20th centuries, emphasizing Darwin’s theory of evolution by natural selection; social, political, religious, and philosophical dimensions of Darwinism; comparative reception of Darwinism in different countries and cultures.

HSci 3244. History of Ecology and Environmentalism. (3 cr; QP–$3534) Development of ecological thought from 18th century natural theology to contemporary ecology and conservation biology; changing views of the “balance” and the “economy” of nature; conceptual and methodological developments in ecosystems ecology; connections between ecology and conservation, population and environmental politics.

HSci 3331. Technology and American Culture. (3 cr; QP–$5331, SP–$5332) Development of American technology in its cultural and intellectual context from 1790 to present. Technology of Native Americans; transfer of technology to America; establishment of an infrastructure promoting economic growth; and social response to technological developments.

HSci 3332. Science and American Culture. (3 cr; QP–$5332, SP–$5333) Development of American science, including transfer of science to America; development of indigenous traditions for pursuit of science; establishment of infrastructure for education and research; response of public to scientific development.

HSci 3333. Honors Course: Issues in 20th Century American Science. (3 cr; QP–$5341) Historical approach to understanding science and technology, emphasizing intellectual, political, and social contexts; decision-making by practitioners on issues of importance to the profession and the community; and topics relating to popular science, science, and warfare.

HSci 3401. Ethics in Science and Technology. (3 cr; QP–$5401) Historical issues involving research ethics (e.g., human experiments and environmental, nuclear, and safety issues).

HSci 3714. Technology and Western Civilization: To the Industrial Revolution. (4 cr; QP–$3711, $3712; SP–$3714) History of technology in its cultural context from earliest times to the Industrial Revolution. Neolithic Revolution, Bronze and Iron Ages, ancient civilizations, Greece, Rome, Middle Ages, and Renaissance.
HSci 3715. Technology and Western Civilization: Since the Industrial Revolution. (4 cr; QP–SP–S1713; SP–SP–S1715) Relations of technology to culture since the Industrial Revolution. Diffusion of Industrial Revolution, modes of adaptation by different cultures, and social impact.

HSci 3814. Introduction to History of Science: Ancient Science to the Scientific Revolution. (4 cr; QP–SP–S1811; SP–SP–S1814) Development and changing nature of the sciences are placed in their cultural context. Babylonian and Greek science; decline and transmission of Greek science; Scientific Revolution (1500–1700) from Copernicus to Newton.

HSci 3815. Introduction to History of Science: Modern Science. (4 cr; QP–SP–S1813; SP–SP–S1815) Development and changing nature of the sciences are placed in their cultural context. Newton and new mechanics; new chemistry; light; Darwin and species; new experimental biology; atomic and nuclear physics; relationships among science, technology, society, and politics.

HSci 4050. Special Topics in History of Science. (3 cr) Topics specified in Class Schedule.

HSci 4060. Special Topics in History of Technology. (3 cr) Topics specified in Class Schedule.


HSci 4121. History of 20th-Century Physics. (3 cr; QP–General physics or #; SP–SP–Phys 4121; general physics or #) Experimental and theoretical discoveries in 20th-century physics (modern physics, theory of relativity, quantum theories, nuclear physics to World War II) within the context of educational, institutional, and political developments in Europe and the United States.

HSci 4125. The Nuclear Age. (3 cr) History of the nuclear age embraces X-rays, radiation, the atom and its nucleus, subatomic particles, nuclear weapons and power, growth of nuclear science in university and national laboratories, effects of cold war, legacies of Hiroshima, Eniwetak, and Chernobyl.

HSci 4302. History of High-Technology Weapons. (3 cr) History of high-technology weapons, including nuclear missiles, launchers, guided weapons, and intercontinental ballistic missiles.

HSci 4321. History of Computing. (3 cr; SP–SP–Gsci 4921) Developments in the last 150 years; evolution of hardware and software; growth of computer and semiconductor industries and their relation to other business areas; changing relationships resulting from new data-gathering and analysis techniques; automation; social and ethical issues.


HSci 4455. Women, Gender, and Science. (3 cr) Three intersecting themes analyzed from 1700s to the present: women in science, sexual and gendered concepts in modern sciences, and impact of science on conceptions of sexuality and gender in society.

HSci 5211. Biology and Culture in the 19th and 20th Centuries. (3 cr; SP–SP–S2113) Changing conceptions of life and aims and methods of biology; changing relationships between biology and the physical and social sciences; broader intellectual and cultural dimensions of developments in biology.

HSci 5242. The Darwinian Revolution. (3 cr; SP–Biol 1009 or Biol 1100 or SP–SP–S3242; Biol 1009 or Biol 1101 or #) Development of evolutionary thought in the 19th and 20th centuries, emphasizing Darwin’s theory of evolution by natural selection; scientific, economic, political, religious, and philosophical dimensions of Darwinism; comparative reception of Darwinism in different countries and cultures.

HSci 5244. History of Ecology and Environmentalism. (3 cr; SP–SP–S3244) Development of ecological thought from 18th century natural theology to contemporary ecology and conservation biology; changing views of the “balance” and the “ecology” of nature; conceptual and methodological developments in ecosystems ecology; connections between ecology and conservation, and between population and environmental polities.

HSci 5331. Technology and American Culture. (3 cr; SP–SP–S3331) Development of American technology in its cultural and intellectual context from 1790 to present. Technology of Native Americans; transfer of technology to America; establishment of an infrastructure promoting economic growth; and social response to technological developments.

HSci 5332. Science and American Culture. (3 cr; SP–SP–S3332; SP–SP–S3332) Development of American science, including transfer of science to America; development of indigenous traditions for pursuit of science; establishment of infrastructure for education and research; response of public to scientific development.

HSci 5401. Ethics in Science and Technology. (3 cr; SP–SP–S3401) Historical issues involving research ethics (e.g., human experiments and environmental, nuclear, and safety issues).

HSci 5993. Directed Studies. (1–3 cr; max 15 cr; SP–#; SP–#) Guided individual reading or study.

HSci 5994. Directed Research. (1–15 cr; max 15 cr; SP–SP–#) For additional research related to a seminar topic.

Honors Seminar (HSem) CLA Honors Program College of Liberal Arts

HSEM 3010, 3020, 3030, 3040, 3050, 3060, 3070, 3080, 31130, 3120, 3130, and 3140. Honors Seminar. (1–3 cr; SP–# or SP, honors div regis; A–F only) Special topics course designed to add breadth and depth to the education of honors students. Discussions and active learning. Often interdisciplinary in perspective.

HSEM 3093. Directed Studies. (1–3 cr; SP–# or SP, honors div regis, B, C, D) For additional research related to a seminar topic.

Horticultural Science (Hort) Department of Horticultural Science College of Agricultural, Food, and Environmental Sciences


Hort 1002. Home Horticulture. (3 cr; SP–Non-horticulture majors) Fundamental concepts of plant identification, growth, and culture with practical applications to home landscape, floral design, house plants, fruit, flower, and vegetable gardening.

Hort 1003. Master Gardener Core Course: Horticulture for the Home and Garden. (3 cr) Provides a foundation in soils; botany; entomology; plant pathology; indoor, herbaceous and woody plants, lawns, fruits, vegetables, pesticides; and wildlife. Geared at an introductory level with an emphasis on Extension publications and resources useful in answering consumer horticulture questions.

Hort 1011. Herbaceous Landscape Plants. (3 cr) Taxonomy, identification, ecology, and landscape uses of annuals, perennials, wildflowers, ferns, tender and hardy bulbs, including tropicals and sub-tropicals used in interior landscapes.

Hort 1012. Woody Landscape Plants. (3 cr) Taxonomy, identification, ecology, and landscape uses of trees, shrubs, vines, groundcovers, and evergreens. Lecture and lab.

Hort 1013. Floral Design. (2 cr) Design for use in commercial flower shops and home, including principles and elements of design, wedging arrangements, corsages, and the decorative use of dried materials.

Hort 1014. Edible Landscaping. (2 cr; QP–1036; SP–1001) Edible plants in the home landscape. Variety of plant materials available and their placement, and the impact of decisions on production. Plant combinations to enhance design and production considerations. Writing and decision cases used.


Hort 1012. Woody Landscape Plants. (3 cr) Taxonomy, identification, ecology, and landscape uses of trees, shrubs, vines, groundcovers, and evergreens. Lecture and lab.

Hort 1013. Floral Design. (2 cr) Design for use in commercial flower shops and home, including principles and elements of design, wedging arrangements, corsages, and the decorative use of dried materials.

Hort 1014. Edible Landscaping. (2 cr; QP–1036; SP–1001) Edible plants in the home landscape. Variety of plant materials available and their placement, and the impact of decisions on production. Plant combinations to enhance design and production considerations. Writing and decision cases used.

Hort 3005. Environmental Effects on Horticultural Crops. (2 cr; QP- 1011, 1012; 3 cr; Chem 1051, 1091, 3005) Plant science course, Chem 1021 or equiv or # A-F only) The effects of the environment on plant growth and physiology and how horticulturists manipulate the environment to produce high quality plants. Biol 3005 must be taken concurrently.

Hort 3018. Landscape Operations. (1 cr) A discussion/lab course taught by a team of faculty, staff, and industry professionals. Demonstration and hands-on experiences associated with landscape operations in areas such as planting, mulching, staking, pruning, fertilization, large tree care, seeding, and sodding, aeration, calibration, irrigation, and surveying.

Hort 3090. Horticultural Practicum. (2 cr [max 12 cr]; QP- or # Hort major, # SP- or # Hort major, # Approved field, laboratory, or greenhouse experiences in application of horticultural practices and hort.

Hort 4011. Landscape Design, Implementation, and Management. (4 cr; QP- 1021, 1022, 1036; SP- 1001, 1011, 1012) Based on philosophy of sustainable landscape theory and practice. Emphasis on sustainability at all phases of landscape development. Lab includes design, implementation, and management of actual landscape operations. (SP- 1001, 1012, 3005; A-F only) Production, maintenance, and marketing of woody ornamental plants. Establishment and management of nursery or garden centers. Lab and field trips required.

Hort 4051. Floriculture Production and Management I. (4 cr; QP- 1021, 1036 or # SP- 1001. 1012, 3003; A-F only) Problem-solving and management practices important to propagation, production, and utilization of floral crops with emphasis on potted plants and hydroponics. Learn to grow, market, and utilize floral crops to modify the environment. Lecture, lab, field trips.


Hort 4071. Applications of Biotechnology to Plant Improvement. (4 cr; QP- Chem 1001 or 1051, GCB 3022 or equiv; SP- 1001, 1021, GCB 3022 or equiv) Fundamentals of plant molecular biology and biotechnology with emphasis on their applications to plant propagation and crop improvement. Lab includes plant tissue culture, gel electrophoresis, and other plant propagation and crop improvement. Lab includes design, implementation, and management of actual landscape operations. (SP- 1001, 1012, 3005; A-F only) Production, maintenance, and marketing of woody ornamental plants. Establishment and management of nursery or garden centers. Lab and field trips required.

Hort 4072. Growing Plants Organically: What It Means To Be Green. (3 cr; QP- 1036 or Biol 1102 or Biolo 3012 or equiv, Jr or Sr or # SP- 1001 or Biol 2022 or Biolo 3xxx or equiv, Jr or Sr or #) Science and cultural practice of organic gardening. What is meant by “green” from a legal, scientific, and ethical perspective? Explore original literature on an organic practice, prepare a written report, and lead a class discussion.

Hort 4092. Special Topics in Horticulture. (1-5 cr [max 15 cr]; QP- Varies with topic; SP- Varies with topic) Topics of public and scientific interest in horticulture. Content varies each semester. Inquire at departmental office before registering; # SP- lab fees may be assessed.

Hort 4096. Professional Experience Program. Internship. (1-3 cr [max 6 cr]; QP- COAFES undergrad, # complete internship contract available in COAFES Career Services before registering; UC only; SP- COAFES undergrad, # complete internship contract available in COAFES Career Services before registering; UC only; S-N only)

Hort 4051. Floriculture Production and Management II. (4 cr; QP- 1054 or # SP- 4051; A-F only) Propagation, production, and utilization of floral crops with emphasis on bedding plants, perennials, and cut flowers. Grow, market, and utilize herbaceous plants. Cultural practices; concepts behind manipulation of environmental factors to achieve desired plant growth and quality. Lab, field trips.

Hort 5016. Turfgrass Science. (3 cr; QP- 3072; SP- 4061) For advanced students in turf with career objectives in professional turf management. Emphasis on ecology, physiology, and theory of turf population dynamics and specialized management situations such as golf course, commercial sod production, and fine turf athletic settings.

Hort 5071. Restoration and Reclamation Ecology. (3 cr; QP- Biol 1103 or 3012; Biol 1201, Biol 5041, Ecol 3001 or equiv or # SP- Biol 2022 or Biol 3002, Biol 1001 or Biol 3407 or equiv or #) Ecological and physiological concepts as a basis for revegetation of grasslands, wetlands, forests, and other landscapes. Plant selection, stand establishment, evaluating revegetation success. State and federal programs that administer restoration and reclamation programs. Field trips within Minnesota.

Hort 5090. Directed Studies. (1-6 cr [max 18 cr]; QP- 3 or 4 upper div Hort courses; SP- 3 or 4 upper div Hort courses) In-depth exploration of concepts, technology, materials, or programs in specific area to expand professional competency and self-confidence. Planning, organizing, implementing, and evaluating knowledge obtained from formal education and experience.

Hort 5183. Water, Minerals, and Translocation. (3 cr; QP- Soil 3125 or equiv, PlPh 1xxx or #; SP- Soil 2125 or equiv, PlPh 1xxx or #) Transport processes in plants including water and nutrient absorption and distribution, effects of and adaptations to water and nutrient stress, functions of mineral nutrients, and translocation of photosynthates.

Hort 5950. Special Workshop in Horticulture. (1-4 cr [max 12 cr]; QP- or #; SP- or #) Workshops on a variety of topics in horticulture offered in locations other than the Twin Cities campus. See Class Schedule or department for current offerings.
Human Resource Development (HRD)

Department of Work, Community, and Family Education

College of Education and Human Development

HRD 5001. Survey: Human Resource Development and Adult Education. (3 cr)
Overview of fields of human resource development and adult education. Includes societal context, theories, processes, definitions, philosophies, goals, sponsoring agencies, professional roles, participants, and resources. Focus on the unique characteristics and ways the fields overspill and enhance one another.

HRD 5101. Foundations of Human Resource Development. (1 cr)
Introduction to human resource development as a field of study and practice.

HRD 5102. Economic Foundation of Human Resource Development. (1 cr; SP-5101)
Introduction to economics as a core discipline supporting the theory and practice of human resource development.

HRD 5103. Psychological Foundation of Human Resource Development. (1 cr; SP-5101)
Introduction to psychology as a core discipline supporting the theory and practice of human resource development.

HRD 5104. Systems Foundation of Human Resource Development. (1 cr; SP-5101)
Introduction to systems theory as a core discipline supporting the theory and practice of human resource development.

HRD 5105. Strategic Planning through Human Resources. (3 cr; SP-5001 or 5101, 5102, 5103, 5104; A-F only)
The theory and practice of strategically developing, utilizing, and aligning human resources as a major contributor to organizational and quality improvement success.

HRD 5106. Evaluation in Human Resource Development. (3 cr; A-F only)
Evaluation of human resource development efforts from the perspective of impact on organizations, work processes, and individuals, plus follow-up decisions.

HRD 5111. Facilitation and Meeting Skills. (1 cr)
Introduction to the disciplines of planning and running effective meetings. Tools and methods for meeting management and evaluation are presented within the context of organization development.

HRD 5196. Internship: Human Resource Development. (1-10 cr; max 10 cr; SP-5001, 5201 or 5301; S-N only)
Students apply and contract for human resource development positions. Contracts describe specific HRD responsibilities to be fulfilled during internship and theory-to-practice learning outcomes.

HRD 5201. Personnel Training and Development. (3 cr; A-F only)
Introduction to the personnel training and development process in organizations and the advancement of expertise in the areas of analysis, design, development, implementation, and evaluation.

HRD 5202. Training on the Internet. (3 cr)
Evaluation of human resource development processes for giving and receiving training on the Internet.

HRD 5301. Organization Development. (3 cr; A-F only)
Introduction to major concepts, skills, and techniques for organization development and change.

HRD 5302. Managing Work Teams in Business and Industry. (3 cr; SP-Two core courses in HRD; A-F only)
Frameworks and strategies for developing effective work teams. Skill development in facilitating resolution of conflicts in organizations. Provides foundational knowledge as well as practical applications for participants to become small team leaders.

HRD 5408. International Human Resource Development. (3 cr)
Introduction to the disciplines of planning and decision making typically used in process improvement interventions. Tools and methods for facilitating group decision and problem solving.

HRD 5496. International Field Study in Human Resource Development. (3 cr; SP-5001)
Field study of the organization development, personnel training and development, career development, and quality improvement theories and practices in a selected nation.

HRD 5610. Student and Trainee Assessment. (2 cr; SP-§BIE 5610; A-F only)
Development of tests of knowledge, effect, and processes for programs focused on instruction of skills associated with business and industry; development of learning progress reporting systems; evaluation of instructional effectiveness.

HRD 5611. Futurism in Human Resource Development and Adult Education. (3 cr; SP-§AdEd 5611)
Exploration of the implications of future developments in several areas of theory and practice in human resource development and adult education.

HRD 5612. Managing and Consulting in Human Resource Development and Adult Education. (3 cr; SP-§AdEd 5612; 5001)
The theory of managing and consulting in human resource development and adult education. Includes a personal assessment of role requirements and experimentation with management and consultation processes and techniques.

HRD 5624. Sales Training. (3 cr; SP-§BIE 5624; A-F only)
Strategies and techniques for developing effective sales people.

HRD 5625. Technical Skills Training. (3 cr; SP-§BIE 5625)
Analyzing technical skills training practices in business and industry. Systems and process analysis and troubleshooting of work behavior; design methods and developing training materials.

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

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

HRD 5628. Multimedia Presentations in Business. (3 cr; SP-§BIE 5628; BIE 5011 or equiv)
Designing, creating, and presenting information using multimedia resources in business settings.

HRD 5629. Course Development in Business and Industry. (2 cr; SP-§BIE 5629; A-F only)
Identifying content, stating objectives, sequencing, planning lessons, selecting methods and media for instruction, and evaluation and feedback.

HRD 5661. Instructional Methods in Business and Industry Education. (2 cr; SP-§BIE 5661)
Exploration of basic strategies and techniques used by instructors in settings ranging from schools and colleges to business and industry.

HRD 5662. Computer Training in School and Industry Settings. (2 cr; SP-§BIE 5662; BIE 5011 or equiv)
Alternative practices for teaching business applications software such as word processors, spreadsheets, graphics software, desktop publishing software, databases, and communications software— in both public school and industry settings.

HRD 5770. Special Topics in Human Resource Development. (1-4 cr; max 12 cr)
Exploration of issues, research, and knowledge in areas of HRD. Content varies by offering.

HRD 5821. Diversity Issues and Practices in Work, Community, and Family Settings. (3 cr; SP-§WCFE 5821)
Examination of the nature of diverse populations and their unique learning and training needs, exemplary programs, and collaborative efforts among persons representing work, community, and family settings.

HRD 5822. Diversity and Organizational Transformation in Education, Work, and Community. (2 cr; SP-§WCFE 5822)
Develop models for understanding the impact of diversity on individual, organizational, and community outcomes. Discuss organizational change in relation to diversity.

Human Resources and Industrial Relations (HRIR)

Industrial Relations Center

Curtis L. Carlson School of Management

HRIR 3021. Human Resource Management and Industrial Relations. (2 cr; QP-Econ 1101, 1102, Psy 1001; SP-Econ 1101, 1102, Psy 1001)

HRIR 3024. Governing the Workplace: Comparative Perspectives. (2 cr)
An international comparison of who is allowed to make the rules governing the employment relationship. Study of alternative models/systems (e.g., business, government, employees, unions, market forces, mixed models) in the context of the U.S. and other countries. Exploration of models for the future.

HRIR 3031. Staffing and Selection: Strategic and Operational Concerns. (2 cr)
Introduction to theory and practice related to staffing decisions: recruitment, selection, promotion, demotion, transfer, dismissal, layoff, and retirement. Analyze staffing from strategic and operational perspectives. Legal issues.

HRIR 3032. Training and Development. (2 cr)
Introduction to theory, research, and techniques related to design, implementation, and evaluation of employee training programs. Training as a process for influencing individual and organizational outcomes, such as performance, job satisfaction, and work climate.

HRIR 3041. The Individual in the Organization. (2 cr)
Focus on factors influencing individual work performance. Includes motivation, perceptual differences, career choice, psychological contracts, assumptions about workers/work, leadership/management, learning/skill development, openness to change. Examines evidence on current trends.
HRIR 3042. The Individual and Organizational Performance. (2 cr)
Factors influencing group, team, and organizational performance. Examines systems that drive organizational success. Topics include job design and organization structure, organization effectiveness measures, culture, group dynamics, teamwork, power and influence.

HRIR 3051. Compensation/Theory and Practice. (2 cr)
Introduction to compensation and reward programs. Theories of organizational and employee behavior used in design and implementation of pay programs. Design, implementation, and evaluation of job evaluations, salary surveys, skill-based pay, merit-based pay, and other compensation programs.

HRIR 3071. Union Organizing and Labor Relations. (2 cr)
Analysis of labor unions, employee associations, and collective bargaining within the framework of contemporary American legislation and policy. Covers forming/organizing labor unions; union, employee, and management strategies and responsibilities, historical influences on policy and practice in the private and public sectors.

HRIR 3072. Collective Bargaining and Dispute Resolution. (2 cr)
Collective bargaining, contract administration, grievance processing, interests/rights arbitration, strikes and related policies and practices of employers, workers, and labor unions in dealing with worker representation in the private and public sectors. Impact and transfer of practices to the nonunion sector are considered.

HRIR 5000. Topics in Human Resources and Industrial Relations. (1-6 cr)
Selected topics of current relevance to human resource management and industrial relations.

HRIR 5021. Systems of Conflict and Dispute Resolution. (1-4 cr)
Introduction to theoretical and practical treatment of conflict settlement in interpersonal, work-related, community, business, and international settings. Lectures, discussions, observations of actual dispute resolution sessions, and lab exercises with students participating in dispute resolution simulations applied to real world conflicts.

HRIR 5022. Managing Diversity. (2 cr)
Investigate ways to effectively manage the increasingly diverse workforce. Human resource practices with a commitment to diversity. Learn how to incorporate diversity into decision making to enhance organizational performance.

HRIR 5023. Personnel and Industrial Relations Law. (2 cr)
Human rights, equal employment, compensation and benefit laws, employee protection laws, labor relations laws. Special issues such as wrongful discharge, sexual harassment, and defamation are discussed in the context of statute, case law, and their application to the work setting.

HRIR 5024. Employee Performance: Appraisal and Management. (2 cr)
Learn how employee performance is organized, appraised, and managed for achieving organizational and individual performance goals. Job design standards, employee appraisal systems, and worker satisfaction.

HRIR 5061. Labor Policy. (3 cr)
Analysis of public policies regarding employment, unions, and labor markets. Public programs affecting wages, unemployment, training, worker mobility, security, and quality of work life. Policy implications of the changing nature of work.

HRIR 5991. Independent Study in Human Resources and Industrial Relations. (1-6 cr; max 8 cr) OP–MAHRIR office approval; SP–MAHRIR office approval
Individual readings or research topics in human resources and industrial relations.

Humanities (Hum)

Humanities Program
College of Liberal Arts

Hum 1001. Humanities in the West I. (4 cr; SP–§ 3001)
Greek and Roman civilization, rise of Christianity. Epic and lyric poetry, drama, architecture, sculpture, philosophy religion. Integrative study of works by creative figures such as Homer, Hesiod, Aeschylus, Sophocles, Euripides, Aristophanes, Plato, Aristotle, Caesar, Lucretius Virgil, Ovid, Petronius, Augustine, Boethius.

Hum 1002. Humanities in the West II. (3 cr; SP–§ 3002)

Hum 1003. Humanities in the West III. (4 cr; SP–§ 3003)
Civilization in 15th- and 16th-century Italy; religious and cultural reaction in northern Europe. Humanism. Counter-Reformation, religious wars. New science, philosophy, Literature, art, music. Works by creative figures such as Petrarch, Machiavelli, Erasmus, Luther, Cervantes, Descartes, Moliere. Michelangelo, Bernini, Rembrandt, Josquin, Bach.

Hum 1004. Humanities in the West IV. (3 cr; SP–§ 3004)
Eighteenth-century Europe. Old Regime through French Revolution and Napoleon; new science, Enlightenment, cult of sensibility; art, music. Integrative study of works by creative figures such as Pope, Voltaire, Rousseau, Diderot, Goethe, Watteau, Boucher, Hogarth, David, Goya, Mozart, Haydn.

Hum 1005. Humanities in the West V. (4 cr; SP–§ 3005)
Industrial Revolution, liberalism, socialism; Romanticism. Impact of science, especially evolution theory, on religious and humanistic thought; roots of existentialism; art, music. Integrative study of works by creative figures such as Wordsworth, Adam Smith, Marx, Dostoevsky, Delacroix, Courbet, Beethoven, Darwin, Nietzsche, Joyce, Monet, Wagner.

Hum 1006. Humanities in the West VI. (4 cr; SP–§ 3006)

Hum 3001. Humanities in the West I. (4 cr; SP–§ 1001)
Greek and Roman civilization, rise of Christianity. Epic and lyric poetry, drama, architecture, sculpture, philosophy of religion; new science, religion. Integrative study of works by creative figures such as Homer, Hesiod, Aeschylus, Sophocles, Euripides, Aristophanes, Plato, Aristotle. Caesar, Lucretius Virgil, Ovid, Petronius, Augustine, Boethius.

Hum 3002. Humanities in the West II. (4 cr; SP–§ 1002)

Hum 3003. Humanities in the West III. (4 cr; SP–§ 1003)
Civilization in 15th- and 16th-century Italy; religious and cultural reaction in northern Europe. Humanism. Counter-Reformation, religious wars. New science, philosophy, Literature, art, music. Works by creative figures such as Petrarch, Machiavelli, Erasmus, Luther, Cervantes, Descartes, Moliere. Michelangelo, Bernini, Rembrandt, Josquin, Bach.

Hum 3004. Humanities in the West IV. (3 cr; SP–§ 1004)
Eighteenth-century Europe. Old Regime through French Revolution and Napoleon; new science, Enlightenment, cult of sensibility; art, music. Integrative study of works by creative figures such as Pope, Voltaire, Rousseau, Diderot, Goethe, Watteau, Boucher, Hogarth, David, Goya, Mozart, Haydn.

Hum 3005. Humanities in the West V. (4 cr; SP–§ 1005)
Industrial Revolution, liberalism, socialism; Romanticism. Impact of science, especially evolution theory, on religious and humanistic thought; roots of existentialism; art, music. Integrative study of works by creative figures such as Wordsworth, Adam Smith, Marx, Dostoevsky, Delacroix, Courbet, Beethoven, Darwin, Nietzsche, Joyce, Monet, Wagner.

Hum 3006. Humanities in the West VI. (4 cr; SP–§ 1006)

Hum 3021. Introduction to the Historical Foundations of Modern Education. (3 cr; SP–§ 4021, §EDPA 3021, §EDPA 5021)
Analysis and interpretation of important elements in modern education derived from classical, Greek, Roman, Middle Ages, Renaissance, Reformation, Enlightenment, and Industrial Revolution. Basic background course.

Hum 3023. Introduction to the History of Western Educational Thought. (3 cr; SP–§ 4023, §EDPA 3023, §EDPA 5023)
Great educational classics of Western civilization. By: Plato, Aristotle, Quintilian, Montaigne, Milton, Locke, Rousseau, and others.

Hum 3027. Lyric Song in Medieval Culture. (3 cr)
Courtly, paraliturgical, and popular song traditions, 1100-1500, in specific contexts: castle, palace, monastery, nunnery, cathedral, theater, tavern, street and countryside. Social roles of men and women as patrons, performers, poets, composers. Writing historical narratives and recreating medieval performance traditions.

Hum 3029. Music in the Twentieth Century. (3 cr)
Surveys music in European and American culture from 1890s to present. Emphasizes interactions between high art, popular and ethnic musics, contributions of men and women as composers and performers, concurrent developments in the arts, dance, and literature, music as social commentary.

Hum 3036. Islam: Religion and Culture. (3 cr)
Religion of Islam, faith, pre-Islamic splintering, expansion outside original home to status of world religion, institutions, status in world societies—Asia, Europe, Americas.

Hum 3256. Aesthetics, Arts, and Society: France, 1848-1900. (2 cr)
Major movements in painting, literature, and poetry in France during second half of 19th century. Aesthetic concepts of artists and their critics, in context of historical events and social and political changes.

Hum 3281. European Intellectual History: the 18th and 19th Centuries. (3 cr)
First of a two-semester course dealing with logical, philosophical and methodological issues in the historical, social and natural sciences. The period covered is from the late seventeenth century to the mid-nineteenth.

Hum 3282. European Intellectual History: the Late 19th and 20th Centuries. (3 cr)
Second and concluding semester of readings in fundamental texts dealing with issues in logic, philosophy and the methodologies of the historical, social and natural sciences, from the late nineteenth century to the present. There is no text. Readings are from original sources.