

Course Numbers, Symbols, and Abbreviations

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

Course Designators

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

Course Numbers

- 0xxxCourses that do not carry credit toward any University degree.
- 1xxxCourses primarily for undergraduate students in their first year of study.
- 2xxxCourses primarily for undergraduate students in their second year of study.
- 3xxxCourses primarily for undergraduate students in their third year of study.
- 4xxxCourses primarily for undergraduate students in their fourth year of study; graduate students may enroll in such courses for degree credit. 4xxx courses can be counted for a Graduate School degree if the course is taught by a member of the graduate faculty or an individual appointed to Limited Teaching Status (LTS).
- 5xxxCourses primarily for graduate students; undergraduate students in their third or fourth year may enroll in such courses.

Course Symbols

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

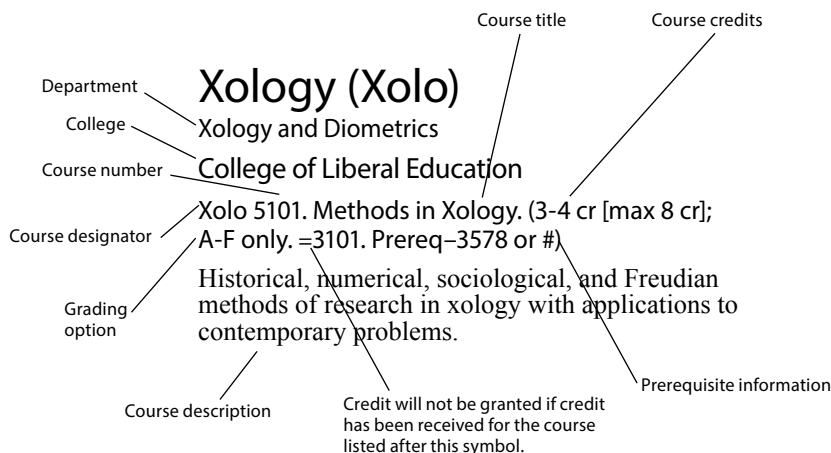
- =Credit will not be granted if credit has been received for the course listed after this symbol.
- &Concurrent registration is required (or allowed) in the course listed after this symbol.
- #Approval of the instructor is required for registration.
- %Approval of the department offering the course is required for registration.
- @Approval of the college offering the course is required for registration.
- ,In prerequisite listings, comma means "and."
- 1-4 cr [max 6] ...The course can be taken for 1 to 4 credits and may be repeated for up to 6 credits.

Abbreviations

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

- PrereqCourse prerequisites.
- crCredit.
- divDivision.
- DUSDirector of undergraduate studies.
- equivEquivalent.
- fr, soph, jr, srFreshman, sophomore, junior, senior.
- HHonors. Courses with an H following the course number satisfy honors requirements.
- VHonors and Writing Intensive. Courses with a V following the course number satisfy both honors and liberal education writing intensive requirements.
- WWriting Intensive. Courses with a W following the course number satisfy the writing intensive requirement for liberal education.
- A-F onlyA-F grade basis only; course may not be audited or take pass/fail
- A-F or AudA-F grade basis, or course may be audited for no grade
- S-N onlyS-N grade basis only (pass/fail), course may not be audited or taken A-F
- S-N or AudS-N grade basis (pass/fail), or course may be audited for no grade
- No GradeNo grade will be given for the course; typically used for laboratory components of courses
- OPT No AudStudent selects the grading option; course may not be audited
- Stdnt OptStudent selects the grading option; course may be audited

Course Listing Sample



Accounting (ACCT)

Labovitz School of Business and Economics

ACCT 2001. Principles of Financial

Accounting. (3.0 cr.; A-F only; prereq Minimum 15 credits or college consent; fall, spring, summer, every year)
Concepts of financial accounting and external reporting. Nature and measurement of assets, liabilities, equities, revenues, expenses. Emphasis on use and understanding of external financial statements.

ACCT 2002. Principles of Managerial

Accounting. (3.0 cr.; A-F only; prereq 2001, LSBE student or college consent; fall, spring, summer, every year)
Information accumulation, analysis, and use for managerial decisions. Cost-volume-profit relationships; short- and long-term decisions; standards and budgets; segment and managerial performance evaluation.

ACCT 2005. Survey of Accounting. (LE CAT8; 3.0 cr.; A-F only; prereq Not open to LSBE students or non-LSBE acct minors; spring, offered periodically)

Accounting information presented in published financial statements. Debt financing, stock issuance, alternative methods of accounting. Bookkeeping topics not emphasized.

ACCT 3001. Technology Tools in

Accounting. (1.0 cr.; A-F only; prereq LSBE candidate; fall, spring, every year)
Introduction to basic and advanced applications of spreadsheet, database and other accounting specific to solve accounting problems.

ACCT 3101. Intermediate Accounting I. (3.0 cr.; A-F only; prereq LSBE candidate or non-LSBE accounting minor or college consent; fall, spring, summer, every year)

Review of financial accounting standard setting, conceptual framework, and accounting process. Income statement, balance sheet, and statement of cash flows. Present value concepts, cash, receivables, inventories, fixed assets, current liabilities, and contingencies.

ACCT 3102. Intermediate Accounting II. (3.0 cr.; A-F only; prereq A grade of C or better in 3101, LSBE candidate or non-LSBE accounting minor or college consent; fall, spring, every year)

Long-term liabilities, stockholders' equity, earnings per share, revenue recognition, and tax allocation. Investments, pensions, leases, accounting changes and error analysis, financial statement analysis, and disclosures in financial statements.

ACCT 3201. Cost Accounting. (3.0 cr.; A-F only; prereq LSBE candidate or non-LSBE accounting minor or college consent; fall, spring, every year)

Determining manufacturing costs, e.g., in a job order or process manufacturing environment. Cost-volume-profit relationships, activity-based accounting, standard costing techniques.

ACCT 3301. Accounting Information

Systems. (3.0 cr.; A-F only; prereq LSBE candidate or non-LSBE accounting minor or college consent; credit will not be granted if

already received for 3110.; fall, spring, every year)

Overview of the characteristics and functions of modern accounting information systems. Focus on system use, internal controls, security issues, and system design and implementation in computerized accounting procedures within the business organization. Develop proficiency in the use of accounting software.

ACCT 3401. Individual Income Taxation.

(3.0 cr.; A-F only; prereq Credit will not be granted if already received for ACCT 3152 or 4152; LSBE candidate or approved non-LSBE accounting minor or college consent; fall, spring, summer, every year)

Provides an understanding of how taxes impact personal financial decisions. Takes tax planning/minimization perspective and provides a basic information on reporting tax positions to the IRS. In addition to tax planning and compliance, the student will be exposed to basic tax concepts.

ACCT 3402. Advanced Business Taxation.

(3.0 cr.; A-F only; prereq 3401, LSBE candidate or college consent; credit will not be granted if already received for 3151; fall, every year)

Understanding how taxes impact basic business and entrepreneurial decisions. It takes a tax planning/minimization perspective and presents advanced tax research and resource materials available on the web.

ACCT 3701. Small Business Initiative in

Accounting. (1.0-2.0 cr. [max 3.0 cr.]; S-N or Audit; prereq 3001, 3101, LSBE candidate and instructor consent; fall, every year)

Provide practical experience in the development of budgets, analysis of financial statements and other types of small business accounting issues.

ACCT 3705. Volunteer Income Tax

Assistance. (1.0-2.0 cr. [max 3.0 cr.]; S-N only; prereq department consent, 2 credit first registration, 1 credit repeat; credit will not be granted if already received for 3096; spring, every year)

Provides volunteer experience preparing tax returns for low and moderate income Duluth residents through both classroom and hands-on training.

ACCT 3796. Internship in Accounting.

(2.0-6.0 cr. ; S-N only; prereq 3101, department consent; repeatable for a max of 6 credits; 3 repeats allowed; max 2 credits may be applied to Active Learning Experience.; fall, spring, summer, every year)

Participation in an approved program with professional accounting firms, businesses, government agencies, or non-profit organizations. Requires minimum 200 hours work experience, assigned written reports, and performance evaluations. Students can take an additional credit for each additional 100 hours of work, up to a maximum of 6 credits. 3 repeats allowed, max 2 credits may be applied to Active Learning Experience.

ACCT 3991. Independent Study. (1.0-3.0 cr. ; A-F only; prereq BAc candidate with 80 cr, department consent; credit not available as accounting elective; may take ACCT 3191

and 3991 for a total of 3 credits.; fall, spring, summer, every year)

For students wishing to do special work in an accounting area that extends beyond, or in greater depth than, regular course offerings.

ACCT 4101. Auditing. (3.0 cr.; A-F only; prereq 3102, 3110 or 3301, LSBE candidate or college consent; no grad credit; credit will not be granted if already received for 4160.; fall, spring, every year)

Theory and procedures in audit process.

ACCT 4501. Advanced Accounting. (3.0

cr.; A-F only; prereq 3102, LSBE candidate or college consent; fall, spring, offered periodically)

Topics including consolidated financial statements, partnership, and fiduciary accounting.

ACCT 4505. International Accounting. (3.0

cr.; A-F only; prereq 3102, LSBE candidate or college consent; fall, spring, offered periodically)

International comparative analysis, accounting measurement, and reporting issues unique to multinational business transactions and multinational enterprises; international financial markets; foreign exchange accounting; international audit environment; international taxation and transfer pricing; harmonization of worldwide accounting.

ACCT 4510. Fund and Not-For-Profit

Accounting. (3.0 cr.; A-F only; prereq LSBE candidate or college consent; summer, every year)

Accounting concepts and processes applied to government, hospital, education, charity, and other not-for-profit entities.

ACCT 4600. Employee Benefit and

Retirement Planning. (3.0 cr.; A-F or Audit; prereq Acct 3401, LSBE candidate, no grad credit; fall, offered periodically)

This course will provide preparation for professionals who will be providing employee benefits and retirement planning services for clients. The course will focus on the importance of retirement planning, an evaluation of the client's needs, and understanding of Social Security and Medicare, and qualified and non-qualified retirement plans.

ACCT 4795. Special Topics (Various Titles to be Assigned). (1.0-3.0 cr. [max 9.0 cr.]; A-F only; prereq 3101, LSBE candidate or college consent; fall, spring, offered periodically)

Enables students, working closely with the instructional faculty, to explore one or more contemporary accounting issues in substantial depth.

Aerospace Studies (AIR)

Swenson College of Science and Engineering

AIR 1000. AFROTC GMC Lead Lab. (1.0 cr. [max 4.0 cr.]; S-N or Audit; fall, spring, every year)

Practical environment giving leadership training while being instructed on military customs and courtesies, physical fitness, military drill and the general Air Force environment. This class

MUST be taken concurrently with AFROTC 1xxx and 2xxx level academic classes

AIR 1101. Foundations of the U.S. Air Force. (1.0 cr.; A-F or Audit; fall, every year)
Two-part survey of U.S. Air Force as public-service organization. Role of military in U.S. society; military history; officership; professionalism; core values; career opportunities; customs/courtesies; communication skills. Leadership Laboratory (Air 0100) is mandatory for AFROTC cadets and complements this course by providing followership experiences.

AIR 1102. Foundations of the U.S. Air Force. (1.0 cr.; A-F or Audit; spring, every year)
Two-part survey of U.S. Air Force as public-service organization. Role of military in U.S. society; military history; officership; professionalism; core values; career opportunities; customs/courtesies; communication skills. Leadership Laboratory (Air 0100) is mandatory for AFROTC cadets and complements this course by providing followership experiences.

AIR 1591. Leadership Practicum. (1.0-4.0 cr.; A-F or Audit; fall, spring, every year)
Leadership techniques and their practical application in structured problems and realistic situations; Air Force customs and courtesies.

AIR 2101. The Evolution of the U.S. Air Force Air and Space Power. (1.0 cr.; A-F or Audit; fall, every year)
Air Force heritage; development/deployment of air power, a primary element of U.S. national security; leadership and quality principles; ethics and values. Leadership development based on student participation in group problem solving. Oral/written communication development. Leadership Laboratory (Air 0100) is mandatory for AFROTC cadets and complements this course by providing followership experiences.

AIR 2102. The Evolution of the U.S. Air Force Air and Space Power. (1.0 cr.; A-F or Audit; spring, every year)
Air Force heritage; development/deployment of air power, a primary element of U.S. national security; leadership and quality principles; ethics and values. Leadership development based on student participation in group problem solving. Oral/written communication development. Leadership Laboratory (Air 0100) is mandatory for AFROTC cadets and complements this course by providing fellowships experiences.

AIR 3001. AFROTC POC Lead Lab. (2.0 cr. [max 8.0 cr.]; S-N or Audit; fall, spring, every year)
Practical environment giving leadership training through teaching freshmen and sophomores military customs and courtesies, physical fitness, military drill and the general Air Force environment. MUST be taken concurrently with AFROTC 3xxx and 4xxx level academic classes

AIR 3101. Air Force Leadership Studies. (3.0 cr.; A-F or Audit; fall, every year)
Comprehensive study of leadership/quality management fundamentals, professional

knowledge, organizational doctrine and ethics, and communication skills required of today's Air Force officer. Leadership/management case studies. A mandatory Leadership Laboratory (Air 3000) provides advanced leadership experiences and the opportunity to apply the leadership and management principles of this course.

AIR 3102. Air Force Leadership Studies. (3.0 cr.; A-F or Audit; spring, every year)
Comprehensive study of leadership/quality management fundamentals, professional knowledge, organizational doctrine and ethics, and communication skills required of today's Air Force officer. Leadership/management case studies. A mandatory Leadership Laboratory (Air 3000) provides advanced leadership experiences and the opportunity to apply the leadership and management principles of this course.

AIR 3591. Leadership Practicum. (1.0-4.0 cr.; A-F or Audit; fall, spring, every year)
Practical application of leadership and management in structured realistic situations.

AIR 4101. National Security Affairs, Preparation for Active Duty. (3.0 cr.; A-F or Audit; prereq No grad credit; fall, every year)
Advanced leadership development; national security processes, regional studies, advanced leadership ethics, doctrine, the military as a profession, officership, military justice, civilian control of the military. A mandatory Leadership Laboratory (Air 3000) provides advanced leadership experiences and the opportunity to apply the leadership and management principles of this course.

AIR 4102. National Security Affairs, Preparation for Active Duty. (3.0 cr.; A-F or Audit; prereq No grad credit; spring, every year)
Advanced leadership development; national security processes, regional studies, advanced leadership ethics, doctrine, the military as a profession, officership, military justice, civilian control of the military. A mandatory Leadership Laboratory (Air 3000) provides advanced leadership experiences and the opportunity to apply the leadership and management principles of this course.

African and African American Studies (AAAS) College of Liberal Arts

AAAS 1101. Introduction to Black Caribbean Studies. (LE CAT6; LEIP CAT06; 3.0 cr.; A-F or Audit; spring, odd years)
Study of the peoples and cultures of the Black Caribbean; impact of colonization; the evolution, form and content of Black Caribbean cultures, societies and institutions. A survey of the socioeconomic and political development and transformation of the nation-states of the Black Caribbean. Cultural reproductions of Caribbean racial and ethnic identities. Survey of the Caribbean diaspora; Caribbean social and political thought. Relationship with the United States, Britain, and Canada. Inter-Caribbean geopolitical relationship.

AAAS 1102. Introduction to Atlantic Slave Trade. (CDIVERSITY; LE CAT7; LECD CAT07; 3.0 cr.; A-F or Audit; spring, even years)

Genesis of the Trans Atlantic slave trade, survey of the Middle Passage along with historical formations of the slave trade. Examination of roles of the European powers and African nations with the creation of slave communities, identities, and cultures in the new world the political economy of the slave trade. Analysis of cultural and historical legacies of slavery, the abolitionist movement, and resistance to the abolitionist movement including modern day forms of slavery.

AAAS 1103. Introduction to Africa. (GLOBAL PER; 3.0 cr.; A-F or Audit; prereq Credit will not be granted if already received for AAAS 1100.; fall, summer, every year)
Examination of the histories, cultures, and peoples of Africa. Pre-colonization Africa societies. Colonial and postcolonial contacts with Europe. Brief survey of major social, cultural, economic, and political institutions of Africa and their roles in socioeconomic and political development. Issues facing contemporary African societies. Programs and policies to address Africa's problems. Africa and the world. Positioning Africa and its peoples in world affairs.

AAAS 1104. Introduction to Black America. (CDIVERSITY; 3.0 cr.; A-F or Audit; prereq credit will not be granted if already received for AAAS 1100; spring, every year)
Examination of black America in historical and contemporary periods to the post Obama era. African roots in the formation of black American society; genesis of slavery; impact of slavery on black America; contestation of slavery; black oppression; powerlessness and marginality. Black agitation for civil and economics rights; African American social, cultural, economic, and political thoughts; the persistency of structural racial inequities on blacks; closing the gap of inequality; future of black America.

AAAS 3000. Kenyan Experience Abroad. (6.0 cr.; A-F or Audit; prereq Consent from the UMD International Education Office.; summer, every year)

This course provides a critical study of Kenyan cultures and education. Taught on site in Kenya, the course will richly enhance students' understanding of the social, economic, and political challenges influencing contemporary Kenya, from colonization to globalization. It will draw on education, folklores, women's lives, literature, ecoactivism, and ecocriticism in its attempt to promote diversity, global perspectives, and sustainability.

AAAS 3201. The African American Family. (3.0 cr.; A-F or Audit; prereq minimum 60 credits; spring, every year)
This course is about the past and current structure of the African American family. It traces the development and formation of the African American family beginning from the period of slavery through emancipation, reconstruction, and the post-Obama modern

era. The course will feature the patterns and trends in African American family formation, marriage, family life, single parenthood, issues affecting black children and youth, the roles of matriarchs, relationships between black men and women, and the impact of economic and political forces on urban and rural black family life. Attention is given to class and the socioeconomic dynamics of African American life, the rise of the black middle class, the persistence of the urban underclass and the implications for America. The negotiation of bi-racial and multiracial black family identities is stressed, including the current formation of African American diaspora families.

AAAS 3202. African Story-Telling and Folklore. (3.0 cr.; A-F or Audit; fall, spring, every year)

This course is about the importance of story-telling and folklore in diverse African societies. It will examine the social context of the types, forms, and genres of story-telling in African societies and the folklores associated with story-telling. It traces the history of story-telling in African societies before and after colonization, the cultural expressions and meanings of folklore, uses and applications of story-telling and folklore, and the role of community in defining the boundaries of story-telling and folkloric culture.

AAAS 3203. Rap & Hip Hop Music Cultures: A Sociological Perspective. (3.0 cr.; A-F or Audit; fall, spring, summer, every year)

Music is a major institutional fabric of every social system. This course is about rap and hip hop musical forms. It seeks to bring a sociological perspective to elucidate the multiple genres of rap and hip hop musical genres; to show its growth and development; material and nonmaterial cultural features; and assess its overall impact on American and global musical cultures.

AAAS 3305. African American Cinema. (3.0 cr.; A-F or Audit; fall, every year)

This course will investigate how the imagery, poetics and politics of race have played out in the history of American film. Our focus will be African American cinema - which can be loosely defined as films written and/or directed by African Americans - but we will also consider the unique contours of its texts against the larger backdrop of Hollywood's representation of African Americans. In addition, we will explore the role of this medium in shaping social realities.

AAAS 3306. Cities in Africa. (3.0 cr.; A-F or Audit; prereq minimum 90 credits or instructor consent; spring, offered periodically)

This course is about Africa's burgeoning cities and metropolitan enclaves. The primary goal is to provide an understanding of the past and current factors leading to the growth in the sizes of African cities and an assessment of the consequences and sustainability of controlled and uncontrolled urbanization in Africa.

AAAS 3307. African Migrations and Global Diasporas. (3.0 cr.; A-F or Audit; prereq minimum 90 credits or instructor consent; fall, offered periodically)

This course is about the global African diaspora. It seeks to map the myriad of sociological processes undergirding the causes and consequences of the formation of African immigrant and diaspora communities in North America, Europe, the Caribbean region, and more recently, Asia. Focus is given to the formation of the cultural identities that are nurtured in these diaspora spaces and their outcomes for the host and migrant home societies.

American Indian Studies (AMIN)
College of Liberal Arts

AMIN 504. Minnesota Tribal-State Relations: History, Law, Conflict and Conflict Resolution. (0.0 cr.; S-N or Audit; summer, every year)

This course will explore the relationship between Indian tribes in Minnesota and the state government. It will first provide a brief history of federal Indian policy from colonization through the present day with a focus on tribal-state relations. Second, it will provide the legal background (regulatory, civil and criminal) between tribes and states generally and Minnesota tribes specifically. Third, it will provide a brief history of the eleven Minnesota tribes and Minnesota treaties and statutes. Fourth, it will provide an overview of issues in which tribal and state jurisdiction may conflict. Fifth, it will provide new methods for resolving conflicts and the future of tribal-state agreements. Each of these will be presented in five three hour presentations.

AMIN 1001. Introduction to American Indian Studies. (CDIVERSITY; 3.0 cr.; A-F or Audit; fall, every year)

This course serves non-majors, majors, and minors, introducing them to the history, methodologies, and community-oriented aspirations of American Indian studies. Students will collaboratively explore texts, topics, intellectuals, and issues crucial to the field, thereby preparing themselves and one another to be ethically-engaged residents of the Anishinaabe lands in which our campus is situated, and to excel in other courses both within and well-beyond UMD's AMIN curriculum.

AMIN 1010. American Indian Experience to 1900. (CDIVERSITY; LE CAT7; LECD CAT07; 3.0 cr.; A-F or Audit; prereq Credit will not be granted if already received for 1110.; fall, every year)

Introduction to the social, economic, political, and cultural changes and continuities of American Indian life up to 1900. Native-European encounters, the formation of the United States, and the establishments of hundred of treaties between the federal government and Native nations has continued relevance for both Native peoples and Americans today. Students will critically interrogate how we interpret the past and how these narratives shape and inform the present.

AMIN 1020. American Indian Experiences: 1900-present. (HUMANITIES; LE CAT7; CDIVERSITY; LECD CAT07; 3.0 cr.; A-F only;

prereq Credit will not be granted if already received for 1120.; spring, every year)

Through a chronological and biographical approach, the social, economic, political, and cultural changes and continuities of American Indian life from 1900 to the present will be introduced. Significant changes experienced by American Indians as well as their ability to adapt, resist, and thrive will be analyzed.

AMIN 1103. Introduction to the Ojibwe Language. (COMM & LAN; LE CAT3; LECD CAT03; 3.0 cr.; A-F only; fall, every year)
Speaking and comprehension of basic Ojibwe speech patterns. Development of rudimentary reading knowledge.

AMIN 1104. Beginning Ojibwe II. (COMM & LAN; LE CAT3; LECD CAT03; 3.0 cr.; A-F only; prereq 1103 or instructor consent; spring, every year)

Speaking and comprehension of basic Ojibwe speech patterns. Development of rudimentary reading knowledge.

AMIN 1204. Minnesota Tribal-State Relations: History, Law, Conflict and Conflict Resolution. (1.0 cr.; A-F or Audit; summer, every year)

This course will explore the relationship between Indian tribes in Minnesota and the state government. It will first provide a brief history of federal Indian policy from colonization through the present day with a focus on tribal-state relations. Second, it will provide the legal background (regulatory, civil and criminal) between tribes and states generally and Minnesota tribes specifically. Third, it will provide a brief history of the eleven Minnesota tribes and Minnesota treaties and statutes. Fourth, it will provide an overview of issues in which tribal and state jurisdiction may conflict. Fifth, it will provide new methods for resolving conflicts and the future of tribal-state agreements. Each of these will be presented in five three hour presentations.

AMIN 1606. Introduction to American Indian Literature. (HUMANITIES; LE CAT9; CDIVERSITY; 3.0 cr.; A-F only; prereq Credit will not be granted if already received for 1106.; fall, summer, offered periodically)
Introduces American Indian literatures from a variety of tribal perspectives as well as a wide range of genres including oratory, poetry, short stories, and novels. The major tropes and significant theories of American Indian literature will be covered.

AMIN 2015. Ojibwe History and Culture. (CDIVERSITY; 3.0 cr.; A-F only; prereq Credit will not be granted if already received for 2115.; spring, offered periodically)
Anishinaabe, Ojibwe, and Chippewa. Origins and lifestyle; relationship between traditional and contemporary times. Emphasis on Minnesota.

AMIN 2103. Intermediate Ojibwe I. (COMM & LAN; LE CAT3; LECD CAT03; 3.0 cr.; A-F only; prereq 1104 or instructor consent; credit will not be granted if already received for 2203.; fall, every year)
Speaking basic Ojibwe sentences and paragraphs at fluent level so listener can

understand speaking pattern context. Ability to write and read Ojibwe language proficiently.

AMIN 2104. Intermediate Ojibwe II. (COMM & LAN; LE CAT3; LECD CAT03; 3.0 cr.; A-F only; prereq 2103 or instructor consent; credit will not be granted if already received for 2204.; spring, every year)

Speaking basic Ojibwe sentences and paragraphs at fluent level so listener can understand speaking pattern context. Ability to write and read Ojibwe language proficiently.

AMIN 2210. American Indian Politics: Law, Sovereignty, and Treaty Rights. (SOC SCI; LE CAT6; CDIVERSITY; 3.0 cr.; prereq Credit will not be granted if already received for 2110.; fall, even years)

Introduces critical terms and issues facing American Indian nations in their relationships with federal and state governments as well as their own conceptions of nationhood and law by critically analyzing the principal actors and discussing the roles national mythologies, media, identity, and activism play in law and policy formation.

AMIN 2405. American Indian Families and Society. (SOC SCI; LE CAT8; CDIVERSITY; 3.0 cr.; A-F or Audit; fall, every year)
Indigenous North American families before European contact; impact of contact, events and governmental policies upon family structure and survival: Native parenting past and present; current issues for American Indian families.

AMIN 2407. Boarding Schools and Beyond: A History of American Indian Education . (CDIVERSITY; LE CAT8; LECD CAT08; 3.0 cr.; prereq Credit will not be granted if already received for 2707.; fall, odd years)
Explores the diverse experiences American Indians have had in the U.S. educational system from federal boarding schools to contemporary public schools and tribal colleges. Students will be exposed to rhetorical and political aspects of education.

AMIN 2605. Survey of American Indian Arts. (FINE ARTS; LE CAT9; CDIVERSITY; 3.0 cr.; A-F only; prereq Credit will not be granted if already received for 2105.; fall, spring, offered periodically)
Traditional arts of American Indians and the cultures that produced them; techniques, motifs, and aesthetics of Indian textiles and utilitarian and ceremonial arts.

AMIN 3206. Federal Indian Policy. (SOC SCI; LE CAT8; CDIVERSITY; LECD CAT08; 3.0 cr.; A-F only; prereq minimum 30 credits; this course previously titled: Indian-White Relations; credit will not be granted if already received for 3106.; fall, spring, offered periodically)
Examination of the formulation, implementation, evolution, and comparison of Indian policy from pre-colonial to self-governance. Introduces students to the theoretical approaches structuring research of federal Indian policy, views, and attitudes of the policy-makers and reaction of indigenous nations. Discussion of the policies and the impact related to those policies.

AMIN 3230. American Indian Tribal Government and Law. (CDIVERSITY; 3.0 cr.; A-F or Audit; prereq minimum 30 credits; credit will not be granted if already received for 3550.; fall, spring, offered periodically)
American Indian tribal governments and leadership, historically and today, have aimed at the promotion and protection of the nation, overseen domestic and foreign affairs, and provided for the basic needs and desires of their citizens. This course provides students a general background of the history, development, structure, and politics associated with indigenous governments, analyzing how these institutions have been modified to meet ever-changing internal needs and external pressures.

AMIN 3393. Projects in American Indian Studies. (1.0-5.0 cr. [max 10.0 cr.]; A-F only; prereq 1020, 1120, minimum 30 credits, instructor consent; maximum 10 credits between AMIN 3300 and 3393; fall, spring, summer, every year)
Directed reading, research, or involvement in social action culminating in the preparation of a paper.

AMIN 3410. Fur Trade in Canada and the United States. (CDIVERSITY; 3.0 cr.; A-F only; prereq minimum 30 credits; fall, offered periodically)
Historical review and analysis of Canadian and U.S. Indians in the fur trades.

AMIN 3420. American Indians in Sports. (CDIVERSITY; LE CAT7; LECD CAT07; 3.0 cr.; A-F or Audit; prereq 30 credits; credit will not be granted if already received for 3110.; fall, spring, even years)
The role of sports and games in Native tradition and tribal sovereignty; development of individual and tribal self-determination; indigenous and adapted games and sports integration of tribal epistemologies into sports; Native sports figures and leaders; history of Native sports pre-Contact through the present.

AMIN 3430. Global Indigenous Studies. (GLOBAL PER; 3.0 cr.; A-F or Audit; fall, spring, summer, offered periodically)
This course fosters a consideration of the planet's indigenous peoples, emphasizing their various and varying cultural, territorial, political, social, legal, aesthetic, economic, and intellectual contributions and claims. Exploring indigenous peoples' relationships with one another, with settler governments, with non-governmental organizations, and with supranational institutions, students in the course will develop a broad understanding of the increasingly global trajectories of indigenous studies.

AMIN 3450. American Indian Women. (CDIVERSITY; 3.0 cr.; A-F or Audit; prereq minimum 30 credits; credit will not be granted if already received for 3250.; fall, spring, odd years)
American Indian women in tribal societies before and after European contact; Indian women as stewards of knowledge, tradition, and society; impact of colonization; traditional and contemporary female leadership.

AMIN 3460. American Indian Psychology. (3.0 cr.; A-F only; prereq Intro soc sci course, 1020, 3206 or instructor consent; credit will not be granted if already received for 3750.; fall, odd years)
Reviews major theories of personality development and motivational psychology applicable to American Indian issues. Attributes of culturally appropriate developmental models are advanced through cross-cultural examination of general traits, perspectives, norms, and values. Relevant techniques of counseling.

AMIN 3620. Ojibwe Literatures: Sovereignty and Survivance. (CDIVERSITY; 3.0 cr.; A-F or Audit; prereq 1106, 1606; 30 credits; Credit will not be granted if already received for 3520.; fall, even years)
Study of a selection of Ojibwe literatures from the 1800s to the present including traditional stories, poetry, political/activist writings, journalism, novels and short stories. Works will reflect the diversity, resistance, adaptation, and survivance of Ojibwe people.

AMIN 3660. American Indian Novel. (HUMANITIES; CDIVERSITY; 3.0 cr.; A-F only; prereq 1020, 1120 or instructor consent; 30 credits; Credit will not be granted if already received for 3260.; spring, offered periodically)
Approximately four novels by American Indian authors are read with an explanation of the novels and the milieu that produced them.

AMIN 3995. Special Topics: (Various Title to be Assigned). (3.0 cr. [max 12.0 cr.]; A-F only; prereq minimum 30 credits; fall, spring, offered periodically)
Study of topics not included in regular curriculum.

AMIN 3997. Internship in American Indian Studies. (4.0-8.0 cr. [max 12.0 cr.]; A-F only; prereq AmIn major, 60 credits or instructor consent; fall, spring, summer, every year)
Supervised lab experience in American Indian agency or project or with significant Indian clientele. Advance, concurrent, and follow-up written and oral presentations.

AMIN 4191. Senior Study of Ojibwe Language. (1.0-6.0 cr. [max 12.0 cr.]; A-F only; prereq 1103, instructor consent; no grad credit; a total of 12 credits may be taken between AMIN 4191 and AMIN 4302; fall, spring, summer, every year)
Individual opportunity to devise and/or be involved in programs to increase fluency.

AMIN 4230. Introduction to Federal Indian Law. (SOC SCI; CDIVERSITY; 3.0 cr.; A-F only; prereq minimum 60 credits; credit will not be granted if already received for AMIN 3333; no grad credit; fall, spring, offered periodically)
Federal Indian law has had a profound effect on our lives, liberties, and properties of indigenous peoples. At times, U.S. policy and Supreme Court ruling have worked to protect aboriginal rights, while at other times they have had devastating consequences. This course examines the role of the U.S. Supreme Court as a policy-making institution in their dealings with Indigenous nations, requiring us to ask

about the origins of federal judicial power and their application indigenous peoples.

AMIN 4250. American Indian Diplomacy: Treaties, Compacts, and Agreements.

(GLOBAL PER; 3.0 cr.; A-F or Audit; prereq minimum 60 credits, no grad credit; fall, spring, offered periodically)

Indigenous Nations have long engaged in diplomatic arrangements with one another, foreign nations, colonial/state governments, and the United States. Such political engagements affirm the inherent sovereignty of First Nations, recognizing the distinctive rights and power unique to Native peoples and were used to forge friendships, end wars, cede lands and resources, create reservations, and reserve hunting and fishing rights. This course examines the history of First Nations treaty making, the legal and political status of Indian treaties and agreement, the ambiguities and problems in indigenous-state diplomacy and treaty litigation.

AMIN 4630. American Indians and the Media.

(HUMANITIES; CDIVERSITY; 3.0 cr.; A-F only; prereq minimum 60 credits; no grad credit; fall, spring, offered periodically) Examination of Native controlled and non-Native images of American Indians in varied media including journalism, television, and advertising from the times of European contact to the present. Explorations and comparisons of historic images with the contemporary. Students will participate in a hands-on media watch research project.

AMIN 4640. American Indians in the Movies.

(HUMANITIES; CDIVERSITY; 3.0 cr.; A-F or Audit; prereq 60 credits; no grad cr; fall, every year) Indian Country at the beginning of the film era; government Indian policies during the film era; silent film; war and romance; westerns; Indian and White heroes and heroines; stereotypes; modern Native-made film.

AMIN 4990. Directed Research.

(1.0-6.0 cr. [max 12.0 cr.]; A-F only; prereq 60 credits and instructor consent, max 8 credits to grad program; fall, spring, summer, every year) Qualified seniors and graduate students may register for work on tutorial basis in research of an advanced nature in American Indian Studies.

American Sign Language (ASL)

College of Education and Human Service Professions

ASL 2001. Beginning American Sign

Language I. (COMM & LAN; LE CAT3; LECD CAT03; 3.0 cr.; A-F or Audit; prereq Credit will not be granted if already received for CSD 2001.; fall, every year)

Introduction to basic vocabulary in American Sign Language and the fingerspelling alphabet.

ASL 2002. Beginning American Sign

Language II. (COMM & LAN; LE CAT3; LECD CAT03; 3.0 cr.; A-F or Audit; prereq 2001 or instructor consent; credit will not be granted if already received for CSD 2002; spring, every year)

Expansion of vocabulary base in American Sign Language. In-depth study of principles of American Sign Language as used receptively and expressively in communication with deaf individuals.

ASL 3003. Intermediate American Sign

Language I. (COMM & LAN; 3.0 cr.; A-F or Audit; prereq 2002 or instructor consent; credit will not be granted if already received for CSD 5003; fall, every year)

Intermediate-level study of grammatical and linguistic features of ASL; focus on understanding deaf culture and fluency in expressive and receptive skills.

ASL 3004. Intermediate American Sign

Language II. (COMM & LAN; 3.0 cr.; A-F or Audit; prereq 3003 or instructor consent; credit will not be granted if already received for CSD 5004; spring, every year)

Continued intermediate-level study of grammatical and linguistic features of ASL; focus on understanding deaf culture and fluency in expressive and receptive skills.

ASL 4005. Advanced American Sign

Language. (COMM & LAN; 3.0 cr.; A-F or Audit; prereq 3004 or instructor consent; no grad credit; credit will not be granted if already received for CSD 4005; fall, every year)

Advanced level study of American Sign Language vocabulary and structure. Expressive and receptive skill development. Additional focus on use of ASL by the deaf community.

ASL 4100. Linguistics of American Sign

Language. (3.0 cr.; A-F only; prereq 3004 or instructor consent, no grad credit; fall, every year)

Introductory study of the linguistics of ASL. Comparative study of the linguistic structure of ASL and English. Overview of language as a system within a cultural context.

ASL 4105. History of the American Deaf

Community. (CDIVERSITY; 3.0 cr.; A-F or Audit; prereq no grad credit; spring, every year)

Historical roots of the American Deaf Community, including the establishment and growth of the Deaf Education system, the role of the residential schools in Deaf Culture, power and culture differentials, and systemic oppression. Interrelationship of American Sign Language and the deaf community. History, customs and practices of the American Deaf Community. Dynamics of minority cultural existence. Application of cultural theory to evaluation of the deaf life experience in the United States from 1800-present.

ASL 4110. Deaf Culture.

(3.0 cr.; A-F only; prereq 3004 or instructor consent, no grad credit; spring, every year)

Exploration of the history of the deaf community in the United States. Topics will include the deaf community as a cultural and linguistic group with cultural norms, values and traditions. Minority dynamics and cross-cultural interactions also will be covered. ASL will be the language of instruction.

ASL 4298. American Sign Language Skill Building Workshop.

(1.0 cr.; A-F or Audit;

prereq 2002 or instructor consent, no grad credit; fall, spring, summer, every year) Instruction and intensive practice in various subjects related to American Sign Language.

Anthropology (ANTH)

College of Liberal Arts

ANTH 1080. Understanding Global Cultures.

(SOC SCI; LE CAT8; GLOBAL PER; LEIP CAT08; 3.0 cr.; A-F only; fall, odd years)

Explores nations around the globe towards the goal of developing a cross-cultural understanding of how cultures function. Explores America as a foreign culture, looking at the United States from the viewpoints of foreign anthropologists and other scholars, using comparative ethnographic perspectives to interpret aspects of American culture.

ANTH 1601. Freshman Seminar: Prehistoric

Cultures. (SOC SCI; LE CAT7; LEIP CAT07; 4.0 cr.; A-F or Audit; =[ANTH 1602]; prereq Freshman, fewer than 30 cr; fall, spring, every year)

Origin and development of extinct and living human beings, including growth and differentiation of cultures from their beginnings to earliest stages of ancient civilizations.

ANTH 1602. Biological Anthropology and

Archaeology. (SOC SCI; LE CAT7; LEIP CAT07; 4.0 cr.; A-F or Audit; =[ANTH 1601]; fall, spring, every year)

Origin and development of extinct and living human forms, primatology, human biological variations, the race concept, evolution, and development of human societies up to the earliest stages of ancient civilizations.

ANTH 1604. Cultural Anthropology.

(SOC SCI; LE CAT6; GLOBAL PER; LEIP CAT06; 4.0 cr.; A-F or Audit; fall, every year)

Introduction to representative cultures of the world and to concepts and methods of cultural anthropology, focusing on range of variation and degree of uniformity in human behavior and in cultural adaptations.

ANTH 1612. Introduction to Archaeology.

(SOC SCI; LE CAT6; 4.0 cr.; A-F or Audit; fall, spring, offered periodically)

Basic principles of archaeology with examples of their application to world prehistory.

ANTH 2001. Career Development in

Anthropology. (2.0 cr.; A-F only; prereq 1602 or 1604 or equivalent, or instructor consent; fall, spring, offered periodically)

Overview of career opportunities for anthropological skill sets. The mechanics of career development: locating jobs; matching skills to job requirements; networking; writing resumes, cover letters, CV's, and graduate application essays. A focus on the lifelong process of building a career.

ANTH 3200. Exploring Sustainability in

Costa Rica. (4.0 cr.; A-F or Audit; =[FORS 3200]; prereq minimum 30 credits, minimum cumulative GPA 2.5, instructor consent; spring, odd years)

Taught on site in Costa Rica. Introduces students to fieldwork based experiences in sustainability and community engaged

scholarship. Course generally involves travel, extensive outside of the classroom work, and a service learning component with post project reflection.

ANTH 3618. Ancient Middle America. (3.0 cr.; A-F or Audit; prereq minimum 30 credits; fall, offered periodically)

Survey of major pre-Hispanic cultures of Mesoamerica, including peoples such as the Olmecs, Maya, Toltecs, Mixtecs, Aztecs. Using comparative ethnographic and archaeological materials, the course explores the earliest arrival of hunter-gatherer-foragers, the beginnings of agriculture, the formation of early villages, native mathematical and calendar and writing systems, the florescence of regional art styles, and the religious, sociopolitical and economic development of Classical and Postclassical civilizations through the arrival of the Spanish Conquistadors. It features well-known sites such as La Venta, Tikal, Palenque, Chichén Itzá, Monte Albán, Teotihuacán, Tula, and the Aztec capitol of Tenochtitlán.

ANTH 3622. Prehistoric Archaeology: Old World. (3.0 cr.; A-F or Audit; prereq 1604, minimum 30 credits; fall, spring, offered periodically)

Archaeological survey of Europe, Africa, and Asia.

ANTH 3624. Archaeology of North America. (3.0 cr.; A-F or Audit; prereq 1604, minimum 30 credits; fall, spring, offered periodically)

Archaeological survey of major cultural areas of North America north of Mexico.

ANTH 3628. Women in Cross-Cultural Perspective. (3.0 cr.; A-F or Audit; prereq 1604, minimum 30 credits; fall, spring, offered periodically)

Worldwide survey of the structure of gender systems, focusing on women's lives in selected, primarily non-Western, cultures, how gender relations are impacted by colonialism, industrialism, and economic development

ANTH 3632. Latin American Cultures. (3.0 cr.; A-F or Audit; prereq 1604, minimum 30 credits; fall, spring, offered periodically)

Survey of social, political, economic, and religious organization of contemporary national and native cultures of Mexico, Central America, and South America.

ANTH 3635. Peoples and Cultures of Europe. (3.0 cr.; A-F or Audit; prereq minimum 30 credits; fall, spring, summer, every year)

Exploration of European peoples to develop a cross-cultural understanding of how cultures function. Survey of social, political, economic, religious, family and kinship, gender, urban, globalism/globalization and the European Union (EU) on all of the above.

ANTH 3638. Peoples and Cultures of the Middle East. (3.0 cr.; A-F or Audit; prereq 1604, min 30 cr or instructor consent; fall, spring, offered periodically)

Examines how anthropologists study the cultures and social institutions of the modern Islamic Middle East. Focus on religion, family life, gender, politics, economy, urban ways of life, kinship and marriage, and the impacts of globalism on the Middle East.

ANTH 3640. What is a City?: Archaeological Perspectives on Urbanism. (3.0 cr.; A-F or Audit; prereq Min 30 cr or instructor consent; fall, spring, offered periodically)

Focus on a variety of historically and archaeologically documented urban case studies and important concepts, e.g., the use of space, the physical manifestation of cities, urban abandonment, and the impact of cities on the environment.

ANTH 3642. Exploring Human Origins.

(3.0 cr.; A-F or Audit; prereq Minimum 30 credits or instructor consent; fall, spring, offered periodically)

Designed to familiarize students with the discipline of paleanthropology or human evolution. Addresses primate and hominid anatomy, dating techniques, stratigraphy, fossil formation and paleoecology as well as human evolution through the fossil evidence and associated archaeological material of various hominid groups including the australopithecines, Homo erectus, Neanderthals, and early modern humans. Explores human evolution and current debates surrounding the evolutionary relationships of various hominid taxa.

ANTH 3644. Primatology. (3.0 cr.; A-F or Audit; prereq 1602; spring, every year)

This course is designed to familiarize students with the fundamental of primatology including classification, biology, biogeography, behavior, ecology, social relationships, communication, field work and conservation of non-human primates.

ANTH 3691. Independent Study in Anthropology. (1.0-5.0 cr. [max 10.0 cr.]; A-F or Audit; prereq Minimum 60 credits or instructor consent; fall, spring, summer, every year)

Directed reading and research in ethnography leading to preparation of paper.

ANTH 3695. Special Topics: (Various Titles to be Assigned). (1.0-4.0 cr. ; A-F or Audit; prereq 1604, 30 credits or instructor consent; fall, spring, every year)

Seminar on contemporary topics in selected branches of anthropology.

ANTH 3888. Anthropology of Food.

(SUSTAIN; 3.0 cr.; A-F only; prereq minimum 30 credits; fall, spring, summer, every year)

Advanced survey and comparative study of the relationship between food and culture in the past and present. Topics include the domestication and evolution of plants and animals, biological and cultural aspects of the production, distribution, preparation, and consumption of food, and an analysis of the social and cultural significance of food--including food preferences and taboos, food and religion, food and identity, food and power, gendered division of labor in foodways, beliefs and values about foods, food symbols and metaphors, new food technologies, and the globalization of contemporary food systems.

ANTH 4616. Culture and Personality. (3.0 cr.; A-F or Audit; prereq 1604, min 60 cr; fall, spring, offered periodically)

Role of culture in forming of personality; problems of individual adjustment to

demands of culture. Psychological and sociopsychological approach to culture.

ANTH 4620. Archaeological Method and Theory. (4.0 cr.; A-F or Audit; prereq 1602, minimum 60 credits; credit will not be granted if already received for 1612; no grad credit; fall, even years)

Principles of archaeology including data collection, data analysis, history of the field, theoretical approaches, laws, and professional ethics.

ANTH 4621. Myth and Sacred Symbols.

(3.0 cr.; A-F or Audit; prereq 1604, min 60 cr; spring, offered periodically)

Interpretation of myths and sacred symbols found in beliefs and rituals of selected traditional cultures.

ANTH 4623. Anthropology and Contemporary Human Problems. (3.0 cr.; A-F or Audit; prereq 1604, minimum 60 credits; fall, spring, offered periodically)

Cultural roots of such interrelated contemporary human problems as over-population, food production and distribution, health and nutrition, social and ecological disorders. Review of alternative solutions to such problems as suggested by anthropological study and analyses.

ANTH 4628. Language and Culture. (3.0 cr.; A-F or Audit; prereq 1604, minimum 60 credits; fall, spring, offered periodically)

Relationship between language and culture studied through comparative cases from diverse areas of the world.

ANTH 4631. Anthropology and Environment. (SUSTAIN; 3.0 cr.; A-F or Audit; prereq 1604, min 60 cr; fall, spring, offered periodically)

In-depth study of some of the methods and concepts concerning the interrelations of certain human populations with their environments in diverse natural, cultural, historical, and evolutionary settings.

ANTH 4632. Anthropology of Landscapes.

(3.0 cr.; A-F or Audit; prereq 1604, minimum 60 credits or grad student or instructor consent; fall, spring, offered periodically)

Concepts of landscape and space in anthropology. Topics include culturally constructed landscapes, memory, pilgrimage, commemoration, and ways of making a living from the landscape. Theoretical background and analytical examples drawn from the four subfields of anthropology: cultural, physical, linguistics, and archaeology.

ANTH 4633. Ethnobotany. (4.0 cr.; A-F only; prereq 1604, minimum 60 credits; fall, spring, offered periodically)

Advanced survey and study of interrelations between humans and plants, including material, symbolic, ritualistic and other aspects of human-plant interactions. Combines cultural anthropology and botany to investigate the roles of plants as food, medicine, natural resources and/or gateways to culturally sanctioned religious experiences.

ANTH 4640. Medical Anthropology. (4.0 cr.; A-F or Audit; prereq 1604, minimum 60

credits or grad student, or instructor consent; fall, spring, offered periodically)
Comparative, cross-cultural examination of sickness and healing. Drawing from ethnographic work on indigenous, alternative, and Euro-American medical systems as well as shamanism, the course works with symbolic, social, political, and historical perspectives.

ANTH 4644. Anthropology of Law. (4.0 cr.; A-F or Audit; prereq minimum 60 credits; no grad credit; spring, even years)
Introduces key concepts, issues, and methods of legal anthropology and considers how, in various parts of the world, legal systems are integrating local and indigenous conceptions of justice with the formal procedures and institutions of the state. Particular attention is given to culturally creative uses of law to achieve public justice with respect to environmental and economic domains.

ANTH 4651. Development of Anthropological Theory. (4.0 cr.; A-F or Audit; prereq 1604, minimum 90 credits, no grad credit; fall, every year)
Theoretical perspectives from mid-19th century to the present; examines the interrelationship of method and theory, and implications for practice of anthropology.

ANTH 4653. Senior Seminar. (3.0 cr.; A-F or Audit; prereq 1604, minimum 90 credits or instructor consent; no grad credit; spring, every year)
Contemporary topics in selected branches of anthropology. Active participation in group research project to develop and enhance anthropological research skills.

ANTH 4654. Biological Anthropology. (3.0 cr.; A-F or Audit; prereq 1602, minimum 60 credits; fall, spring, offered periodically)
The human skeleton as source of information about individual variations, population structure, and human evolution. Study of human remains from archaeological sites, morphology, paleopathology, and relevant statistical methods. Lectures and labs emphasize acquiring practical experiences in analysis and interpretation.

ANTH 4655. Forensic Anthropology. (4.0 cr.; A-F or Audit; prereq 1602, minimum 60 credit; no grad credit; spring, every year)
This class is designed to familiarize students with the fundamentals of forensic anthropology, including identification of skeletal elements, pathology, age, sex, and population affinity, stature, occupational markers and selected other topics.

ANTH 4691. Independent Study in Anthropology. (1.0-5.0 cr. ; A-F or Audit; prereq Minimum 60 credits or instructor consent, no grad credit; fall, spring, summer, every year)
Directed reading and research in ethnology leading to preparation of paper.

ANTH 4695. Special Topics: (Various Titles to be Assigned). (1.0-5.0 cr. [max 10.0 cr.]; A-F or Audit; prereq 1604, min 90 cr or instructor consent; fall, spring, summer, every year)
Seminar on contemporary topics in selected branches of anthropology.

ANTH 4696. Field Research in Archaeology. (1.0-10.0 cr. ; A-F or Audit; prereq 1602 or 1612, instructor consent; summer, offered periodically)
Archaeological field excavation, survey, and research in historic and prehistoric sites.

ANTH 4697. Anthropology Internship. (2.0-6.0 cr. ; S-N or Audit; prereq instructor consent, no grad credit; fall, spring, summer, every year)
Supervised experience in an anthropological work related setting: social service agency, museum, immigration services, school or other, approved by instructor. Setting learning objectives, techniques for measuring progress and report writing will be taught.

ANTH 4699. Honors Project. (2.0-4.0 cr. ; A-F or Audit; prereq 1604, instructor consent; no grad credit; fall, spring, summer, every year)
Advanced individual project in any area of anthropology demonstrating sound theoretical and research foundations and resulting in a written report, oral presentation. A web page or poster presentation may be done in consultation with the honors advisor.

ANTH 4910. Teaching Assistantship in Anthropology. (1.0-3.0 cr. ; A-F only; prereq Minimum 60 credits, instructor consent, no grad credit; maximum 3 credits between ANTH 4997 and 4910; fall, spring, summer, every year)
Practical experience in teaching-related activities in anthropology courses.

Art (ART) School of Fine Arts

ART 901. Graphic Design Portfolio Review. (0.0 cr.; S-N or Audit; prereq {repeatable one time}, 9 credits in art courses, pre-graphic design major or department consent; spring, every year)
Presentation of portfolio and other required evaluative materials for admission to graphic design major candidacy.

ART 902. Studio Art Portfolio Review. (0.0 cr.; S-N only; prereq 15 credits in art courses, pre-studio art major or department consent; fall, spring, every year)
Presentation of portfolio and other required evaluative materials for admission to studio art major candidacy.

ART 903. Art Education Portfolio Review. (0.0 cr.; S-N or Audit; prereq {repeatable one time}, 9 credits in art courses, pre-art education major or department consent; fall, spring, every year)
Presentation of portfolio and other required evaluative materials for admission to art education major candidacy.

ART 1001. Art Today. (FINE ARTS; LE CAT9; LEIP CAT09; 3.0 cr.; A-F or Audit; fall, every year)
Introductory survey of influence of art and roles of artists in varied sociocultural contexts, emphasizing recent art and its historical sources.

ART 1002. Introduction to Art. (FINE ARTS; LE CAT10; 3.0 cr.; A-F or Audit; =[ART 1005];

prereq Not for art majors or minors except those in art history; fall, spring, every year)
Studio course with strong lecture component for those with little or no creative experience in art, introducing various materials, techniques, and concepts. Studio work, lectures, class discussions, viewing artworks, and outside reading.

ART 1003. Introduction to Design. (FINE ARTS; LE CAT9; 3.0 cr.; A-F or Audit; spring, every year)
Introductory survey of the design of visual communication and the design of everyday objects, emphasizing the social and historical meaning of design and the ways in the design shapes public and private experience. From clothes to cars, from websites to street signs, from plates to phones to plazas, design can help or hinder users perform tasks while it helps them construct identify and meaning.

ART 1006. Freshman Seminar: Fundamentals of Drawing. (FINE ARTS; LE CAT10; 3.0 cr.; A-F or Audit; =[ART 1009]; prereq Freshman, fewer than 30 credits; fall, spring, every year)
Development of visual and conceptual skills through drawing as well as lectures, presentations, group discussions, critiques.

ART 1009. Fundamentals of Drawing. (FINE ARTS; LE CAT10; 3.0 cr.; A-F or Audit; =[ART 1006]; prereq Not for art majors or minors; fall, spring, summer, every year)
Stimulation of visual and conceptual skills through dynamics of drawing as well as lectures/presentations and group discussions.

ART 1010. Drawing I. (3.0 cr.; A-F or Audit; prereq Art or art education major or art minor or architecture and design minor or instructor consent; fall, spring, summer, every year)
Introduction to the drawing experience and problems concerned with translation of three-dimensional visual experience into two-dimensional form.

ART 1011. 2-D Design. (3.0 cr.; A-F or Audit; prereq Art or art education major or pre GDM BFA, or GDM BFA or pre MGD BBA or MGD BBA or art minor or instructor consent; fall, spring, every year)
Introduction to two-dimensional design through study of design elements and principles, including visual organization and color theory and their application in various media.

ART 1012. 3-D Design. (3.0 cr.; A-F or Audit; =[ART 1015]; prereq Art or art education major or architecture and design studies minor or instructor consent; fall, spring, every year)
Introduction to basic concepts and materials of three-dimensional form and space.

ART 1013. 2-D Digital Design. (3.0 cr.; A-F or Audit; prereq Art or art education major or pre GDM BFA or GDM BFA or pre MGD BBA or MGD BBA or art minor or photography minor or arts in media minor or instructor consent; fall, spring, every year)
Two-dimensional studio and graphic design concepts using the computer as a creative tool. Laptop required; digital instruction presented only on the Mac platform.

ART 1125. Watercolor I. (3.0 cr.; A-F or Audit; prereq 1002 or 1010 or instructor consent; fall, spring, every year)
Basic concepts and techniques.

ART 1126. Watercolor II. (3.0 cr. [max 6.0 cr.]; A-F or Audit; prereq 1125 or instructor consent; credit will not be granted if already received for 3125; fall, spring, every year)
Advanced concepts and techniques.

ART 1305. Social Multiples: Availability and Circulation. (FINE ARTS; 3.0 cr.; A-F or Audit; spring, every year)
A survey of the historical and contemporary uses of printed material to engage communities in political, cultural, and ethical conversation.

ART 1405. Fundamentals of Ceramics I. (FINE ARTS; LE CAT10; 3.0 cr.; A-F or Audit; prereq Not for art majors or minors; spring, summer, every year)
Basic handbuilding and glazing of earthenware ceramics.

ART 1605. Fundamentals of Photography. (FINE ARTS; LE CAT10; 3.0 cr.; A-F or Audit; =[ART 1607, ART 2600]; prereq Not for art majors or minors; fall, summer, every year)
Introduction to photography and its roles in the communications culture. Basic photographic principles and introduction to digital darkroom. Assignments emphasize creative thinking. Requires digital camera with adjustable shutter speeds and apertures. Laptop and software required; instruction presented only on the Mac platform. Plus 3 hours arranged studio work per week.

ART 1607. Freshman Seminar: Fundamentals of Photography. (FINE ARTS; LE CAT10; 3.0 cr.; A-F or Audit; =[ART 1605, ART 2600]; prereq Freshman, fewer than 30 credits; fall, every year)
Introduction to photography as a communicative tool and medium for creative expression. Investigation of photography's role in the communications culture and to historical influences in the medium. Students produce a final portfolio of photographic prints. Requires digital camera with adjustable shutter speeds and apertures. Laptop and software required; instruction presented only on the Mac platform.

ART 1814. Creating Across Cultures. (FINE ARTS; LE CAT9; CDIVERSITY; LECD CAT09; 3.0 cr.; A-F or Audit; prereq Credit will not be granted if already received for 2814; spring, every year)
Underrepresented visual arts of cultural groups within U.S. society.

ART 1900. Visual Literacy. (FINE ARTS; LE CAT9; 3.0 cr.; A-F or Audit; prereq Credit will not be granted if already received for 2900; fall, spring, every year)
Various forms of visual expression--art, commercial imagery, typography, architecture, graffiti, etc.--as rhetoric. Introduction to variety of theories and/or modes of criticism, and consideration of their value for explanation of visual expression.

ART 2014. 3-D Digital Studio I. (3.0 cr.; A-F or Audit; =[ART 1014]; prereq 1013 and art or art education major, pre-art education

major or pre-graphic design major, or art minor or architecture and design studies minor or instructor consent; credit will not be granted if already received for 1014 or 3014; fall, spring, every year)

Introduction to design using 3-D digital applications, particularly for the creation of images for the purpose of artistic expression or for use as graphic elements. The class will cover use of the software as well as artistic and design issues raised by this particular medium.

ART 2016. Digital Arts: Mixed-Media Studio. (3.0 cr. [max 6.0 cr.]; A-F or Audit; prereq 1013, art or art education major, pre-art education major or pre-graphic design major, or art or photography minor or instructor consent; credit will not be granted if already received for 3016; fall, spring, every year)

Introduction to digital art studio practice with a focus on digital imaging and cross-media experimentation. Course builds on skills, techniques, and critique of digital art concepts such as image compositing, appropriation, collage, and remixing. Creative projects include development of a serial approach to visual imagery. Readings and presentations discuss current trends in digital culture and key works by digital artists. Mac laptop required with current digital imaging software.

ART 2030. Digital Arts: Time-based Media. (3.0 cr. [max 6.0 cr.]; A-F or Audit; prereq 1013, art or art related majors or minors or instructor consent; credit will not be granted if already received for 3030; fall, spring, every year)
Introduction to time-based media practice and theory through presentations, readings, studio time, and hands-on assignments. Creative exploration of vital forms of contemporary time-based art such as video art, sound/sonic art, basic animation, and performance art.

ART 2040. Digital Filmmaking: Visual Narratives. (3.0 cr.; A-F or Audit; =[ART 1800]; prereq 1013 or film minor or instructor consent; fall, spring, offered periodically)
Introduction to the fundamental of digital video production and basic concepts of cinematic narrative. Beginning hands-on experience using digital video tools to create short narrative works. Creative studio art approach to low budget film techniques and project collaboration. Individual and team projects include visual concept development, storyboarding, video production, and digital editing. Emphasis on the visual language of filmmaking and critical appreciation of cinematic media.

ART 2100. Painting I. (3.0 cr.; A-F or Audit; prereq 1006 or 1009 or 1010, 1011, art or art education major or art minor or instructor consent; credit will not be granted if already received for 1100; fall, spring, summer, every year)
Color and pigment theory, basic concepts and explorations in technology and imagery. Painting traditions and contemporary directions.

ART 2200. Sculpture I. (3.0 cr.; A-F or Audit; prereq 1015 or 1012, art or art education major or art minor or instructor consent; credit will not

be granted if already received for 1200; fall, spring, every year)

Sculptural materials, methods, and concepts, with problems relating to form, time, and space; experience with various sculptural forms and media, emphasizing creative expression.

ART 2300. Printmaking I: Intaglio, Relief. (3.0 cr.; A-F or Audit; =[ART 2302]; prereq 1006 or 1009 or 1010, 1011, art or art education major or art minor or instructor consent; fall, every year)

Introduction to methods and materials used in zinc plate etching and relief printing from wood and linoleum. Technical, aesthetic, and contextual considerations encountered in production of meaningful artwork. Theoretical, legal, critical, and historical aspects of printmaking.

ART 2301. Printmaking I: Litho, Screen. (3.0 cr.; A-F or Audit; prereq 1006 or 1009 or 1010, 1011, art or art education major or art minor or instructor consent; credit will not be granted if already received for 1301; spring, every year)
Introduction to methods and materials used in lithographic printmaking from stones and plates and water-based screenprinting. Content includes technical, aesthetic and contextual considerations encountered in the production of meaningful artwork. Additional information on theoretical, legal, critical and historical aspects of printmaking.

ART 2302. Printmaking I: Hybrid and Non-Toxic Print Processes. (3.0 cr.; A-F or Audit; =[ART 2300]; prereq 1006 or 1009 or 1010, 1011, art or art education major or art minor or instructor consent; spring, offered periodically)
A studio-based investigation of contemporary non-toxic printmaking processes including Solarplate intaglio and relief applications; "ImageOn" photopolymer laminations; Collagraph; "Pronto Plate" lithography and bookmaking.

ART 2400. Ceramics I. (3.0 cr.; A-F or Audit; prereq 1012, art or art education major or art minor or instructor consent; credit will not be granted if already received for 1400; fall, spring, summer, every year)
Handbuilding methods, surface enhancement, and conceptual support for pottery and/or ceramic sculpture.

ART 2500. Jewelry and Metals I. (3.0 cr.; A-F or Audit; prereq 1011 or 1013, art or art education major or art minor or instructor consent; credit will not be granted if already received for 1500; fall, summer, every year)
Basic jewelry design, fabrication, and surface enhancement techniques.

ART 2600. Photography I. (3.0 cr.; A-F or Audit; =[ART 1607, ART 1605]; prereq 1013, Art major or Art or Photography Minor or instructor consent; fall, spring, summer, every year)
Introduction to photographic concepts, materials, and the digital darkroom. Varied thematic assignments within the visual arts context. Requires digital camera with adjustable shutter speeds and apertures. Laptop and software required; instruction presented only on the Mac OS.

ART 2801. 2-D Animation Principles. (3.0 cr.; A-F or Audit; prereq 1010 or 1006, 1011; summer, every year)
Introduction to 2-D animation principles. Students will create a short animation project using traditional cel techniques and subsequent digital capture.

ART 2810. Art in Elementary Education. (FINE ARTS; LE CAT10; 3.0 cr.; A-F or Audit; prereq pre-Elementary education major; fall, spring, every year)
Instructional problems relating to the growth and development of artistic expression in children. Studio experience relating to elementary art curriculum.

ART 2905. Design Technology I. (3.0 cr.; A-F or Audit; prereq 1013 and graphic design major or GDM BFA or pre MGD BBA or GD BBA or arts in media minor or instructor consent; laptop required; digital instruction presented only on the Mac platform.; fall, every year)
Fundamentals of graphic reproduction and Web site design; application of digital programs used in preparing print and web work.

ART 2907. Typography I. (3.0 cr.; A-F or Audit; prereq Graphic design major or GDM BFA or MGD BBA or digital arts and photography emphasis or instructor consent; laptop required; digital instruction presented only on the Mac platform.; fall, every year)
Introduction to fundamentals of typography in print and screen media. Presents terminology, history, and theories of letterforms. Students will perform directed assignments to develop typographic skills on computer and by hand.

ART 2911. Graphic Design I. (3.0 cr.; A-F or Audit; prereq 2905, 2907, graphic design major or GDM BFA or MGD BBA or instructor consent; laptop required; digital instruction presented only on the Mac platform.; spring, every year)
Introduction to theory and practice of graphic design. Meaning and aesthetics of image juxtaposition; resonance of type and image.

ART 3017. 2-D Digital Studio II. (3.0 cr. [max 6.0 cr.]; A-F or Audit; prereq 2016, art or art education major or art minor or instructor consent; credit will not be granted if already received for 5016; fall, spring, every year)
Advanced art making as part of the tradition of digital printmaking and other 2-Dimensional outputs in relationship to contemporary fine art practice.

ART 3018. Digital Arts: Interactive Media. (3.0 cr.; A-F or Audit; prereq 2016, art major or minor or instructor consent; fall, spring, offered periodically)
Creative use of interactive media in contemporary studio art practice. Discussion of emerging media formats and current trends in interactive art. Collaborative projects informed by conceptual dialogue in digital culture and significant works by net artists. Development of game-like interactive experiences via social networking, virtual worlds, or locative media. Experimental works may be created using open source software or other interactive design tools. Laptop required (Mac or PC).

ART 3031. Digital Arts: Installation and Collaborative Media. (3.0 cr. [max 6.0 cr.]; A-F or Audit; prereq 2030, art or art education major, pre-art education major or pre-graphic design major, or art minor or instructor consent; credit will not be granted if already received for 5030; fall, spring, every year)
Intermediate digital art studio course with a focus on interdisciplinary media and collaborative processes used to create site-specific installations and participatory art pieces. Reading and presentations discuss current trends in collaborative projects and key works by installation artists. Multimedia installation projects may include traditional art media, video projection, sound, and audience participation.

ART 3040. Digital Filmmaking: Experimental Techniques. (3.0 cr.; A-F or Audit; prereq 2030 or 2040 or instructor consent; fall, spring, offered periodically)
Exploration of hands on experimental processes and techniques used in contemporary digital video and animation. Introduction to history and theory of experimental film and video works. Focus on digital video production, digital compositing, digital animation techniques, and non-linear video editing skills. Emphasis on innovative, narrative, and non-narrative approaches to creative video projects. Discussion of audience and exhibition options for experimental digital video works.

ART 3095. Special Topics: (Various Titles to be Assigned). (1.0-3.0 cr. [max 12.0 cr.]; A-F or Audit; prereq instructor consent; fall, spring, offered periodically)
Intensive study of special topics in visual arts. Topic announced before course offered.

ART 3100. Painting II. (3.0 cr. [max 9.0 cr.]; A-F or Audit; prereq 2100, art or art education major, pre-art education major or pre-graphic design major, or art minor or instructor consent; max 9 credits; fall, spring, summer, every year)
Painting in specialized interest area, using student/instructor-generated semester goals outline.

ART 3200. Sculpture II. (3.0 cr. [max 6.0 cr.]; A-F or Audit; prereq 2200, art or art education major or art minor or instructor consent; fall, spring, every year)
Sculptural materials, methods, and concepts, with problems relating to form, time, and space; experience with various sculptural forms and media, emphasizing creative expression.

ART 3214. Sculpture II: Robotics and Physical Computing. (3.0 cr. [max 6.0 cr.]; A-F or Audit; prereq 2200, art or art education major or art minor or instructor consent; spring, every year)
Intermediate and advanced sculpture robotics and physical computing: Approaches to sculpture, digital control of objects, kinetic sculpture and sound in installation events, performances, and exhibitions.

ART 3300. Printmaking II. (3.0 cr. [max 6.0 cr.]; A-F or Audit; prereq 2300 or 2301, art or art education major or art minor or instructor consent; spring, every year)

Continued exploration of processes explored in either or both of the introductory courses. Increased technical challenges combined with refinement of image and concept. Some photographic and mixed-media processes; increased experience in editing and critical review.

ART 3305. Sustainability Studio: Theory and Practice. (SUSTAIN; 3.0 cr.; A-F or Audit; prereq minimum 60 credits, Art major; spring, every year)
Within a studio-based context, this course examines the potential of art and design to address issues of sustainability. Drawing from historical and contemporary precedents, student will explore and analyze solutions to the interdependence and growing incongruity between the natural environment and societal demands. As a combined media course, students will use a range of technical and conceptual methods, synthesizing previously learned studio experience and skills, examining the potential of found, ready made, and/or recycled materials to fulfill sustainable challenges.

ART 3400. Ceramics II. (3.0 cr. [max 6.0 cr.]; A-F or Audit; prereq 2400 or instructor consent; fall, spring, summer, every year)
Advanced handbuilding and surface enhancement techniques; development of a stylistically consistent body of work.

ART 3405. Fundamentals of Ceramics II. (FINE ARTS; 3.0 cr. [max 6.0 cr.]; prereq 1405 or instructor consent; not for art majors or minors; spring, every year)
Handbuilding, glazing, and firing of earthenware ceramics.

ART 3425. Ceramics II Wheel Throwing. (3.0 cr.; A-F or Audit; prereq 2400, art or art education major or art minor or instructor consent; fall, spring, every year)
Introduction to the potters wheel and clay throwing techniques. Glazing and firing; surface work and enhancement, with conceptual support for pottery and sculptural clay forms.

ART 3500. Jewelry and Metals II. (3.0 cr. [max 6.0 cr.]; A-F or Audit; prereq 2500, art or art education major or art minor or instructor consent; fall, summer, every year)
Advanced application of jewelry techniques and design.

ART 3600. Photography: Alternative Processes. (3.0 cr.; A-F or Audit; prereq 1013, 1607 or 2600, Art major or Art or Photography minor or instructor consent; fall, spring, every year)
Continued experience with photographic concepts using alternative processes techniques within the creative context. Portfolio requirements are project-based. Requires digital camera with adjustable shutter speeds and apertures. Laptop and software required; instruction presented only on the Mac OS

ART 3615. Photography: Inventing with Light. (3.0 cr.; A-F or Audit; prereq 1013, 1607 or 2600, pre-DAP or Studio DAP major or Photography minor or instructor consent; fall, spring, every year)

This course provides a working knowledge of studio lighting equipment and techniques as they apply to the creative production of still photographs and short digital videos. Students will incorporate these lighting techniques, as well as advanced digital image making skills, into their conceptual practice, demonstrating technical and aesthetic skills related to contemporary and historical practice in the art of artificial lighting. Students will conceptualize how the lighting studio can transform their means of creative production. Requires digital still and/or video camera/s with adjustable shutter speeds and apertures. Laptop and software required; instruction presented only on the Mac OS.

ART 3700. Drawing II. (3.0 cr. [max 6.0 cr.]; A-F or Audit; prereq 1006 or 1009 or 1010, art or art education major, pre-art education major or pre-graphic design major, or art minor or instructor consent; fall, spring, summer, every year)
Individually supervised projects supporting involvement in other studio areas.

ART 3715. Figure Drawing. (3.0 cr.; A-F only; prereq 3700, art or art education or graphic design major or art minor or instructor consent; spring, every year)
The study of the human form, its structures and movements related to aesthetic considerations. Intermediate and advanced issues include perspective, space, foreshortening, proportioning and appropriation for the purposes of approaching the figure as an expressive and conceptual tool of art making.

ART 3809. Art in Elementary Education Methods. (3.0 cr.; A-F or Audit; prereq 0903, art education candidate; spring, every year)
Instructional problems based on the growth of artistic expression in children, philosophy of art education, and contemporary problems. Museum and multicultural based experiences are combined with outreach opportunities to develop inclusive elementary art curriculum and assessment.

ART 3811. Teacher as Artist: Postmodern Theory and Practice. (3.0 cr.; A-F or Audit; prereq 0903, [3809 or 3810], Art education major or instructor consent; spring, offered periodically)
Experience the complex role of the teacher as artist in the postmodern classroom and studio. Focuses on building professional expertise in the field of art education, museum education and contemporary artistic practice. Students will plan for an exhibition of their work in Tweed Museum of Art.

ART 3814. Digital Methods in Art Education. (3.0 cr.; A-F or Audit; prereq Art education major or instructor consent; fall, every year)
Theoretical and practical experiences with emerging visual technologies. Assignments will integrate contemporary pedagogical theories of visual culture and digital media in art education. Art projects will use the computer as a creative tool.

ART 3815. Art in Secondary Education. (3.0 cr.; A-F or Audit; prereq 3811, art education

major only or instructor consent; fall, every year)
Nature and objectives of art programs in secondary school; content and methods. Development of secondary art curriculum and classroom site visits.

ART 3907. Typography II. (3.0 cr.; A-F or Audit; prereq 2907, graphic design major or GDM BFA or MGD BBA or instructor consent; laptop required; digital instruction presented only on the Mac platform.; spring, every year)
Advanced exploration of typography concepts and issues in screen and print media.

ART 3922. Graphic Design II. (3.0 cr.; A-F or Audit; prereq 2911, graphic design major or GDM BFA or MGD BBA or instructor consent; laptop required; digital instruction presented only on the Mac platform.; fall, every year)
Continuation of theory and practice of graphic design. Introduction to professional practices. Materials meaning, aesthetics, and practical use.

ART 3933. Graphic Design III. (3.0 cr.; A-F or Audit; prereq 3922, graphic design major or GDM BFA or MGD BBA or instructor consent; laptop required; digital instruction presented only on the Mac platform.; spring, every year)
Continuation of theory and practice of graphic design. Graphic design as an organizational and informative medium and as a purely aesthetic pursuit.

ART 4016. Digital Arts: Advanced Projects. (3.0 cr. [max 9.0 cr.]; A-F or Audit; prereq 3017 or 3018 or 3031 or instructor consent, no grad credit; fall, spring, every year)
Advanced Digital Arts Studio for students interested in exploring interdisciplinary or advanced projects using current or emerging technologies. Students develop self-directed focus and creative project goals. Advanced projects may concentrate on mixed-media print, time-based media, interactive media, installation art, or collaborative art formats. Students hone a body of digital artwork through research experimentation and critique. Laptop required.

ART 4040. Digital Filmmaking: Advanced Projects. (3.0 cr.; A-F only; prereq 2040 or 3040 or instructor consent; fall, spring, every year)
Advanced digital film projects in narrative, experimental, animation, or documentary formats. Students develop a single ambitious project over the semester, defining their own approach and focus. Develop project pitch, including visual concept, production plans, and storyboards. Hone video production technique and digital video editing skills. Emphasis on collaboration and creative process from pre-production through final craft of short digital film for contemporary audience.

ART 4100. Painting III. (3.0 cr. [max 9.0 cr.]; A-F or Audit; prereq 3100, art or art education major or art minor or instructor consent; no grad credit; fall, spring, summer, every year)
Advanced individually supervised projects using both traditional and contemporary painting media and techniques.

ART 4191. Individual Study in Painting. (1.0-3.0 cr. [max 9.0 cr.]; A-F or Audit; prereq Two semesters painting, instructor consent; no grad credit; fall, spring, summer, every year)
Instruction tailored to individual's needs outside of traditional class structure.

ART 4200. Sculpture III. (3.0 cr. [max 9.0 cr.]; A-F or Audit; prereq 3200, art or art education major or art minor or instructor consent; no grad credit; fall, spring, every year)
Sculpture in area of specialized interest.

ART 4291. Individual Study in Sculpture. (1.0-3.0 cr. [max 9.0 cr.]; A-F or Audit; prereq 2 semesters sculpture, instructor consent; no grad credit; fall, spring, every year)
Individual study in sculpture.

ART 4300. Printmaking III. (3.0 cr. [max 6.0 cr.]; A-F or Audit; prereq 3300, art or art education major or art minor or instructor consent; spring, every year)
Further exploration of print processes. Emphasis on refinement of technical skills as well as development of concepts and imagery. Experimentation encouraged in nontraditional, collaborative, and cross-disciplinary approaches. Increased experience in editioning and alternative formats combined with a more comprehensive critical review.

ART 4391. Individual Study in Printmaking. (1.0-3.0 cr. [max 9.0 cr.]; A-F or Audit; prereq 3300, department consent; fall, spring, every year)
Graduate students complete a project by contract with instructor, supported by a research paper.

ART 4400. Ceramics III. (3.0 cr. [max 6.0 cr.]; A-F or Audit; prereq 3400, art or art education major or art minor or instructor consent; no grad credit; fall, spring, summer, every year)
Technical and conceptual refinement of advanced body of ceramic work.

ART 4491. Individual Study in Ceramics. (1.0-3.0 cr. [max 9.0 cr.]; A-F or Audit; prereq 2 semesters ceramics, department consent; fall, spring, summer, every year)
Directed study in specific areas.

ART 4600. Photography: Digital Portfolio. (3.0 cr. [max 9.0 cr.]; A-F or Audit; prereq 1900, 1607 or 2600, art major or art or photography minor or instructor consent; fall, spring, summer, every year)
Intensive digitally-based portfolio development in area of special interest. Selected readings in photographic theory and criticism. Graduate student portfolios are complemented by a related research project. Requires digital camera with adjustable shutter speeds and apertures. Laptop and software required; instruction presented only on the Mac OS.

ART 4650. Alternative Processes Portfolio. (3.0 cr. [max 9.0 cr.]; A-F only; prereq 3600, art or art education major or photography minor or instructor consent; fall, spring, every year)
Intensive portfolio development using alternative contemporary and historic photographic processes in area of special interest. Graduate student portfolios are

complemented by a related research project. Requires both digital and film cameras, at least one of them with adjustable shutter speeds and apertures. Laptop required. Instruction presented only on the Mac OS.

ART 4675. Photography: The Photographic Book. (3.0 cr. [max 9.0 cr.]; A-F only; prereq 4600, art major or photography minor or instructor consent; spring, summer, every year) Creation of one or more individual photographic book projects, with emphasis on effective sequencing of images and appropriate book form for the specific body of work. Selected readings in book arts relating to photography. Graduate student book projects are complemented by a related research project. Requires digital camera with adjustable shutter speeds and apertures. Laptop required; instruction presented only on the MacOS.

ART 4691. Individual Study in Photography. (1.0-3.0 cr. [max 9.0 cr.]; A-F or Audit; prereq 2 semesters of photography, department consent; fall, spring, summer, every year) Graduate students complete a project by contract with instructor, supported by a research paper.

ART 4700. Drawing III. (3.0 cr. [max 6.0 cr.]; A-F or Audit; prereq 3700, art or art education major or art minor or instructor consent; fall, spring, summer, every year) Individually supervised projects supporting involvement in other studio areas. Graduate students produce a technically and conceptually sophisticated portfolio of drawing, supported by a research paper.

ART 4791. Individual Study in Drawing. (1.0-3.0 cr. [max 9.0 cr.]; A-F or Audit; prereq 2 semesters of drawing, instructor consent; fall, spring, summer, every year) Graduate students complete a project in drawing by contract with instructor, supported by a research paper.

ART 4812. Senior Seminar. (3.0 cr.; A-F or Audit; prereq Senior or instructor consent; no grad credit; fall, spring, every year) Current visual arts and design issues investigated through research, lectures, assigned readings, discussion, writing assignments, and presentations.

ART 4813. Senior Seminar II: Studio Practice. (3.0 cr.; A-F or Audit; prereq 4812, Senior or instructor consent, studio art-general major; no grad credit; fall, spring, every year) Preparation for the emerging studio professional in such areas as documenting work, building an exhibition history, and arts-related employment opportunities, through lectures, presentations, discussion, assigned readings, writing assignments, and field experience.

ART 4898. Art BA Senior Exhibition. (1.0 cr.; S-N only; prereq Senior Art BA major, no grad credit; fall, spring, every year) Students, with faculty guidance, exhibit work in department display cases and work is reviewed by a 3-person committee.

ART 4899. Senior Presentation/Exhibition. (1.0 cr.; A-F or Audit; prereq Senior art major,

instructor consent; no grad credit; fall, spring, every year)

Students, singly or in pairs, plan/prepare/present under guidance of faculty/museum staff an exhibition of their work in Tweed Museum of Art or an approved alternative public venue.

ART 4903. Art Education Student Teaching Seminar. (1.0 cr.; A-F or Audit; prereq Art ed major and Educ 4500, EdSe 4600, EIED 4650; concurrent registration is required; no grad credit; fall, spring, every year) For students currently student teaching in art (K-12). Students will share concerns and situations, suggestions, and gain group support. The seminar supplements the field experience and builds on issues of supervision, evaluation, professional development, and the culminating Standards of Effective Practice art education portfolio.

ART 4905. Design Technology II. (3.0 cr.; A-F or Audit; prereq 2905, graphic design major or GDM BFA or MGD BBA or instructor consent; laptop required; digital instruction presented only on the Mac platform.; spring, every year) Advanced concepts and digital program applications for print and web graphic contexts.

ART 4907. Motion Graphics. (3.0 cr.; A-F or Audit; prereq 2911 and graphic design major, or digital art and photography emphasis or Grad Student, or instructor consent; credit will not be granted if already received for 5907; laptop required; digital instruction presented only on the Mac platform.; fall, every year) Introduces aesthetics, mechanics, and meaning of motion graphics.

ART 4908. Interactive Design I. (3.0 cr. [max 6.0 cr.]; A-F or Audit; prereq 3922, graphic design major or GDM BFA or MGD BBA or digital art and photography emphasis or Grad Student or instructor consent; credit will not be granted if already received for 5909; laptop required; digital instruction presented only on the Mac platform.; spring, every year) Interactivity in graphic design, concentrating on computer-based interactive presentations.

ART 4909. Interactive Design II. (3.0 cr. [max 6.0 cr.]; A-F or Audit; prereq 4908, graphic design major, or digital art and photography emphasis or Grad Student, or instructor consent; credit will not be granted if already received for 5910; laptop required; digital instruction presented only on the Mac platform.; fall, every year) Interactivity in graphic design, concentrating on computer-based interactive presentations.

ART 4922. Senior Design Studio I. (3.0 cr. [max 6.0 cr.]; A-F or Audit; =[ART 4893]; prereq 3933 or instructor consent, no grad credit; fall, every year) Exploration of advanced graphic design topics through an extensive project for print and/or screen: research, creative production and development of a presentation system. Done individually or in groups.

ART 4933. Senior Design Studio II. (3.0 cr. [max 6.0 cr.]; A-F or Audit; prereq 4922 or instructor consent, no grad credit; spring, every year)

Professional presentation, portfolio development and professional practice.

ART 4944. Graphic Design IV. (3.0 cr.; A-F or Audit; prereq 3933, no grad credit; fall, every year) Continuation of theory and practice of graphic design. Research-based development of design systems in multiple media.

ART 4955. Graphic Design V. (3.0 cr.; A-F or Audit; prereq 3933, no grad credit; spring, every year) Continuation of theory and practice of graphic design. Advanced projects.

ART 5091. Individual Study in Electronic Arts. (1.0-3.0 cr. [max 9.0 cr.]; A-F or Audit; prereq 1014 or 3016, art or art education major or art minor and instructor consent; fall, spring, every year) Individually supervised projects in electronic arts media.

ART 5793. Intermedia Studio Problems. (1.0-3.0 cr. [max 9.0 cr.]; A-F or Audit; prereq 2 semesters work in each subject area with instructor consent; fall, spring, summer, every year) Directed study emphasizing intermedia concerns.

ART 5991. Independent Study in Graphic Design. (1.0-3.0 cr. [max 9.0 cr.]; A-F or Audit; prereq 2 semesters work in graphic design and graphic design major and instructor consent; fall, spring, summer, every year) Independent work in graphic design

ART 5997. Art Museum Internship. (1.0-3.0 cr. [max 12.0 cr.]; A-F or Audit; prereq 1001, 6 credits ArH; 1 credit for each 45 hrs of work; instructor consent; fall, spring, summer, every year) Supervised practicum in art museum operation

ART 5999. Special Projects in Design. (3.0 cr. [max 6.0 cr.]; A-F or Audit; prereq Graphic design major or Grad Student; instructor consent; fall, spring, every year) Specific projects in graphic design practice.

ART 8333. FTE: Master's. (1.0 cr.; No Grade Associated; prereq Master's student, adviser and DGS consent;) (No description)

ART 8901. Graduate Seminar. (4.0 cr. [max 16.0 cr.]; A-F or Audit; prereq Concurrent registration is required (or allowed) 8980; fall, spring, every year) Critique of student work and discussion of readings. Faculty presentations on design history, criticism, theory, and analysis.

ART 8903. Art Teaching Practicum. (1.0 cr. [max 4.0 cr.]; A-F or Audit; prereq Graduate teaching assistant or instructor consent; fall, spring, every year) Theory of and experience in teaching college-level art.

ART 8980. Graduate Studio. (4.0 cr. [max 16.0 cr.]; A-F or Audit; prereq concurrent registration is required or allowed 8901; Grad student; fall, spring, every year) Production of graphic designs based on problems and topics that are discussed in Art

8901 (Graduate Seminar), in which students enroll concurrently.

ART 8990. M.F.A. Creative Thesis. (3.0-6.0 cr.; A-F or Audit; prereq Grad Student and instructor consent; fall, spring, every year) In consultation with advisor, completion of major project as culmination of M.F.A. studies.

Art History (ARTH)

School of Fine Arts

ARTH 1303. History of World Art I. (HUMANITIES; LE CAT9; GLOBAL PER; 3.0 cr.; A-F or Audit; fall, every year) Development of world art and architecture from prehistory through Middle Ages.

ARTH 1304. History of World Art II. (HUMANITIES; LE CAT9; LEIP CAT09; 3.0 cr.; A-F or Audit; spring, every year) Development of world art and architecture from Renaissance to present.

ARTH 1305. Survey of Non-Western Art. (HUMANITIES; GLOBAL PER; 3.0 cr.; A-F or Audit; fall, every year) Survey of non-Western art examines the visual arts of the Americas, Asia and Africa. This course aims to develop a critical understanding of art forms from non-Western cultures. We will examine a range of visual material including painting, sculpture, ceramics, and architecture, from prehistoric times to present. We will also examine the critical debates that frame the study of non-Western art.

ARTH 1400. Paris in the Age of Impressionism: Honors Seminar. (HUMANITIES; LE CAT9; 3.0 cr.; A-F or Audit; prereq honors student; fall, odd years) Paris in art and literature, 1860-1900.

ARTH 2300. The City as a Work of Art. (HUMANITIES; LE CAT9; LEIP CAT09; 3.0 cr.; A-F only; spring, every year) The city as a work of art and center of culture. A study of artistic representations combined with references to primary texts. Use of case studies of particular urban centers to explore the rise of the city and the history of urban planning around the globe.

ARTH 2380. A Global History of Contemporary Art. (3.0 cr.; A-F or Audit; spring, every year) This course maps the trajectories of art and design from the 1970's to the present, paying close attention to: global movements; the terrains of the category called contemporary art; the modes through which globalization affects and challenges this terrain; and the role of art in world politics.

ARTH 2390. American Art of the 20th Century. (HUMANITIES; LE CAT9; CDIVERSITY; LECD CAT09; 3.0 cr.; A-F or Audit; fall, every year) American art from Armory Show of 1913 to present examined in social and historical contexts.

ARTH 2815. Women Artists in History. (FINE ARTS; LE CAT9; LECD CAT09; 3.0 cr.; A-F or Audit; summer, offered periodically)

Survey of contributions women have made in the visual arts throughout history.

ARTH 2892. Independent International Study. (1.0-3.0 cr. [max 6.0 cr.]; A-F or Audit; prereq Instructor consent; this course cannot be substituted for any course in the art history major or minor.; summer, offered periodically) An elective course for students traveling abroad with an instructor outside of the United States. Includes art history lectures, site visits, scholarly readings, and assigned writings. Credits may also be granted for travel, research, and/or research and/or internships in/at international museums or at foreign sites. Requires advanced planning and final research paper/project. Credits granted depends on nature and scope of project.

ARTH 3110. Art of the Ancient Americas. (3.0 cr.; A-F or Audit; spring, offered periodically) A selective visual introduction to the Americas before the Spanish Conquest, focusing on the form, function, and symbolism of Ancient American art and architecture and its role in the construction and maintenance of political power, religious belief and practice, concepts of space, and bodily performance.

ARTH 3120. Art of Colonial Latin America. (3.0 cr.; A-F or Audit; fall, offered periodically) This course will cover the art and architecture of Colonial Latin America, from the time of the Spanish Conquest of the Americas through the mid-19th century period of independence and nationalization. Adopting a "Global Renaissance" approach, we will examine the numerous points of contact and encounter that contribute to the colonial period in the Americas.

ARTH 3130. Modern and Contemporary Mexican Art. (3.0 cr.; A-F or Audit; fall, offered periodically) This course focuses on modern and contemporary visual culture of Mexico from approximately 1860 to the present. It examines the dominant art forms of late nineteenth and twentieth century Mexico: these include post-revolutionary muralism and social realism; movements, artists, and visual genre outside of the nationalist traditional; abstraction, surrealism, the international avant-garde, urban planning, photography, print culture, film, performance, and conceptual art.

ARTH 3140. Women in Art/Visual Culture in Latin America. (3.0 cr.; A-F or Audit; fall, offered periodically) This course focuses on representations of women and by women in the art and visual culture of Mexico and other Latin American countries, examining the many ways in which the image of female body in Latin America has been used to construct and typify regional understandings of gender, class, racial, and national identities. Distinguishing between women as subject matter and women as producers of art, we will also look to female artists in the nineteenth, twentieth and twenty-first centuries to investigate how they might be engaging with and/or critiquing traditional iconographical representations.

ARTH 3150. Contemporary Global Exhibition. (3.0 cr.; A-F or Audit; spring, offered periodically) This class will examine the transformation of art worlds and urban spaces by the development of contemporary global exhibitions, such as various Art Biennales now held around the globe, Art Basel, Documenta, and the Sculpture Projects Munster. In particular, we will examine how such exhibitions, as well as globalization in general, have transformed the way art is created, distributed, and received.

ARTH 3320. Ancient Art. (3.0 cr.; A-F or Audit; fall, even years) Art and architecture of Minoans, Mycenaeans, Greeks, and Romans.

ARTH 3330. Renaissance Painting and Sculpture. (3.0 cr.; A-F or Audit; spring, every year) Developments in Europe, 1300-1600.

ARTH 3340. Baroque and Rococo Art. (3.0 cr.; A-F or Audit; spring, every year) Developments in European painting and sculpture during 17th and 18th centuries.

ARTH 3360. European Art in an Age of Revolution. (3.0 cr.; A-F or Audit; fall, spring, offered periodically) European art from French Revolution through pan-European revolutions of 1848, examined in social and historical contexts.

ARTH 3361. European Art: Impressionism and Post-Impressionism. (3.0 cr.; A-F or Audit; fall, spring, offered periodically) European art from mid-19th century through 1900, including late Realism, Impressionism, pan-European Symbolism and Art Nouveau, examined in social and historical contexts.

ARTH 3370. European Art, 1900-1945. (3.0 cr.; A-F or Audit; fall, spring, offered periodically) Includes Cubism, Futurism, Dada, de Stijl, German Expressionism, New Objectivity, Surrealism, art of Bauhaus, and art of National Socialists, examined in social and historical contexts.

ARTH 3380. Art of the United States: Colonial to Impressionist. (3.0 cr.; A-F or Audit; fall, spring, offered periodically) U.S. art from colonial period through 1900, examined in social and historical contexts.

ARTH 3395. Special Topics: (Various Titles to be Assigned). (1.0-4.0 cr. [max 24.0 cr.]; A-F or Audit; fall, spring, every year) Title announced before course is offered.

ARTH 4330. Florence and the Courts: History of Art & Architecture in Fifteenth-century Italy. (3.0 cr.; A-F or Audit; prereq 3330, Art History major or instructor consent; no grad credit; fall, odd years) Focuses on the art and architecture of fifteenth-century Italy in Florence, Mantua, Milan, Ferrara, and Urbino. As the so-called birthplace of the Renaissance, Republican Florence has been seen as the origin point of Renaissance art; its rich humanist tradition nurtured an interest in arts inspired by classical antiquity.

Nevertheless, more peripheral areas, like the courts also played a critical role in the development and definition of Renaissance art.

ARTH 4491. Directed Study in 19th- and 20th-Century European Art. (1.0-4.0 cr. [max 9.0 cr.]; A-F or Audit; prereq Graduate Student or instructor consent; max 6 credits for undergrads, max 9 credits for grad; fall, spring, every year)

Independent research in an area of the student's interest; fundamental knowledge of period or subject required.

ARTH 4620. History of Photography. (3.0 cr.; A-F or Audit; prereq 2390 or 3370 or art or art education major or communication arts or photography minor or instructor consent; spring, every year)

Conceptual and technical evolution of the photographic medium from its inception to the present, with special emphasis upon its development within art, design and new media contexts.

ARTH 4691. Directed Study in the History of Photography. (3.0-4.0 cr. ; A-F only; prereq instructor consent, concurrent registration in ARTH 4620 is not allowed; fall, spring, odd years)

Independent research in an area of the student's interest, culminating in a paper or project. Fundamental knowledge of subject required. Graduate student must complete a substantial research paper or project on a topic chosen in consultation with instructor

ARTH 4901. History of Graphic Design. (3.0 cr.; A-F or Audit; prereq Graphic Design major or Art History major or minor or Studio Art major or Digital Art and Photography minor or Arts in Media minor or Grad student or instructor consent; spring, every year)

Introduction to the history of graphic design, from the origins of written communication to present. Graduate students complete a substantial research paper or project on a topic in consultation with the instructor.

ARTH 4991. Directed Study in the History of Graphic Design. (1.0-4.0 cr. [max 8.0 cr.]; A-F or Audit; prereq Grad student or instructor consent; spring, every year)

Independent research in an area of the student's interest, culminating in a paper or project. Fundamental knowledge of subject required.

ARTH 4999. Senior Paper Art History. (1.0 cr.; A-F or Audit; prereq Major in Arth with 90 credits, instructor consent, no grad credit; fall, spring, every year)

Students write and/or revise a final paper demonstrating their competency in art historical research and writing.

ARTH 5191. Directed Study in Ancient and Medieval Art. (1.0-3.0 cr. [max 9.0 cr.]; A-F or Audit; prereq instructor consent; max 6 credits for undergraduates; fall, spring, offered periodically)

Independent research in an area of art history pertinent to the interests of the student. Fundamental knowledge of period or subject required.

ARTH 5391. Directed Study in Renaissance and Baroque Art. (1.0-3.0 cr. [max 9.0 cr.]; A-F or Audit; prereq instructor consent; max 6 credits for undergraduates; fall, spring, every year)

Independent research in an area of art history pertinent to the interests of the student. Fundamental knowledge of period or subject required.

ARTH 5591. Directed Study in American Art. (1.0-3.0 cr. [max 9.0 cr.]; A-F or Audit; prereq instructor consent; max 6 credits for undergraduates; fall, spring, every year)

Independent research in an area of art history pertinent to the interests of the student. Fundamental knowledge of period or subject required.

Astronomy (AST)

Swenson College of Science and Engineering

AST 1040. Introductory Astronomy. (NAT SCI; LE CAT5; 3.0 cr.; A-F or Audit; fall, spring, summer, every year)

Survey of present knowledge of solar system, interstellar space, stars, galaxies, and universe. Historical development of astronomy as a science. Taught in day school and in Individualized Learning Program format.

AST 2040. The Solar System. (3.0 cr.; A-F or Audit; prereq 1040, Math 1250 or instructor consent; fall, spring, summer, offered periodically)

Survey of terrestrial and jovian planets and their satellites; asteroids, comets, interplanetary debris; examination of lunar rocks and meteorite samples when available; origin and evolution of solar system.

AST 4110. Observational Astronomy. (3.0 cr.; A-F or Audit; prereq Phys 2012 or instructor consent; fall, even years)

Applied principles of astronomical observation; review of optical telescopes and mounts; locating and tracking objects; remote telescope operation, CCD, CMOS, and film astrophotography, astrometry, photometry, spectroscopy, astronomical image processing and analysis.

Behavioral Sciences (BHSC)

University of Minnesota Medical School Duluth

BHSC 5432. Clinical Psychopharmacology. (3.0 cr.; spring, every year)

Clinical application of pharmacological principles; overview of major psychological disorders, such as depression, anxiety, psychosis, ADHD, substance abuse, and sleep disorders; appropriate treatments of psychological disorders with psychotropic medications. Clinical guidelines for psychotropic drugs.

BHSC 5491. Problems in Medical Behavioral Sciences. (1.0-6.0 cr. ; A-F or Audit; prereq Med or upper div or Grad Student, instructor consent; max 6 cr to grad program; fall, spring, summer, every year)

Independent study on a tutorial, seminar, or lecture basis. Investigative work, lecture

material, and/or appropriate reading and discussions designed according to interest and capabilities of individual student.

BHSC 5591. Social and Behavioral Medicine II. (4.0 cr.; P-N Grade Basis; prereq Registered med student, instructor consent; spring, every year)

Selectives on topics in general medical behavioral science, typically including women's mental health issues, chronic pain, socialization into medicine, aging, hypnosis and others.

BHSC 6652. Social and Behavioral Medicine I. (4.0 cr.; P-N Grade Basis; prereq Regis med student; summer, every year)

Human psychological development throughout life; normal cognitive, learning, social, and personality development; problems expressed during various stages of life in the family and other settings. Assessment/treatment described as relevant to practice of family medicine.

Biochemistry and Molecular Biology (MDBC)

Medical School - Duluth Campus

MDBC 3194. Biochemistry Undergraduate Research. (1.0-3.0 cr. ; S-N or Audit; prereq instructor consent; fall, spring, summer, every year)

Laboratory experience in biochemistry and molecular biology research.

MDBC 5201. Topics in Biochemistry. (3.0 cr.; A-F or Audit; prereq Chem 3322 or Chem 4341 or instructor consent; fall, spring, offered periodically)

In-depth coverage and expansion of selected biochemical principles introduced in introductory undergraduate courses

MDBC 5202. Cellular and Molecular Biology. (3.0 cr.; A-F or Audit; prereq Biol 2102 or Biol 5231 or Chem 4342 or instructor consent; fall, spring, offered periodically)

In-depth coverage of selected topics in cellular and molecular biology. Most topics will have been introduced in undergraduate courses.

MDBC 5501. Neurobiochemistry. (2.0 cr.; A-F or Audit; prereq Chem 3322 or Chem 4351 or instructor consent; spring, every year)

Current concepts on anatomical and compositional properties of brain; membranes and transport; neurotransmission; receptors and signal transduction mechanisms; energy, carbohydrate, protein, lipid, and nucleic acid metabolism; development and diseases of the central nervous system.

MDBC 8151. Biochemistry Seminar. (1.0 cr. [max 4.0 cr.]; S-N or Audit; prereq Biochemistry or Chemistry Graduate Student or instructor consent; fall, spring, every year)

Current topics in biochemistry.

MDBC 8294. Current Research Techniques. (1.0-3.0 cr. [max 4.0 cr.]; S-N or Audit; prereq Biochemistry or Chemistry Graduate Student or instructor consent; fall, spring, every year)

Research projects in biochemistry, each carried out in research lab of a faculty member.

MDBC 8333. FTE: Master's. (1.0 cr.; No Grade Associated; prereq Master's student, adviser and DGS consent; fall, spring, every year)
(No description)

MDBC 8444. FTE: Doctoral. (1.0 cr.; No Grade Associated; prereq Doctoral student, adviser and DGS consent; fall, spring, every year)
(No description)

MDBC 8666. Doctoral Pre-Thesis Credits. (1.0-6.0 cr. [max 12.0 cr.]; No Grade Associated; prereq Max 6 cr per semester or summer; doctoral student who has not passed prelim oral; no required consent for the first two registrations up to 12 cr; departmental consent for the third and fourth registrations up to an additional 12 cr, or 24 cr total (for doctoral students admitted summer 2007 and beyond; doctoral students admitted prior to summer 2007 may register up to 4 times totaling 60 cr); fall, spring, summer, every year)
(No description)

MDBC 8777. Thesis Credits: Master's. (1.0-18.0 cr. [max 50.0 cr.]; No Grade Associated; prereq Max 18 cr per semester or summer; 10 cr total required (Plan A only); fall, spring, every year)
(No description)

MDBC 8888. Thesis Credits: Doctoral. (1.0-24.0 cr. [max 100.0 cr.]; No Grade Associated; prereq Max 18 cr per semester or summer; 24 cr required; fall, spring, every year)
(No description)

Biology (BIOL)

Swenson College of Science and Engineering

BIOL 1001. Biology and Society. (NAT SCI; LE CAT4; SUSTAIN; 4.0 cr.; A-F or Audit; prereq For nonmajors; fall, spring, every year)
This course covers basic biology as it pertains to contemporary issues. Biology coverage includes cell biology, genetics, evolution and ecology. In addition to helping students understand biology, students will learn to more critically evaluate science that is presented in the media. (3 hrs lect, 2 hrs lab)

BIOL 1010. Home Horticulture. (NAT SCI; LE CAT5; 3.0 cr.; A-F or Audit; spring, every year)
Concepts of basic botany, plant identification, growth and culture with practical application to sustainable landscaping, vegetable gardening, fruit culture, house plants and flower garden design. Labs include plant propagation, grafting, seed propagation, and an experiment using the scientific methods, there will be a lab report, a paper, a class presentation, a design project and two field trips.

BIOL 1011. General Biology I. (NAT SCI; LE CAT4; 5.0 cr.; A-F or Audit; prereq 1 yr high school Chem or 1 sem college Chem, Math ACT 21 = or 1 sem college math or min 15 cr. SCSE student, or student in exercise science or athletic training or teaching life science or teaching earth and space science or teaching physical science or environment and sustainability or recreation-outdoor

education or B.A. major in biology or chemistry or geological sciences.; fall, spring, every year)
Fundamental concepts of biology, including chemical basis of life, cell structure and function, energy transformations, photosynthesis, cellular respiration, genetics, molecular biology, DNA technology, development, origin of life, and evolution. (4 hrs lect, 2.5 hrs lab)

BIOL 1012. General Biology II. (SUSTAIN; 5.0 cr.; A-F or Audit; prereq A grade of C- or better in 1011; fall, spring, every year)
Fundamental concepts of biology, including classification and diversity of life, anatomy, physiology, and development of prokaryotes, protists, fungi, animals, and plants; behavior; population, community, and ecosystem ecology. (4 hrs lect, 2.5 hrs lab)

BIOL 1087. Freshman Seminar: Darwinian Medicine. (NAT SCI; LE CAT5; 3.0 cr.; A-F or Audit; prereq Freshman, fewer than 30 credits; fall, spring, offered periodically)
Darwinian medicine integrates evolutionary explanations into understanding human vulnerabilities to disease. This course introduces principles of evolution including natural selection, adaptation and phylogeny within Darwinian medicine's major subject categories: defenses, infection, novel environments, genes, design compromises, and evolutionary legacies.

BIOL 1094. Freshman Seminar: Northern Stream Ecosystems and the Angler. (NAT SCI; LE CAT5; 3.0 cr.; A-F or Audit; prereq Freshman, fewer than 30 credits; fall, offered periodically)
Fundamental concepts of nature and history of stream ecosystems, their inhabitants, and ecological concepts of stream organization in addition to appreciation of stream conservation and angling. Acquisition of skills and techniques for participation in the sport of flyfishing.

BIOL 1098. Freshman Seminar: Oceans and Human Health. (LE CAT5; 3.0 cr.; A-F or Audit; prereq Freshman fewer than 30 credits, high school biology and chemistry; fall, odd years)
This multidisciplinary course will explore the interactions between the marine environment and human health. As terrestrial resources continue to be depleted, humans are exploring the oceans for additional sources of food and material. The students will be exposed to the marine environment through in class viewing of the award winning Blue Planet video series. We will investigate the consequences of both exploration and exploitation of the marine environment both in terms of marine biology and human health.

BIOL 2101. Cell Biology. (3.0 cr.; A-F or Audit; prereq A grade of C- or better in both 1011 and 1012, ((Chem 1152 or Chem 1162 or (Chem 1155 and 1156)), (Chem 2521 or Chem 2541), may be taken without lab BIOL 2102; fall, spring, every year)
Structure and function of prokaryotic and eucaryotic cells, including cell surface, membranes, organelles, cytoskeleton, cell

growth, cell physiology, and experimental methods used in cell studies. (3 hrs lect)

BIOL 2102. Cell Biology Laboratory. (2.0 cr.; A-F or Audit; prereq A grade of C- or better in both 1011 and 1012, concurrent registration is allowed for 2101, (Chem 2521 or Chem 2541); fall, spring, every year)
Contemporary cell biology research techniques, hypothesis testing and communication of results.

BIOL 2201. Genetics. (3.0 cr.; A-F or Audit; prereq A grade of C- or better in both 1011 and 1012; may be taken without lab BIOL 2202; fall, spring, every year)
Basic principles of Mendelian inheritance, molecular genetics, chromosomal aberrations, and population genetics. (3 hrs lect)

BIOL 2202. Genetics Laboratory. (2.0 cr.; A-F only; prereq A grade of C- or better in 1011, 1012 and 2201 (concurrent registration is allowed for 2201); fall, spring, every year)
Writing intensive course that uses an array of experimental approaches to gain understanding of the principles of genetics.

BIOL 2512. Biology of HIV and AIDS. (3.0 cr.; A-F or Audit; prereq 1012; summer, every year)
A comprehensive overview of the current AIDS pandemic ranging from molecular and biomedical aspects to societal and psychological aspects. Molecular biology of HIV, the immune system's response, diagnosis, prevention, treatment, and social implications will be discussed.

BIOL 2763. Biology of Women. (NAT SCI; LE CAT5; CDIVERSITY; LECD CAT05; 2.0 cr.; A-F or Audit; prereq 1012; spring, summer, every year)
Fundamental principles of biology unique to women. Evolution of sex and gender; sex determination, differentiation, and development; sexual brain differences; anatomy and physiology; menstruation; oogenesis; ovulation; fertilization; pregnancy and birthing; birth control; menopause; aging; cancer; and nutrition. (2 hrs lect)

BIOL 2769. Human Anatomy. (4.0 cr.; A-F or Audit; prereq 1011, 1012; credit will not be granted if already received for 1761; fall, every year)
Lectures in the structure of organs and tissues of the major body systems including skeletal, articular, muscular, nervous, respiratory, digestive, cardiovascular, urinary and reproductive in the context of the science of biology. Lecture material is reinforced with inquiry-based laboratory studies involving human bones, cat dissections, sheep organs, and microscopic study of tissues. Suitable for biology majors/minors and pre-professional students interested in entering health related professions. Provides (2hrs lect, 4hrs lab).

BIOL 2801. General Ecology. (3.0 cr.; A-F or Audit; prereq A grade of C- or better in both 1011 and 1012; may be taken without lab BIOL 2802; fall, spring, every year)
Relationships between life and environment for individuals, populations, communities, and

ecosystems; surveys of environmental factors and biomes. May be taken without lab 2802. (3 hrs lect)

BIOL 2802. Ecology Laboratory. (2.0 cr.; A-F or Audit; prereq A grade of C- or better in 1011, 1012 and 2801, concurrent enrollment is allowed in 2801.; fall, every year)
Writing-intensive course that introduces sampling, data analysis and interpretation, hypothesis testing, ethical considerations in scientific practice. Includes field studies (4 hrs lab)

BIOL 3101. Molecular Biology of Cancer. (3.0 cr.; A-F or Audit; prereq 2101; summer, every year)
Overview of mechanisms underlying the development of human cancer. Topics include intracellular signaling systems including oncogenes and tumor suppressors, cell cycle, tumorigenesis, multi-step carcinogenesis, invasion and metastasis and genetic instability in cancer. The detection and modern treatment of cancer will also be discussed.

BIOL 3102. Cell Biology of Human Disease. (3.0 cr.; A-F or Audit; prereq 2101; summer, odd years)
Topics in human cellular biology as related to human diseases. A focus on learning to read primary literature and critically analyze and communicate scientific ideas.

BIOL 3301. Patterning the Embryo. (3.0 cr.; A-F or Audit; prereq 1011, 1012, Min 60 cr; fall, every year)
Important topics in developmental biology from the historical literature up to recent presentations with focus on learning how to read and critically analyze primary literature, and how to communicate ideas in written and oral scientific presentations.

BIOL 3501. Outreach to the K-12 Science Classroom. (3.0 cr.; A-F or Audit; prereq 2201 and instructor consent; spring, every year)
Undergraduates in this course will work with K-12 teacher partners to develop new hands-on science projects that will improve the opportunities for K-12 school students to do experimental science and learn about the biological sciences.

BIOL 3601. Plant Diversity. (3.0 cr.; A-F or Audit; prereq 1012; fall, every year)
Evolutionary survey of plants, focusing on diversity of life histories and patterns of organization. Fossil and extant groups, including algae, fungi and nonvascular and vascular land plants. (2 hours lecture, 3 hours lab, field trip)

BIOL 3603. Plant Taxonomy. (3.0 cr.; A-F or Audit; prereq 1012; spring, every year)
Introduction to taxonomy of vascular plants, emphasizing seed plants; representative families; terminology; literature; use of keys. (2 hrs lect, 2 hrs lab)

BIOL 3701. Animal Diversity. (4.0 cr.; A-F or Audit; prereq 1012; spring, every year)
Survey of major animal phyla, focusing on phylogeny, anatomy, physiology, and ontogeny. (2 hrs lect, 4 hrs lab)

BIOL 3703. Animal Physiology. (3.0 cr.; A-F or Audit; prereq 1011, 1012, one semester college chemistry; fall, every year)
Examination of principles, patterns, and mechanisms of biological function from the level of cells and tissues to the whole animal. Primary focus on comparative vertebrate physiology. (2 hours lecture, 2 hours lab)

BIOL 3760. Marine Biology. (3.0 cr.; A-F only; prereq 1011, 1012; spring, odd years)
A multidisciplinary approach will be used to explore the diverse ecosystems of the marine realm. Emphasis will be on the ecological and physiological adaptations that have allowed animals to colonize habitats ranging from the intertidal zone to the abyss. A field trip to the Shedd Aquarium will serve as a capstone to the course. (3 hours lecture, field trip) Course fee required.

BIOL 3761. Field Studies in Marine Biology. (4.0 cr. [max 8.0 cr.]; A-F or Audit; prereq 1011 or instructor consent; Course may only be repeated if location is different.; summer, offered periodically)

Introduction to the marine environment by visiting either US ie Friday Harbor, WAS or MBL, Woods Hole, MA) or International (ie Leigh, New Zealand) marine lab and conducting both laboratory and field research. Topics include ecology, animal physiology, animal behavior, ichthyology and fisheries biology. Lectures will precede daily field trips where students will make in situ measurements and/or bring specimens back to the laboratory for study.

BIOL 3802. Evolution. (SUSTAIN; 3.0 cr.; A-F or Audit; prereq A grade of C- or better in all of the following Biology courses 1011, 1012, 2201 or IBS Grad student; credit will not be granted if already received for 4801 or 4802; fall, spring, every year)

Origin, history, opposition, and evidence supporting evolutionary ideas. Basic concepts: origin of life, phylogeny, biological history, mechanisms of evolutionary change, population genetics, speciation, tempo of evolution, macroevolution, extinction, biogeography, evolution of social systems, altruism. (3 hours lecture)

BIOL 3830. Aquatic Food Webs. (3.0 cr.; A-F or Audit; prereq 1012; summer, offered periodically)
Classic and modern topics in aquatic food web ecology including biogeography, predator-prey interactions, competition, life-history strategies, and energy flow. Emphasis on phytoplankton, zooplankton, fish, and macroinvertebrates. Instruction includes lectures, field and laboratory exercises, and reading and discussion.

BIOL 3835. Freshwater Ecology. (3.0 cr.; A-F or Audit; prereq 2801 or concurrent; spring, odd years)
Exploration of freshwater habitats and their biological diversity with emphasis on how human behavior is affecting those habitats and biodiversity.

BIOL 3987. Biology Seminar. (1.0 cr.; A-F only; prereq Minimum 90 credits, Biology or

Cell and Molecular Biology major; credit will not be granted if already received for 3997 AND 3998; fall, spring, every year)
Prepare, attend, evaluate, and discuss the content and mechanics of department seminars. Students also prepare an oral presentation of their field, lab, or library research findings.

BIOL 3990. Special Topics: (Various Titles to be Assigned). (1.0-5.0 cr. ; prereq 1012; fall, spring, summer, offered periodically)
Specific topics submitted for biology department review. Topic announced before course offered.

BIOL 3993. Laboratory Teaching Experience. (1.0-2.0 cr. ; S-N or Audit; prereq instructor consent required, biol or cell biol major, 90 cr incl 25 cr Biol; max 2 cr may be applied toward Biol major; fall, spring, summer, every year)
Participation in teaching biology lab courses: help set up labs, participate in teaching of labs, and share in instruction of review labs.

BIOL 3994. Undergraduate Research. (1.0-3.0 cr. [max 6.0 cr.]; S-N or Audit; prereq A grade of C or better in both 1011 and 1012, 60 cr, department consent required; max 4 cr may be applied to biol or cell biol major as upper div elective; fall, spring, summer, every year)
Advanced independent work in special fields.

BIOL 3996. Internship in Biology. (1.0-2.0 cr. ; S-N or Audit; prereq A grade of C- or better in both 1011 and 1012, department consent required; max 1 cr may be applied to biol or cell biol major; fall, spring, summer, every year)
Credit given for professional work experience outside an academic department. Requires prior department approval and coordination with faculty sponsor.

BIOL 4199. Frontiers in Cell Biology. (2.0 cr.; A-F or Audit; prereq 2101, 2201, 90 cr, IBS Grad Student; credit will not be granted if already received for 5199; fall, offered periodically)
Analysis and discussion of current literature and topics.

BIOL 4231. Molecular Biology. (3.0 cr.; A-F only; prereq A grade of C- or better in both 2101 and 2201, (CHEM 3322 or 4351), or IBS Grad student; credit will not be granted if already received for 5231; spring, every year)
Contemporary molecular biology techniques, linkage analysis, mutation, DNA repair and recombination, genetics of viruses and bacteria, transposable genetic elements, genetics of mitochondria and chloroplasts, genomics, genetic control of animal development and the vertebrate immune system. (3 hours lecture)

BIOL 4233. Genomics. (3.0 cr.; A-F or Audit; prereq 3802 or IBS grad student; credit will not be granted if already received for 5233; spring, every year)
A survey of current research in genome structure and evolution, and some of the bioinformatics tools used to analyze genomic data; topics include genomic data collection, gene and genome duplication, transposable

elements, comparative and functional genomics

BIOL 4361. Developmental Biology. (3.0 cr.; A-F or Audit; prereq 2101, 2201 or IBS Grad student; credit will not be granted if already received for 5361; spring, every year)
Molecular and cellular mechanisms of development, emphasizing animal systems and including cell cycle, gametogenesis, fertilization, morphogenetic movements, differentiation of cell types, cell-cell interactions, pattern formation, gene expression, organogenesis, metamorphosis, regeneration, and aging. (2 hrs lect, 3 hrs lab)

BIOL 4501. General Microbiology. (4.0 cr.; A-F or Audit; prereq 2101 or IBS Grad student; spring, every year)
Morphology of microorganisms; growth; environmental and physiological types; physical and chemical control; taxonomy; viruses; genetics of bacteria; practical applications, including medical, water, soil, and food microbiology. (2 hrs lect, 4 hrs lab)

BIOL 4503. General Microbiology offered in Wroclaw, Poland. (4.0 cr.; A-F or Audit; prereq 2101, department consent required; no grad credit; summer, every year)
Microbial cell structure, metabolism, nutrition, growth, and genetics. Structure and pathogenicity of viruses. Microbial taxonomy and diversity. Microbial diseases, immunity, serology, and control. Applied and environmental microbiology including medical, food, aquatic, and soil microbiology. Offered at Wroclaw University, Poland. (2 hour lecture, 4 hours lab)

BIOL 4511. Medical Microbiology. (3.0 cr.; A-F or Audit; prereq 4501, no grad credit; fall, every year)
Overview of the dynamic relationships between human hosts and pathogenic microbes. Topics include the human immune system, antimicrobial therapy, pathogenic bacteria, viruses, and pathogenic eukaryotic species.

BIOL 4604. Plant Physiology. (4.0 cr.; A-F or Audit; =[BIOL 5603, BIOL 4603]; prereq 2201 and 1 year college chemistry or IBS grad student; spring, every year)
Mechanisms underlying plant function, growth and development: metabolism, water relations, mineral nutrition, transport, internal and external regulators of growth and development, stress physiology, biotechnology. Lab exercises evaluate physiological processes that enable plants to grow under varied conditions found in nature, such as water relations, mineral nutrition, metabolism, growth and development.

BIOL 4631. Plant Cell and Molecular Biology. (3.0 cr.; A-F or Audit; prereq 2101, 2201 or IBS Grad Student; fall, spring, offered periodically)
Molecular processes and structures unique to plant cells; methods for the study of plant cells, genes and genomes. Structure and function of plant-specific organelles, endomembrane trafficking, cellular responses to biotic and abiotic stress, signal transduction, plant biochemistry and biotechnology.

BIOL 4731. Entomology. (3.0 cr.; A-F or Audit; prereq 1012 or IBS Grad student; fall, every year)
Structure, life history, ecology, classification, evolution, principles of control, and significance of insects in our society. Field collections. (2 hrs lect, 3 hrs lab and field)

BIOL 4761. Ichthyology. (3.0 cr.; A-F or Audit; prereq 2801 or IBS Grad student; spring, every year)
Physiologic, taxonomic, ecologic, economic, and behavioral aspects of fishes. Lab emphasis on fishes of Great Lakes region, including field conducted independent study. (2 hrs lect, 3 hrs lab, field)

BIOL 4763. Ornithology. (3.0 cr.; A-F or Audit; prereq 2801 or IBS Grad student; spring, offered periodically)
Lab and field identification of birds, their migration and habitats; biological, taxonomic, and economic considerations. (2 hours lecture, 2 hours lab and field)

BIOL 4764. Mammalogy. (3.0 cr.; A-F or Audit; prereq 2801 or IBS Grad student; fall, offered periodically)
Origin, taxonomy, distribution, physiology, ecology and behavior of mammals. Laboratory and fieldwork includes collection, preparation and identification of Minnesota species. (2 hrs lecture, 3 hours lab, field)

BIOL 4803. Ecology Field Methods: Identification and Natural History of Terrestrial and Aquatic Organisms. (4.0 cr.; A-F or Audit; prereq 1011, 1012, if you have taken Biol 3990 T:ID and Field Methods for ecological study of terrestrial and aquatic animals and plants, credit will not be granted for Biol 4803, no grad credit; summer, offered periodically)
Provides undergraduates with an introduction to field ecology, including field identification of northern Minnesota terrestrial and aquatic flora and fauna and basic field methods to quantify distribution and abundance of plants and animals. Sampling methods taught include releves, variable radius plots, point-counts, random plots, line transects, calling surveys, dip nets and tow nets. Fieldwork will include exploration of issues related to project design and data collection, summarization and evaluation. Additional hours in the field may be required beyond regular course hours.

BIOL 4805. Ecological Invasions. (2.0 cr.; A-F or Audit; prereq 2801 or IBS Grad student; spring, offered periodically)
Characteristics of successful invaders, ecological effects of invasive species, genetic effects on native populations, impacts on human societies, options for control, relationships to other global changes. Case studies

BIOL 4807. Plant Physiological Ecology offered in Poland. (4.0 cr.; A-F or Audit; prereq 2101 or 2801, instructor consent, no grad credit; summer, offered periodically)
Physiological mechanisms which individual plants, plant populations, and plant communities have evolved in response to

their abiotic and biotic environment. Integrated lecture/laboratory/field study course offered at Wroclaw and Karpacz Ecological Field Station in the Karkonosz Mountains, Poland.

BIOL 4818. Biotic Response to Climate Change. (2.0 cr.; A-F or Audit; prereq Biol 2201 or IBS Grad student; spring, offered periodically)
Many species are already responding to climate change, as evidenced by earlier budburst, flowering, and arrival of insect and bird pollinators. In only a few cases can we distinguish between phenotypic responses to longer growing seasons and warmer temperatures (plasticity) and evolutionary change in response to altered patterns of natural selection. Climate change will pose strong evolutionary challenges to native populations. In this course we will explore the fundamental response of the biota to these changes" extinction, migration, and adaptation.

BIOL 4850. Evolution in Agriculture: Crops, Animals, Weeds, and Insects. (3.0 cr.; A-F or Audit; prereq 2201, 3802 or IBS graduate student; fall, odd years)
In this course we will examine the evolutionary genetics underlying the process of plant and animal domestication, and the evolution of weeds and insect pests in the new environment provided by human-initiated agriculture. Classical readings on the origin of agriculture and agricultural pests (weeds and insects) and the latest findings in this constantly changing field will be examined. Students will learn key concepts regarding the response of plants and animals to natural and artificial selection, and the application of population genetics, phylogenetics, quantitative genetics, and genetic mapping to major questions in agricultural genetics. Past and current challenges in agricultural productivity and sustainability will be addressed throughout the course.

BIOL 4891. Animal Behavior. (2.0 cr.; A-F or Audit; prereq 2801 or IBS Grad student; fall, offered periodically)
Known behavior of various vertebrate and invertebrate phyla, emphasizing adaptive significance and the genetics and ontogeny of behavioral patterns. Mating, aggressive, nutritive, and nurturing behavior and relation to ecology of animal populations. (2 hrs lect)

BIOL 4992. Senior Seminar: Classic Readings in Natural History. (1.0 cr.; S-N or Audit; prereq Seniors who have declared a natural history minor, no grad credit; spring, every year)
Readings and discussion of the classics of natural history writing from authors such as Charles Darwin, Charles Lyell, John Wesley Powell, Peter Freuchen, Rachel Carson, Paul Errington, and E.O. Wilson, among others.

BIOL 5001. Teaching and Learning in the Life Sciences. (1.0 cr.; S-N only; prereq grad student or prior teaching experience; instructor consent; spring, every year)
Exploration of learning theory and educational practices designed to help develop skills in the classroom. Topics will include: learning styles,

classroom management, assessment, active and cooperative learning, and educational technology.

BIOL 5232. Molecular Biology Laboratory. (2.0 cr.; A-F only; prereq 4231 or 4231 (concurrent enrollment is allowed), CHEM 3322 or Biochemistry and Molecular Biology or IBS Grad student; credit will not be granted if already received for 4232; spring, every year) Regulation of gene expression in prokaryote and eukaryotes explored through use of recombinant DNA technologies.

BIOL 5235. Biotechnology. (4.0 cr.; A-F or Audit; prereq (2101, 2102, 2201, Chem 3322 or Chem 4341) or Biol or IBS Grad student; fall, offered periodically)

Genetic engineering with emphasis on large-scale production and isolation of recombinant proteins and metabolites. Microbial, plant and animal cell culture. Comparison of recombinant DNA technology to selective breeding and natural isolate use. Practical, legal and ethical considerations of genetic engineering. (4 hours lecture and lab)

BIOL 5240. Ecological Genetics. (3.0 cr.; A-F or Audit; prereq 1012, 2201, Stat 1411 or IBS grad student; fall, spring, offered periodically) Examines basic concepts in population and quantitative genetics. Focus is on techniques that reveal the genetic structure and adaptive value of ecologically important traits.

BIOL 5401. Coevolution of Plants, Animals and Microbes. (3.0 cr.; A-F or Audit; prereq 2801, 2802, or IBS Grad student; fall, every year)

Explores the evolution of interactions between species ranging from strongly antagonistic such as predator-prey interactions to strongly cooperative such as obligate mutualisms. The behavior, ecology and genetics of interacting organisms will be studied to understand their evolution. Includes two hours lecture and one three-hour lab per week.

BIOL 5511. Virology. (3.0 cr.; A-F or Audit; prereq 4501, or IBS Grad student or instructor consent; fall, spring, offered periodically) Viruses and hosts; effects of viral infections on cells; expression of viral genome in prokaryotic and eucaryotic cells; epidemiology and pathogenesis of viruses, including emerging ones; viral evolution. (2 hrs lect, 2 hrs lab)

BIOL 5515. Microbial Diversity and Phylogeny. (3.0 cr.; A-F only; prereq 2101 or 4501 or IBS Grad student; fall, offered periodically) Evolutionary survey and characteristics of microorganisms focusing on autotrophic and heterotrophic prokaryotes from various habitats. Isolation, examination, and identification of bacteria from field collections using microscopic, physiological, biochemical, molecular, phylogenetic, and computer database techniques. (2 hours lecture and 2 hours lab)

BIOL 5772. Neural Systems and Behavior. (3.0 cr.; A-F or Audit; prereq 1012, 3703 or IBS Grad student or instructor consent; spring, offered periodically)

Review of the basic neurophysiological components of animal behavior. Emphasis will be on well studied neuroethological models such as weakly electric fish, bats, owls and crayfish.

BIOL 5777. Plankton Biology. (2.0 cr.; A-F or Audit; prereq 2801, 2802 or WRS or IBS Grad student; spring, every year)

Explores topics in the biology of plant and animal plankton with emphasis on lake communities. Topics include biogeography, life-history, anatomy, physiology, and ecology of plankton. Basic limnology covered as relevant. Meets twice weekly for lecture and literature discussion.

BIOL 5801. Microbial Ecology. (2.0 cr.; A-F or Audit; prereq (2101, (2801 or 4501)), or WRS or IBS Grad student; spring, offered periodically)

Microorganisms in natural environments: diversity, distribution, energetics, and growth of heterotrophic and autotrophic microbes in oxic and anoxic habitats. Roles of microbial populations and communities in biogeochemical cycling, ecosystem functioning, landscapes, and industrial, agricultural, and environmental applications.

BIOL 5802. Microbial Ecology Laboratory.

(2.0 cr.; A-F or Audit; prereq 5801 (may take concurrently) or WRS or IBS grad student; spring, offered periodically) Lab and field-oriented exercises that teach concepts about microbial populations and their communities, energetics, food webs, biogeochemistry, and biodiversity while providing an introduction to research methods. Students master advanced microscopic, culturing, spectroscopic, molecular, radioisotopic, and computational techniques. (3 hours lab)

BIOL 5805. Fisheries Ecology. (3.0 cr.; A-F or Audit; prereq 2801, 2802, college-level course in statistics or WRS or IBS Grad student; fall, spring, offered periodically) Lectures, readings and computer exercises relating to current issues in fisheries ecology. Computer exercises will emphasize techniques used by scientists working in the field and prepare the student for the use of quantitative research tools for independent research. Includes 2 one-hour lectures and 1 three-hour lab weekly.

BIOL 5807. Mathematical Ecology. (3.0 cr.; A-F or Audit; prereq (2801, (Math 1290 or Math 1297)) or WRS or IBS Grad student; fall, odd years)

Development and use of mathematical models to describe ecological patterns and processes.

BIOL 5808. Landscape Ecology: Theory and Application. (3.0 cr.; A-F or Audit; prereq 2801, 2802 or WRS or IBS Grad student; fall, offered periodically)

Key issues in landscape ecology including scale, measuring landscape patterns, mechanisms shaping landscapes, implications of landscape patterns on plant and animal populations, communities, and ecosystems, and implementing landscape principles for natural resource management.

BIOL 5811. Plant Autecology. (2.0 cr.; A-F or Audit; prereq 2801 or IBS Grad student; fall, offered periodically)

Survey of environmental factors, responses to these by an individual plant. Ecological life histories. Biotic interactions. Intraspecific variation. Use of instrumentation. Emphasizes seed plants.

BIOL 5833. Stream Ecology. (3.0 cr.; A-F or Audit; prereq 2801 or WRS or IBS Grad student; fall, even years)

Studies of stream communities and ecosystems as influenced by biological interactions and physical factors. Emphasis on North Shore streams. (2 hrs lect, 6 hrs lab and field)

BIOL 5839. Coral Reef Field Studies. (3.0 cr.; A-F or Audit; =[GEOL 5839]; prereq 2801 or instructor consent or IBS Grad student; spring, offered periodically)

Biological studies of the coral reef complex and associated habitats of the Caribbean. Ecology and taxonomy of associated biota. Field study on San Salvador, Bahamas; taught J-term every other year.

BIOL 5861. Lake Ecology. (3.0 cr.; A-F or Audit; prereq 2801 or WRS or IBS Grad student; spring, every year) Ecology of lakes and reservoirs. (3 hrs lect)

BIOL 5862. Advanced Lake Ecology. (3.0 cr.; A-F or Audit; prereq 5861 (concurrent registration allowed) or WRS or IBS grad student; fall, offered periodically) Lake and laboratory approaches to evaluation of ecosystem health and experimental aquatic ecology. (1 hr lect, 4 hrs lab)

BIOL 5863. Ecosystems Ecology. (3.0 cr.; A-F or Audit; prereq 2801, or WRS or IBS Grad student; fall, even years)

Survey of terrestrial and aquatic ecosystems, emphasizing current literature on ecosystem processes. (3 hrs lect)

BIOL 5865. Conservation Biology. (2.0 cr.; A-F or Audit; prereq 2801 or IBS Grad student; spring, offered periodically)

Introduction to science of species, habitat, and ecosystem conservation and management.

BIOL 5868. Ecotoxicology. (3.0 cr.; A-F or Audit; prereq 2101, 2801, college-level statistics course or WRS or IBS Grad student; fall, spring, offered periodically)

Examines the effects of toxicants on constituents of the biosphere at levels of biological organization from cells to ecosystems. Toxicant identification, toxicity testing, exposure routes, bioaccumulation, toxicant effects, regulations, and current issues.

BIOL 5869. Great Lakes Ecology and Management. (3.0 cr.; A-F or Audit; prereq 5861 or WRS or IBS grad student; fall, odd years)

The world's great lakes account for over 60% of surface freshwater, occur from the Arctic Circle to the tropics and sustain a disproportionate share of the world's population and economic activity. Utilization has too often led to degradation and loss of biodiversity

and beneficial uses. In response, a variety of management agencies attempt to protect and restore the lakes. The world's largest lakes will be surveyed to appreciate unique aspects of their ecology and the current problems that challenge management agencies. Successes and deficiencies of current management approaches will be reviewed as well as their capacity to address new global challenges such as climate change and biotic globalization.

BIOL 5870. Wetland Ecology. (3.0 cr.; A-F or Audit; prereq 2801, 2802 or WRS or IBS Grad student; fall, odd years)

Hydrology, nutrient cycling, and productivity of wetland ecosystems and the adaptations and interactions of resident biota; assessment, management, conservation, restoration, and creation of wetlands. Two daylong weekend field trips required.

BIOL 5990. Special Topics: (Various Titles to be Assigned). (1.0-5.0 cr. [max 10.0 cr.]; A-F or Audit; prereq 1012, instructor consent; spring, summer, every year)
Special topics submitted for biology department review. Topic announced before course offered.

BIOL 8139. Seminar in Cell Biology. (1.0 cr. [max 10.0 cr.]; S-N or Audit; prereq Grad student in biol or related field; fall, spring, offered periodically)
Analysis of current topics.

BIOL 8333. FTE: Master's. (1.0 cr.; No Grade Associated; prereq Master's student, adviser and DGS consent; fall, spring, summer, every year)
(No description)

BIOL 8777. Thesis Credits: Master's. (1.0-18.0 cr. [max 50.0 cr.]; No Grade Associated; prereq Max 18 cr per semester or summer; 10 cr total required (Plan A only); fall, spring, summer, every year)
(No description)

BIOL 8899. Seminar in Ecology. (1.0 cr. [max 10.0 cr.]; A-F or Audit; prereq Grad student in biol or related field; fall, spring, every year)
In-depth analyses of topics in ecology.

BIOL 8993. Graduate Seminar. (1.0 cr. [max 10.0 cr.]; S-N or Audit; prereq Grad student in biol or related field; fall, spring, offered periodically)
Reports on recent developments in biology and on research projects in the department.

BIOL 8994. Graduate Research. (1.0-4.0 cr. [max 10.0 cr.]; S-N or Audit; prereq Grad student in biol or related field; fall, spring, summer, every year)
Directed research or study on an advanced topic.

Business (BUS)

Labovitz School of Business and Economics

BUS 2100. Fundamentals of Accounting. (2.0 cr.; A-F or Audit; prereq CUE major or Business Administration Certificate or college

consent; this course cannot be used to fulfill a LSBE major/minor requirement.; fall, spring, summer, offered periodically)
Introduction to financial and managerial accounting. Basic financial statement preparation. Basic decision making by managers using financial information.

BUS 2200. Fundamentals of Economics. (2.0 cr.; A-F or Audit; prereq CUE major or Business Administration Certificate or college consent; this course cannot be used to fulfill a LSBE major/minor requirement.; fall, spring, summer, offered periodically)
The course will provide a general description of the U.S. economy and an introduction to the framework used by economists to analyze economic issues.

BUS 2300. Fundamentals of Operations Management. (2.0 cr.; A-F or Audit; prereq CUE major or Business Administration Certificate or college consent; this course cannot be used to fulfill a LSBE major/minor requirement.; fall, spring, summer, offered periodically)
Introductory survey of production and operations as a functional area of management, including operations strategy and sustainability; manufacturing and service process design; project management; global supply chain, capacity and inventory management. Current industry best practices, such as lean six-sigma will also be discussed.

BUS 2400. Fundamentals of Organizational Management. (2.0 cr.; A-F or Audit; prereq CUE major or Business Administration Certificate or college consent; this course cannot be used to fulfill a LSBE major/minor requirement.; fall, spring, summer, offered periodically)
This course presents students with a broad introduction to management processes and the complex world of managing in today's business environment. Topics include what managers do and skills they must possess to achieve organizational objectives, the management functions of planning, organizing, leading, and controlling and organizational dynamics such as globalization, social responsibility, and change.

BUS 2500. Fundamentals of Applied Statistics. (2.0 cr.; A-F or Audit; prereq CUE major or Business Administration Certificate or college consent; this course cannot be used to fulfill a LSBE major/minor requirement.; fall, spring, summer, offered periodically)
This course introduces students to the fundamental of modern business statistics. Emphasis is on application of the statistical concepts to decision making in an uncertain environment. Topics include summary statistics, probability distributions and statistical inference, which includes estimation, hypothesis testing and regression analysis. The application of computers in statistical analysis is introduced.

BUS 2600. Fundamentals of Financial Management. (2.0 cr.; A-F or Audit; prereq CUE major or Business Administration Certificate or college consent; this course

cannot be used to fulfill a LSBE major/minor requirement.; fall, spring, summer, offered periodically)

The objective of this course is to help the student to develop an understanding of the concepts and techniques of financial management in the modern business enterprise. Evaluation of the financial risks, returns, and costs is the necessary framework in which all business policies must be examined. Students are expected to have a basic understanding of the concepts and methods of financial management by the completion of this course. Specific topics of coverage include financial statement analysis, time value of money, risk and return, the valuation of equity and bonds, capital budgeting and the cost of capital analysis. Moreover, the course also serves as a foundation for advanced work in finance.

BUS 2700. Fundamentals of Marketing. (2.0 cr.; A-F or Audit; prereq CUE major or Business Administration Certificate or college consent; this course cannot be used to fulfill a LSBE major/minor requirement.; fall, spring, summer, offered periodically)
This course introduces students to the discipline of marketing as it is practiced by organizations. Emphasis is on understanding how to best serve the consumer needs utilizing the most appropriate value proposition. The four P's of marketing (product, place, price, and promotion) are introduced in the context of a globally competitive environment.

BUS 2800. Fundamentals of Human Resource Management. (2.0 cr.; A-F or Audit; prereq CUE major or Business Administration Certificate or college consent; this course cannot be used to fulfill a LSBE major/minor requirement.; fall, spring, summer, offered periodically)
This course introduces students to the field of Human Resource Management (HRM). Course materials and assignments are designed to help students understand why organization have an HRM function, what are the primary functional areas of HRM, how a well developed HRM system can benefit organizations, and the respective roles of line managers, employees, and HRM professional in carrying out good HRM policies and practices.

Business Law (BLAW)

Labovitz School of Business and Economics

BLAW 2001. The Legal Environment. (HUMANITIES; LE CAT8; 3.0 cr.; A-F only; prereq Minimum 30 credits; fall, spring, summer, every year)
Introduction to U.S. legal system and its impact on modern business operations. Ethical, economic, social, and political perspectives of legal environment. Constitutional law, administrative regulation, torts and products liability, contracts, business organizations, employment/labor law.

BLAW 3001. Law and Ethics for Financial Professionals. (3.0 cr.; A-F only; prereq LSBE candidate or department consent; fall, spring, every year)

Examination of the legal and ethical issues faced by financial professionals. Topics include agency, bankruptcy, insider trading and other securities laws, obligations of corporate directors and officers, negotiable instruments and secured lending transactions.

BLAW 3201. Law for Entrepreneurs. (3.0 cr.; A-F only; prereq LSBE candidate or college consent; fall, offered periodically)
Introduction to legal topics relevant to entrepreneurs, including law of agency, government regulation of employment, property and bailments, forms of business organizations bankruptcy.

BLAW 3301. Estate Planning Concepts and Strategies. (3.0 cr.; A-F or Audit; prereq Acct 3401, LSBE candidate or college consent; spring, offered periodically)
Examines the basics of estate planning, including both the legal and tax aspects of developing an estate and/or incapacity plan. Topics include: probate and probate substitutes, wills and other estate planning documents, gifting and insurance strategies, use of trusts, and federal estate, gift and generation-skipping taxation.

Career Exploration & Education (CNED)

Academic Affairs

CNED 2535. Major and Career Exploration. (2.0 cr.; A-F or Audit; prereq Fewer than 45 credits or instructor consent; fall, spring, summer, every year)

Major and career exploration through the use of theoretical models and practical experience. Students explore interests, skills, values, and personality; research educational and occupational possibilities; and learn how to integrate the information about themselves and the world of work to assist them in choosing a major.

CNED 3010. Internship Preparation. (1.0 cr.; A-F or Audit; prereq WRIT 1120, 45 credits and declared major; fall, spring, every year)
This course is designed for students who plan to complete an internship or cooperative education experience. Course content will include assessment of self (strengths, interests, values, and skills) and the relationship to career plans; development of career goals and goals for internship; identification and evaluation of possible internship sites; development of internship seeking skills; and examination of professional ethics and etiquette.

CNED 3535. Strategic Career Planning. (3.0 cr.; A-F or Audit; =[PSY 3535]; prereq Minimum 45 credits or instructor consent; fall, spring, summer, every year)
Theoretical base and practical experiences integrating knowledge of self with knowledge of the marketplace. Course emphasizes learning effective job/internship search strategies.

CNED 4010. Job Search and Career Success. (1.0 cr.; A-F or Audit; prereq minimum 90 credits; WRIT 31xx or FMIS

3141 or instructor permission; no grad credit; fall, spring, every year)

This course is designed for seniors who will be graduating within two semesters. Students learn and implement effective job search strategies and gain knowledge and skills to be successful in their careers. Self assessment, discovering career passions and goals, integration of research skills, application of job seeking strategies, and demonstration of professionalism are key components.

Chemical Engineering (CHE)

Swenson College of Science and Engineering

CHE 1011. Introduction to Chemical Engineering.. (LE CAT5; 3.0 cr.; A-F or Audit; prereq Chem 1151 or 1161 or pre or coreq Chem 1153 and 1154 or higher and Math 1296 or higher.; fall, spring, every year)
Investigation of chemical engineering careers. Use of science and mathematics in chemical engineering. Introduction to fundamental topics: process flow diagrams, continuous and batch operations, material and energy balances, fluid flow, heat and mass transfer, reactor design, material science, process control, engineering economics. Group dynamics and ethics. Team project on industrial case study.

CHE 1020. Sustainable Engineered Systems. (SUSTAIN; 3.0 cr.; A-F or Audit; prereq High school algebra and chemistry; fall, even years)

Explore the engineered world using basic conservation tools (mass, momentum and energy balances). Use concepts from pollution control, unsustainable and sustainable systems, economics, history, and political contexts to understand what a sustainable future may look like. Develop problem solving skills and creativity.

CHE 1143. Life Cycle Analysis. (3.0 cr.; A-F or Audit; prereq Math 1005 or higher; fall, every year)

This course will identify and investigate the true environmental cost of consumer decisions. We will challenge "green" marketing vs. true best actions. Individual, community and organizational decisions will be investigated.

CHE 2001. Introduction to Environmental Engineering. (3.0 cr.; A-F or Audit; prereq Chem 1113 or higher, Math 1250 or higher; fall, spring, every year)

Comprehensive survey of environmental engineering. Fundamental science and engineering principles as basis for analyzing environmental issues. Federal laws on air pollution, wastewater discharge, and hazardous waste. Wastewater treatment, air pollution control, waste minimization, resource recovery, and recycling.

CHE 2011. Design of Engineering Experiments. (3.0 cr.; A-F or Audit; prereq Math 1297 and (prereq or coreq 2111); fall, every year)

Basic theories of experimental design, data analysis, and statistical process control, emphasizing their application to chemical engineering practice.

CHE 2111. Material and Energy Balances. (3.0 cr.; prereq Chem 1151 or 1161 or 1153 and 1154, Math 1296 or 1596 minimum grade of C; fall, spring, every year)
Elementary principles of chemical processes, emphasizing material and energy balances.

CHE 2121. Chemical Engineering Thermodynamics. (3.0 cr.; A-F or Audit; prereq 2111, (prereq or coreq Math 3280); spring, every year)

Application of thermodynamic principles to chemical engineering, emphasizing pressure-volume-temperature relationships, thermodynamic laws, thermochemistry, chemical equilibrium, and phase relationships.

CHE 3031. Computational Methods in Chemical Engineering. (3.0 cr.; A-F or Audit; prereq 2111, Math 3280, (prereq or coreq CS 1121); spring, every year)

Modeling and simulation of chemical engineering processes; computational methods applied to chemical engineering; use of computation and process simulation tools.

CHE 3111. Fluid Mechanics. (3.0 cr.; A-F or Audit; prereq BSChE cand, CHE 2111 prereq or coreq, Phys 2011 or 2013 and 2014, Math 3280, or instructor consent; credit will not be granted if already received for ME 3111 or CE 3221.; fall, spring, every year)

Mass and energy balances, Bernoulli's equation, momentum balance, laminar and turbulent flow, boundary layer theory, pumps, compressors, and turbines.

CHE 3112. Heat and Mass Transfer. (3.0 cr.; A-F or Audit; =[ME 4112]; prereq BSChE candidate, 3111, (prereq or coreq 2121) or instructor consent; fall, spring, every year)
Theory and practice of heat and mass transfer. Fundamentals of diffusion, conduction, convection, and radiation with application to design of heat and mass transfer equipment and systems.

CHE 3196. Cooperative Education I. (1.0 cr. [max 3.0 cr.]; A-F or Audit; prereq BSChE cand, department consent; fall, spring, summer, every year)

Practical work experience with an employer closely associated with student's academic area. Arranged by mutual agreement among student, department, and employer. Formal written report of work completed must be submitted to department at end of experience.

CHE 3211. Chemical Engineering Laboratory I. (COMM & LAN; 3.0 cr.; A-F or Audit; prereq BSChE candidate, 3112, instructor consent; fall, every year)
Introduction to statistical uncertainty analysis and design of experiments. Experiments illustrating physicochemical, fluid mechanics, and heat and mass transfer principles. Technical report writing and presentation. Standard laboratory practice and safety.

CHE 3231. Properties of Engineering Materials. (3.0 cr.; A-F or Audit; prereq BSChE cand, 2121, Chem 1152 or 1162; spring, every year)
Thermodynamic, mechanical, and kinetic properties of materials: structure and

bonding in metals, alloys, corrosion, crystals, semiconductors, polymers, colloids, ceramics, interfaces, and composites.

CHE 3241. Principles of Particle

Technology. (3.0 cr.; A-F or Audit; =[CHE 4621]; prereq BSChE candidate, (prereq or coreq 3111), Phys 2012 or 2015 and 2016, instructor consent; fall, every year)

The science and engineering dealing with the production, handling, modification and use of a wide variety of particulate materials, both wet and dry, in sizes ranging from the sub-micron to the centimeter scale.

CHE 3251. Introduction to Pulp and Paper Process and Technology. (SUSTAIN; 3.0 cr.; A-F or Audit; prereq 2111 or instructor consent; spring, even years)

This course introduces pulping and bleaching processes followed by the paper making process. The various processes in pulp and paper manufacturing, the grades of paper and language of the industry will be introduced and the equipment used in papermaking will be explored. Following the course, students will be able to do basic calculation related to pulp and paper and will understand the basic principles of pulp and paper manufacturing.

CHE 3296. Cooperative Education II. (2.0 cr. [max 4.0 cr.]; A-F or Audit; prereq BSChE candidate, CHE 3196 and department consent; fall, spring, summer, every year)

Continuation of practical work experience with an employer closely associated with student's academic area. Arranged by mutual agreement among student, department, and employer. Formal written report of work completed must be submitted to department at end of experience.

CHE 3791. Independent Study. (1.0-3.0 cr. ; prereq BSChE cand, department consent; fall, spring, summer, every year)

Directed individual study arranged with instructor and head of department before registration.

CHE 3894. Chemical Engineering Research.

(1.0-3.0 cr. [max 6.0 cr.]; prereq BSChE candidate, maximum 6 credits, instructor consent; fall, spring, summer, every year) Experience in a selected research area. Student must present a satisfactory written report and oral presentation. Course may also be used for portion of a research proposal.

CHE 4111. Separations. (3.0 cr.; A-F or Audit; prereq BSChE Candidate, 3031, 3112; no grad credit; fall, every year)

Application of principles of mass transfer. Design of distillation, gas absorption, liquid extraction, drying, leaching, and membrane separation processes.

CHE 4141. Material and Minerals

Processing. (3.0 cr.; A-F or Audit; prereq Chem 1153, 1154, Math 1297, Phys 2013; fall, every year)

Flow sheets and unit operations of processes for the separation of commercially valuable minerals from their ores; particle characterization, comminution, concentration, handling; economics, environment, introduction to pyro and hydrometallurgy.

CHE 4211. Chemical Engineering

Laboratory II. (3.0 cr.; A-F or Audit; prereq BSChE candidate, 3211, 4111, 4301, and (prereq or coreq 4402), instructor consent, no grad credit; spring, every year)

Statistical design of engineering experiments. Experiments illustrating principles of separations and reactor design. Technical report writing and presentation. Standard laboratory practice and safety.

CHE 4301. Chemical Reaction Engineering.

(3.0 cr.; A-F or Audit; prereq 3112; no grad credit; fall, summer, every year)

Theory of rates of chemical reactions. Application of rate data to design of batch, tubular, continuous stirred-tank, and catalytic-chemical reactors.

CHE 4402. Process Dynamics and Control.

(3.0 cr.; A-F or Audit; =[CHE 4401]; prereq BSChE candidate, 3031 (prereq or coreq 2121, 3112), Phys 2012 or 2015 and 2016, instructor consent, no grad credit; spring, every year) Dynamic behavior of open-and closed-loop systems. Design and operation of automatic controllers for chemical process systems. The programming of a microcontroller.

CHE 4501. Chemical Engineering Design I.

(SUSTAIN; 4.0 cr.; A-F or Audit; prereq BSChE candidate, prerequisite or corequisite 4111 and 4301; no Grad credit; fall, every year)

Preliminary design of chemical processing or hazardous waste treatment plant. Use of engineering economics and calculation of rate return and hazardous waste management as applied to chemical plants. Market survey, flow sheet preparation, material and energy balances.

CHE 4502. Chemical Engineering Design II.

(4.0 cr.; A-F or Audit; prereq BSChE candidate, 4501, (prereq or coreq 3231, 4402); no grad credit; spring, every year)

Continuation of ChE 4501. Equipment design, instrumentation, process control, hazardous waste management plan, plant safety, economic feasibility, and institute analysis for process chosen.

CHE 4601. Biochemical Engineering I.

(3.0 cr.; A-F or Audit; prereq 2111, minimum 60 credits or instructor consent; credit will not be granted if already received for 5601; fall, every year)

Application of chemical engineering principles to design and operation of industrial biological processes, emphasizing enzyme and cell growth kinetics.

CHE 4603. Biorenewable Resources.

(SUSTAIN; 3.0 cr.; A-F or Audit; prereq 2111 or instructor consent; no grad credit; spring, every year)

Comprehensive investigation of the engineering systems involved in the sustainable production of fuels, chemicals, and materials from bioresources.

CHE 4612. Hazardous Waste Processing

Engineering. (3.0 cr.; A-F or Audit; prereq 2111, Chem 2521; spring, every year)

Identification of hazardous substances and their effects. Federal and state regulations.

Design of waste treatment processes.

Management of hazardous wastes.

Modifications of processes to avoid hazardous waste formation.

CHE 4613. Air Pollution Control. (3.0 cr.; A-F or Audit; prereq 2111, Math 3280, minimum 60 credits; spring, odd years)

Analysis of what air pollution is, where it comes from and where it goes on the local, regional and global scales. Discussion of the regulatory apparatus concerning air quality. Design of air pollution control equipment.

CHE 4621. Particle Technology. (3.0 cr.; A-F or Audit; =[CHE 3241]; prereq 2111, 3111; credit will not be granted if already received for 5621.; fall, every year)

Applications of particle technology, especially in the chemical and minerals industry context. Particle concepts including: particle characterization, slurry characterization, size reduction, size enlargement, particle separation, and multi phase processes. The major unit operations common to solids processing: mining, crushing, concentration by sedimentation, filtration, flotation, and pyrometallurgy.

CHE 4701. Biochemical Engineering II.

(3.0 cr.; A-F or Audit; prereq 4601 or 5601; credit will not be granted if already received for 5701; spring, every year)

Continuation of ChE 4601/5601. Advanced design and operation of bioreactors for varied cultivation methods, transport limitations, and reactor types. Operatoion and control considerations for aeration, agitation, heat transfer, and instrumentation. Unit operations for recovery and purification of products. Microbial, animal, plant, and mixed culture applications.

CHE 5021. Transport Phenomena.

(3.0 cr.; A-F or Audit; prereq 3112 or Grad student or instructor consent; fall, every year)

Study of the fundamentals and field equations for momentum, heat and mass transport with emphasis on the prediction of transport rates in chemical engineering applications.

CHE 5022. Transport Processes in Wells

and Pipelines. (3.0 cr.; A-F or Audit; prereq 3111, 3112 or Grad student or instructor consent; fall, spring, offered periodically)

Exposes students to various elements of fluid and heat flows that occur in oil/gas wells and pipelines. The fundamentals of multiphase flow are explained in terms of single-phase flow mechanics and configuration of the phases. Simplicity in modeling approach is retained. Field examples are used to reinforce understanding of the models.

CHE 5131. Polymer Engineering.

(3.0 cr.; A-F or Audit; prereq ((ChE 2121 or ME 3211) and ChE 3231 or ME 2105 OR CHEM 4641 or instructor consent; spring, every year)

Polymeric materials have a tremendous variety of applications in synthetic fibers, packaging, automobiles, electronic instruments, energy, sports, etc. This course will focus on theoretical and engineering applications of polymer design, processing, and production.

CHE 5193. Process Optimization: Lean Six Sigma. (3.0 cr.; A-F or Audit; prereq Instructor; fall, every year)

Emphasis on applying Lean and 6 Sigma process design and improvement techniques, data driven decision making, cultural transformation and effective change communication.

CHE 5250. Advanced Process Control. (3.0 cr.; A-F or Audit; prereq 4402 or instructor consent; spring, every year)

Investigation into the theory and practical application of the concept of process control dynamics, feedback, and stability. Emphasis will be on dynamic behavior, physical and empirical modeling, computer simulation, measurement, and control technology, basic control concepts, and advanced control strategies.

CHE 5555. Project Credits: MEng - Chemical Engineering. (3.0-6.0 cr.; A-F or Audit; prereq MEng candidate, instructor consent; fall, spring, summer, every year)

Master of Engineering project work as determined by faculty adviser and student with approval by the department director of graduate studies.

CHE 5601. Biochemical Engineering I. (3.0 cr.; A-F or Audit; prereq 2111, grad student and instructor consent; credit will not be granted if already received for 4601; spring, odd years)

Application of chemical engineering principles to design and operation of industrial biological processes, emphasizing enzyme and cell growth kinetics.

CHE 5602. Bioseparations. (3.0 cr.; A-F or Audit; prereq 2111, grad student; credit will not be granted if already received for 4602; fall, even years)

Application of engineering principles to the isolation, purification, and finishing of biologically derived products. Design of unit operations specific to biochemical processes, including cell disruption, sedimentation, precipitation, filtration, extraction, chromatography, crystallization and drying. Integration of operations with upstream processing.

CHE 5610. Recycling Process Engineering. (3.0 cr.; A-F or Audit; prereq BSChE candidate or instructor consent; fall, odd years)

Investigation into the best available current technology for recycling processes. Processes used to recycle materials such as metals, oils plastics, cardboard, and white-goods will be investigated. Identification of current regulations and state of the art processes. Comparison of recycled vs. raw chemical property characteristics.

CHE 5612. Hazardous Waste Process Engineering. (3.0 cr.; A-F or Audit; prereq Grad student or BSChE candidate with ChE 2111, 3112 and 4111; spring, every year)

Identification of hazardous substances and their effects. Federal, State and International regulations. Green Engineering - modification of processes to avoid hazardous waste formation. Life Cycle Management of

hazardous substances. Design of waste treatment processes.

CHE 5615. Pollution Control Technologies.

(4.0 cr.; A-F or Audit; prereq 3111, Chem 1151 or 1161, Grad Student; credit will not be granted if already received for 4615 or SCeI 4102.; fall, every year)

Sources, distribution, and ultimate fate of air, water, and solid/hazardous wastes. Principles of treatment of point and non-point source wastes. Case studies of successful remediation technologies. Models of contaminant movement in the environment; landfill construction and application of federal law.

CHE 5621. Particle Technology. (3.0 cr.; A-F or Audit; prereq 3111 and Grad Student; credit will not be granted if already received for 4621; fall, odd years)

Applications of particle technology, especially in the chemical and minerals industry context. Particle concepts including: particle characterization, slurry characterization, size reduction, size enlargement, particle separation, and multi phase processes. The major unit operations common to solids processing: mining, crushing, concentration by sedimentation, filtration, flotation, and pyrometallurgy.

CHE 5642. Mining and Environmental Quality. (3.0 cr.; A-F or Audit; prereq minimum 60 credits, CHE 2001 or CE 3025 or ESCI 2210; or instructor consent; fall, every year)

Design of environmental engineering controls used in and discussion of environmental issues associated with mining and mineral processing activities. Includes mining industry regulatory/public policy issues.

CHE 5701. Biochemical Engineering II. (3.0 cr.; A-F or Audit; prereq 4601 or 5601, grad student; credit will not be granted if already received for 4701; spring, every year)

Continuation of ChE 4601/5601. Advanced design and operation of bioreactors for varied cultivation methods, transport limitations, and reactor types. Operation and control considerations for aeration, agitation, heat transfer, and instrumentation. Unit operations for recovery and purification of products. Microbial, animal, plant, and mixed culture applications.

CHE 5991. Graduate Independent Study in Chemical Engineering. (1.0-3.0 cr. [max 6.0 cr.]; A-F or Audit; prereq graduate student and instructor consent; fall, spring, summer, offered periodically)

Directed study of special interest topics not available in the standard curriculum. Must be arranged with instructor before registration. May include readings, research and/or special projects.

CHE 5995. Special Topics in Chemical Engineering: (Various Titles to be Assigned). (1.0-4.0 cr. [max 12.0 cr.]; A-F or Audit; prereq Graduate student or instructor consent; fall, spring, summer, offered periodically)

Topics not available in the regular department curriculum. Topics may include specialties of the department or visiting faculty.

Chemistry (CHEM)

Swenson College of Science and Engineering

CHEM 1103. Aspects of Chemistry. (NAT SCI; LE CAT5; SUSTAIN; LE CAT4; 3.0 cr.; A-F or Audit; prereq Credit will not be granted if already received for 1102, 1113, 1151, 1153 or 1161.; fall, spring, every year)

Topics in general, organic, and biological chemistry using sustainability as the underlying theme. Study of chemical principles, their application, and their impact on daily life. Independent unit in contrast to CHEM 1113, 1151, 1153 or 1161. CHEM 1103 alone satisfies the requirements in liberal education categories Natural Sciences and Sustainability. Alternatively, the combination of CHEM 1103 and CHEM 1104 meets liberal education category requirements for Natural Sciences with lab.

CHEM 1104. Aspects of Chemistry Lab. (NAT SCI; LE CAT4; 1.0 cr.; A-F or Audit; prereq Must be taken either after or concurrently with CHEM 1103; credit will not be granted if already received for 1102 (4-credit option), 1113, 1151, 1154 or 1161.; fall, spring, every year)

Laboratory in general, organic, and biological chemistry. This laboratory optionally accompanies lecture CHEM 1103. The combination of CHEM 1103 and CHEM 1104 meets liberal education category requirements for Natural Science with lab.

CHEM 1105. From the Industrial Revolution to Green Chemistry. (SUSTAIN; LE CAT5; 3.0 cr.; fall, offered periodically)

The study of the chemistry associated with scientific and technological discoveries made during the Industrial Revolution in England from 1750-1850. Twenty-first Century "green chemistry" solutions to reduce detrimental impacts of industrialization such as those that occurred during the Industrial Revolution. The study of the lives of selected chemists and natural scientists whose work was located in the Midlands of England.

CHEM 1113. Introduction to General, Organic, and Biological Chemistry I. (NAT SCI; LE CAT4; 5.0 cr.; A-F or Audit; prereq For students terminating study of chem with no more than 10 cr; credit will not be granted if already received for 1151, 1153, 1161, or 2172; fall, every year)

Chemical principles and their applications: atomic and molecular structure, solutions, acids, bases, salts, equilibria.

CHEM 1114. Introduction to General, Organic, and Biological Chemistry II. (5.0 cr.; A-F or Audit; prereq 1113; spring, even years)

Chemical principles and their applications: physical and chemical properties of organic compounds, organic chemistry of living systems; carbohydrates, lipids, proteins, enzymes, nucleic acids, and metabolic pathways.

CHEM 1153. General Chemistry I. (NAT SCI; LE CAT5; 4.0 cr.; A-F or Audit; prereq One year high school chem, high school algebra,

Math ACT 21 or higher or a grade of least C- in Math 1005, SCSE, exercise science, athletic training, teaching life science, teaching earth and space science, teaching physical science or B.A. major in environment and sustainability, biology, chemistry or geological sciences student. Credit will not be granted if already received for 1151 and 1161.; fall, spring, summer, every year)

Fundamental principles of chemistry exemplified by study of elements, compounds, and their reactions. Covers fundamental concepts of the atom, molecule, stoichiometry, chemical reactions, thermochemistry, gas laws, atomic structure, periodic table, chemical bonding, and other selected topics. The companion laboratory, CHEM 1154, should be taken concurrently. The combination of CHEM 1153 and CHEM 1154 meets the lab component of NAT SCI, LE CAT 4.

CHEM 1154. General Chemistry Lab I. (NAT SCI; LE CAT4; 1.0 cr.; A-F or Audit; prereq Previous or concurrent enrollment in CHEM 1153; credit will not be granted if already received for CHEM 1151 or 1161; fall, spring, summer, every year)

Basic laboratory skills while investigating the fundamental principles of chemistry. Covers fundamental concepts of the atom and molecule, stoichiometry, acid-base reactions, oxidation-reduction reactions, thermochemistry, characteristic properties of anions, gas laws and spectrophotometry. This laboratory accompanies lecture CHEM 1153. The combination of CHEM 1153 and CHEM 1154 meets liberal education category 4 requirements.

CHEM 1155. General Chemistry II. (4.0 cr.; A-F or Audit; prereq 1151 or 1153 or 1161; credit will not be granted if already received for 1152 or 1162; fall, spring, summer, every year)

Fundamental principles of chemistry exemplified by study of elements, compounds, and their reactions. Covers intermolecular forces, properties of liquids, solids and solution, chemical kinetics, chemical equilibrium, acids and bases, solubility, thermodynamics, electrochemistry, nuclear chemistry, and other selected topics. Solid knowledge of college algebra and General Chemistry I is required. The companion laboratory course CHEM 1156 should be taken concurrently.

CHEM 1156. General Chemistry Lab II. (1.0 cr.; A-F or Audit; prereq 1151 or 1161 or 1154, concurrent or previous enrollment in CHEM 1155; credit will not be granted if already received for Chem 1152 or 1162; fall, spring, summer, every year)

Fundamental principles of chemistry exemplified by laboratory study of elements, compounds, and their reactions. Covers titration, intermolecular forces, colligative properties, kinetics, chemical equilibria, and qualitative analysis. This laboratory accompanies lecture CHEM 1155.

CHEM 1161. Honors: General Chemistry I. (NAT SCI; LE CAT4; 5.0 cr.; A-F or Audit; prereq High school chem and high school algebra, Math ACT 21 or higher or a grade of at least C- in Math 1005, SCSE student

or exercise science or athletic training or teaching life science or teaching earth and space science, or teaching physical science; credit will not be granted if already received for 1151, 1153 or 2172; fall, every year)

Advanced coverage of principles of chemistry exemplified by study of elements, compounds, and their reactions, intended for students with good high school preparation in mathematics and science. Covers concepts of the atom, molecule, stoichiometry, chemical reactions, thermochemistry, gas laws, atomic structure, periodic table, chemical bonding, intermolecular forces, and other selected topics. Mathematically demanding quantitative problems.

CHEM 1162. Honors: General Chemistry II. (5.0 cr.; A-F or Audit; =[CHEM 2172]; prereq 1151 or 1153 and 1154 or 1161; credit will not be granted if already received for 1152, 1155 or 2172; spring, every year)

Advanced coverage of principles of chemistry exemplified by study of elements, compounds, and their reaction, intended for students with good high school preparation in mathematics and science. Covers properties of liquids, solids and solutions, chemical kinetics and reaction mechanisms, chemical equilibrium, acids and bases, solubility, thermodynamics, electrochemistry, descriptive chemistry of the elements, coordination chemistry, nuclear chemistry, and other selected topics. Mathematically demanding quantitative problems.

CHEM 1191. Independent Study. (1.0-2.0 cr. [max 4.0 cr.]; A-F or Audit; prereq department consent; fall, spring, summer, every year) For students wishing to do special work in areas useful to individual programs and objectives when such are not available in regular course offerings.

CHEM 2212. Environmental Chemistry. (NAT SCI; SUSTAIN; 4.0 cr.; A-F or Audit; prereq 1152 or 1162 or 1155 and 1156, Environmental Science major; credit will not be granted if already received for 2222 or 2223 or 2242; fall, offered periodically) Study of chemical processes in natural air, water, soil and sediment environments. Sources, reaction, transport, effects, and fates of natural and anthropogenic chemical species will be covered. Methods of analysis of environmental samples, with emphasis on quantitative treatment of data.

CHEM 2222. Quantitative Analysis. (3.0 cr.; A-F or Audit; prereq 1152 or 1162 or 1155 and 1156, concurrent registration in 2223 is required; credit will not be granted if already received for 2212 or 2242; fall, spring, summer, every year) Theory in analytical techniques; introduces gravimetric, volumetric, and spectrophotometric methods.

CHEM 2223. Quantitative Analysis Laboratory. (1.0 cr.; A-F or Audit; prereq 1152 or 1162 or 1155 and 1156; concurrent registration in 2222 is required; credit will not be granted if already received for 2212 or 2242; fall, spring, summer, every year)

Lab companion to 2222 involving the quantitative analysis of organic and inorganic samples using classical and instrumental techniques. Students are instructed in the use of classical and modern computer-controlled instrumentation and techniques, as applied to the acquisition and analysis of experimental data.

CHEM 2242. Analytical Chemistry and the Environment in Poland. (4.0 cr.; A-F or Audit; prereq 1152 or 1162 or 1155 and 1156, instructor consent; credit will not be granted if already received for 2222, 2232; summer, offered periodically)

Theory and practice in quantitative analysis, covering statistics, acid-base equilibria, chelometry, spectrometry, and chromatography, including volumetric, spectrophotometric, and separation methods, to be offered in Poland, with field trips to sites of environmental concern.

CHEM 2541. Organic Chemistry I. (3.0 cr.; A-F or Audit; prereq 1152 or 1162 or 1155 and 1156; concurrent registration in 2543 is required; credit will not be granted if already received for 2521, CHE 3231, ENGR 2110; fall, spring, summer, every year) Structure and bonding, stereochemistry, functional group reactions.

CHEM 2542. Organic Chemistry II. (3.0 cr.; A-F or Audit; prereq 2521 or 2541, must be taken after or concurrently with either 2544 or 2545; credit will not be granted if already received for 2522, 2532; fall, spring, summer, every year) Functional group reactions, bioorganic chemistry.

CHEM 2543. Organic Chemistry I Laboratory. (1.0 cr.; A-F or Audit; prereq 1152 or 1162 or 1155 and 1156, must be taken after or concurrently with CHEM 2541; credit will not be granted if already received for 2521, CHE 3231, ENGR 2110; fall, spring, summer, every year) Laboratory companion to CHEM 2541. Structure and bonding, stereochemistry, functional group reactions.

CHEM 2544. Organic Chemistry II Laboratory. (1.0 cr.; A-F or Audit; prereq 2521 or (2541 and 2543), must be taken after or concurrently with CHEM 2542; credit will not be granted if already received for 2522, 2532, 2545; fall, spring, summer, every year) Laboratory companion to Chem 2542, for non-chemistry majors. Functional group reactions, bioorganic chemistry.

CHEM 2545. Organic Chemistry II Laboratory for B.S. Chemistry Majors. (2.0 cr.; A-F or Audit; prereq 2521 or (2541 and 2543), must be taken after or concurrently with CHEM 2542; credit will not be granted if already received for 2532; spring, every year) Laboratory companion to Chem 2542, for B.S. Chemistry majors. Functional group reactions, bioorganic chemistry.

CHEM 2901. Principles of Green Chemistry. (SUSTAIN; 3.0 cr.; A-F or Audit; prereq 2542 or concurrent; spring, offered periodically)

Survey of the principles of green chemistry emphasizing basic toxicology, the evaluation of waste production and environmental performance, catalysts and organic solvents, renewable resources and intentional design of green reactions and processes.

CHEM 3097. Internship in Chemistry. (1.0-2.0 cr. ; S-N only; prereq 2521 or 2541 or 2223, chemistry or biochemistry/molecular biology majors and department consent; summer, every year)
Experience in a commercial, government, or industrial setting. Prior department approval and coordination with faculty sponsor are required.

CHEM 3194. Chemistry Undergraduate Research. (1.0-3.0 cr. [max 30.0 cr.]; S-N or Audit; prereq department consent; fall, spring, summer, every year)
Experience in a selected area of research.

CHEM 3322. Biochemistry. (3.0 cr.; A-F or Audit; prereq 2522 or 2532 or 2542; spring, summer, every year)
Survey of biochemistry, emphasizing enzyme catalysis, cellular energetics, and major metabolic processes.

CHEM 3324. Biochemistry Laboratory. (1.0 cr.; A-F or Audit; prereq 2522 or 2532 or 2542; previous or concurrent registration in 3322; spring, summer, every year)
Identification and analysis of biological molecules with emphasis on the macromolecules, polysaccharides, proteins, and nucleic acids (RNA, DNA).

CHEM 3432. Descriptive Inorganic Chemistry. (3.0 cr.; A-F or Audit; prereq (2222 or 2242) and 2542; spring, every year)
The course will survey the chemistry of the elements, including periodic trends. Acid base chemistry, electrochemistry, structures of solids, and bioinorganic chemistry will be discussed.

CHEM 4184. Undergraduate Seminar I. (1.0 cr.; S-N or Audit; prereq BS Chem or BS BMB Major; minimum 90 credits; fall, every year)
First course of a two-course senior seminar requirement for B.S. Chemistry and B.S. Biochemistry and Molecular Biology majors. Students will learn to prepare and present scientific talks. Use of visual aids and computer technology, presentation organization and delivery, and use of scientific literature will be among the skills students will learn. In addition, students will attend and evaluate weekly departmental seminars.

CHEM 4185. Undergraduate Seminar II. (1.0 cr.; S-N or Audit; prereq 4184; spring, every year)
Second course of a two-course senior seminar requirement for B.S. Chemistry and B.S. Biochemistry and Molecular Biology majors. Students will learn to prepare and present scientific talks. Use of visual aids and computer technology, presentation organization and delivery, and use of scientific literature will be among the skills students will learn. In addition, students will attend and evaluate weekly departmental seminars. Students

will participate in and present at the annual Departmental Undergraduate Symposium.

CHEM 4242. Instrumental Analysis. (3.0 cr.; A-F or Audit; prereq 2222, 4632 or 4634 or 4642; spring, every year)
Theory of instrumental methods of chemical analysis, including electrochemistry, spectroscopy, and separations.

CHEM 4243. Instrumental Chemistry Laboratory. (2.0 cr.; A-F or Audit; prereq 2223, must be taken after or concurrently with CHEM 4242; spring, every year)
Lab companion to 4242 involving the use of computerized chemical instrumentation in the analysis of organic and inorganic samples. Students learn the use of modern programming tools as applied to the control of chemical instrumentation and acquisition and analysis of data there from.

CHEM 4351. Biochemistry I. (3.0 cr.; A-F or Audit; prereq 2222, 2522 or 2532 or 2542, Math 1296, concurrent registration in physical chem recommended - 4363; fall, every year)
Introduction to structural classes of biologically relevant molecules. Descriptions of monomeric small molecules and their incorporation into macromolecules. Covers amino acids, proteins, fatty acids, lipids, sterols, carbohydrates, nucleic acids, RNA, and DNA structures.

CHEM 4352. Biochemistry II. (3.0 cr.; A-F or Audit; prereq 4351; spring, every year)
Introduction to metabolism of carbohydrates, fatty acids, sterols, nucleic acids, amino acids, and xenobiotics. Common metabolic pathways of glycolysis, gluconeogenesis, citric acid cycle, et. The interrelated nature of these pathways and their cellular regulation will be covered.

CHEM 4363. Biochemistry Laboratory. (2.0 cr.; A-F or Audit; prereq 2223, 2522 or 2532 or 2544 or 2545, BS-BMB major, concurrent registration in 4351 is required; fall, every year)
Applications of biochemistry and molecular biology techniques.

CHEM 4373. Physical Biochemistry. (3.0 cr.; A-F or Audit; prereq (4632 or 4634 or 4641) and (4351 or 3322); fall, every year)
The study of biological macromolecules including their thermodynamic and kinetic properties, quantum mechanics and statistical applications.

CHEM 4374. Physical Biochemistry Laboratory. (2.0 cr.; A-F or Audit; prereq 4373, no grad credit; spring, every year)
This capstone course will provide students with the opportunity to critically address research problems in the field of biochemistry via a team-based "open-ended", investigative approach. They will be challenged to utilize and build upon their fundamental knowledge and experience, garnered from previous coursework, to design and carry out experiments focused on understanding the physical chemical basis of biochemical phenomena.

CHEM 4435. Inorganic Chemistry Laboratory. (1.0 cr.; A-F or Audit; prereq 3432, must be taken after or concurrently with CHEM 4436; fall, every year)

Preparation and study of the properties of selected inorganic compounds.

CHEM 4436. Inorganic Chemistry. (3.0 cr.; A-F or Audit; =[CHEM 4434]; prereq 3432, (4634 or 4642), 4435 may be taken concurrent; fall, every year)
Atomic structure and properties of elements based thereon. Chemical bonding. Chemistry of coordination compounds. Mechanisms of selected inorganic reactions. Group theory and spectroscopy applied to inorganic systems.

CHEM 4510. Polymer Chemistry. (3.0 cr.; A-F or Audit; =[CHEM 5510]; prereq 2542 or instructor consent; no grad credit; spring, every year)
In this course students will study the synthesis, characterization, and chemical structure-related properties of polymers. Good knowledge of Organic Chemistry is required. Chemical Kinetics and Thermodynamics will be applied.

CHEM 4633. Physical Chemistry Laboratory. (1.0 cr.; A-F or Audit; prereq 2yrs of college-level chemistry, (2222 or 2212 or 2242), Math 1297, Phys 2012 or (2015 and 2016) or Phys 1001, BS-BMB major or BA-Chem major, 4634 may be taken concurrent; fall, every year)
Laboratory program in physical chemistry, including thermodynamics, spectroscopy, kinetics and quantum mechanics.

CHEM 4634. Physical Chemistry. (3.0 cr.; A-F or Audit; prereq (Phys 2012 or (Phys 2015 and 2016) or Phys 1002), 2 yrs of college-level chemistry, Math 1297, (Chem 2222 or 2212 or 2242), BS-BMB major or BA-Chem major, 4633 may be taken concurrent; fall, every year)
Properties of gases, liquids, and solutions; thermodynamics and equilibria; chemical kinetics, principles of quantum chemistry.

CHEM 4641. Physical Chemistry I. (3.0 cr.; A-F or Audit; prereq 2 yrs chem, (222 or 2212 or 2242), Math 3280, Phys 2012 or 2015 and 2016; concurrent registration in 4643 is required; fall, every year)
Quantitative treatment of physical principles and theories in chemistry, including topics in thermodynamics and kinetics.

CHEM 4642. Physical Chemistry II. (3.0 cr.; A-F or Audit; prereq 4641; Concurrent registration in 4644 is required; spring, every year)
Quantitative treatment of physical principles and theories in chemistry, including topics in quantum mechanics and spectroscopy.

CHEM 4643. Physical Chemistry Laboratory I. (1.0 cr.; A-F or Audit; prereq 2 yrs chem, (2222 or 2212 or 2242), Math 3280, Phys 2012 or 2015 and 2016, 4641 may be taken concurrent; fall, every year)
Laboratory program in physical chemistry, accompanying lecture Chem 4641.

CHEM 4644. Physical Chemistry Laboratory II. (1.0 cr.; A-F or Audit; prereq 4643, 4642 may be taken concurrent; spring, every year)
Laboratory program in physical chemistry, accompanying lecture Chem 4642.

CHEM 5150. Organic and Stable Isotope Biogeochemistry. (3.0 cr.; A-F or Audit;

prereq BIOL 1012 and (CHEM 1152 or 1156 or 1162) and (CHEM 2222 or 2212 or 2242) OR instructor consent; spring, offered periodically) Production and chemical composition of natural organic matter (OM), diagenesis and catagenesis of OM; stable isotopic fractionation processes of C, H, O, N, and S in natural systems, fractionation theory, isotopic indicators of climate, oceanographic/limnologic processes, trophic structure, microbial processes.

CHEM 5350. Research Topics for High School Chemistry Teachers. (2.0-4.0 cr. [max 8.0 cr.]; prereq Ed MA or MEd student, department consent required.; fall, spring, summer, every year)

Experimental work and philosophy associated with a selected research topic.

CHEM 5424. Advanced Inorganic Chemistry I. (3.0 cr.; A-F or Audit; prereq 4436 or equivalent or Grad student; fall, every year)

Advanced topics in inorganic chemistry including the following: Applications of Group Theory to inorganic chemistry such as molecular orbital theory and valence bond theory as well as vibrational analysis, organometallic chemistry including structure and bonding in organometallic compounds, reactions and reaction mechanisms of organometallic compounds, and the application of organometallic compounds as reagents and catalysts in organic synthesis, other advanced aspects of inorganic chemistry, e.g. Bioinorganic Chemistry and Aspects of Material Science.

CHEM 5510. Polymer Chemistry. (3.0 cr.; A-F or Audit; =[CHEM 4510]; prereq graduate student or instructor consent; spring, every year)

In this course students will study the synthesis, characterization, and chemical structure-related properties of polymers. Good knowledge of Organic Chemistry is required. Chemical Kinetics and Thermodynamics will be applied. In addition to the lecture and exams, students in this graduate course will prepare an individual research report on a topic selected from recent developments in polymer chemistry.

CHEM 5524. Advanced Organic Chemistry I. (3.0 cr.; A-F or Audit; prereq 2542 or equivalent or Grad student; fall, every year)

Advanced topics of Organic Reaction Mechanisms and Aspects of Organic Synthesis

CHEM 5624. Advanced Physical Chemistry I. (3.0 cr.; A-F or Audit; prereq 4642 or equivalent or Grad student; spring, every year)

Classical and statistical thermodynamics, chemical kinetics, other selected topics in physical chemistry.

CHEM 5650. Computational Chemistry. (3.0 cr.; A-F or Audit; prereq 4642 or equivalent or Grad student; spring, offered periodically) Molecular Mechanics, Quantum Mechanics, semiempirical and ab initio molecular orbital calculations, density functional theory, and selected additional topics in computation chemistry such as biochemical applications, QSAR, and ligand modeling and docking.

CHEM 5714. Applications of Spectroscopy. (4.0 cr.; A-F or Audit; prereq 4436 or equivalent or Grad student; fall, every year)

Application of spectroscopic techniques to structure elucidation, including NMR, FTIR, MS, UV-Vis, X-ray, EPR spectroscopy. Includes practical component.

CHEM 5725. Advanced Analytical Chemistry I. (3.0 cr.; A-F only; prereq Grad student or 4242 or equivalent; fall, every year)

Intended for advanced undergraduate and beginning graduate students in chemistry and related fields. Augment basic coursework in wet and instrumental analytical chemistry. Topics include statistical and chemometric methods for experimental design and data analysis, electronics and computers in chemical instrumentation, and selected techniques of instrumental analysis such as mass spectrometry, inductively coupled optical emission spectroscopy and analytical gas chromatography.

CHEM 5994. Directed Research in Chemistry. (1.0-3.0 cr. [max 9.0 cr.];

prereq Min 90 cr or grad in the sciences or engineering or instructor consent; fall, spring, summer, every year)

Directed laboratory or theoretical research in the chemical sciences.

CHEM 8184. Seminar. (1.0 cr.; S-N or Audit;

prereq Grad chem major or instructor consent; fall, spring, every year)

Practice in preparation and oral presentation of reports on articles from the literature or on graduate research.

CHEM 8224. Advanced Analytical Chemistry II. (4.0 cr.; A-F or Audit; prereq Grad student or instructor permission; spring, offered periodically)

Advanced treatment of selected methods in analytical chemistry.

CHEM 8333. FTE: Master's. (1.0 cr.; No Grade Associated; prereq Master's student, adviser and DGS consent; fall, spring, every year)

(No description)

CHEM 8424. Advanced Inorganic Chemistry II. (4.0 cr.; A-F or Audit; prereq grad student or instructor permission; fall, spring, offered periodically)

Discussion of structure, reactions, and bonding in inorganic and organometallic compounds in terms of valence bond, molecular orbital, and ligand field theories.

CHEM 8444. FTE: Doctoral. (1.0 cr.; No

Grade Associated; prereq Doctoral student, adviser and DGS consent; fall, spring, every year)

(No description)

CHEM 8524. Advanced Organic Chemistry II. (4.0 cr.; A-F or Audit; prereq grad student or instructor permission; fall, spring, every year)

Advanced treatment of synthetic methods and reaction mechanisms in organic chemistry.

CHEM 8666. Doctoral Pre-Thesis Credits. (1.0-6.0 cr. [max 12.0 cr.]; No Grade

Associated; prereq Max 6 cr per semester or

summer; doctoral student who has not passed prelim oral; no required consent for the first two registrations up to 12 cr; departmental consent for the third and fourth registrations up to an additional 12 cr, or 24 cr total (for doctoral students admitted summer 2007 and beyond; doctoral students admitted prior to summer 2007 may register up to 4 times totaling 60 cr); fall, spring, summer, every year)

(No description)

CHEM 8720. Modern Mass Spectrometry. (3.0 cr.; A-F or Audit; prereq Grad student; fall, odd years)

Current instrumentation and techniques in mass spectrometry of molecular and atomic species. Discussion to include ionization techniques, mass analysis methods and detection of gas phase ions in the context of structural and elemental analysis. Interfacing of mass spectrometers to chromatographic systems is considered. Gas phase unimolecular and ion-molecule reaction kinetics and energetics are stressed as they relate to the information content observed in the mass spectrum.

Current instrumentation and techniques in mass spectrometry of molecular and atomic species. Discussion to include ionization techniques, mass analysis methods and detection of gas phase ions in the context of structural and elemental analysis. Interfacing of mass spectrometers to chromatographic systems is considered. Gas phase unimolecular and ion-molecule reaction kinetics and energetics are stressed as they relate to the information content observed in the mass spectrum.

CHEM 8750. Special Topics: (Various Titles to be Assigned). (1.0-4.0 cr. [max 8.0 cr.];

prereq Grad student or instructor consent; fall, spring, every year)

Topics not available in standard curriculum.

CHEM 8777. Thesis Credits: Master's. (1.0-18.0 cr. [max 50.0 cr.]; No Grade

Associated; prereq Max 18 cr per semester or summer; 10 cr total required (Plan A only); fall, spring, summer, every year)

(No description)

CHEM 8888. Thesis Credits: Doctoral. (1.0-24.0 cr. [max 100.0 cr.]; No Grade

Associated; prereq Max 18 cr per semester or summer; 24 cr required; fall, spring, every year)

(No description)

Chinese (CHIN)

College of Liberal Arts

CHIN 1101. Beginning Chinese I: A Practical Introduction to Everyday Mandarin Chinese. (COMM & LAN; LE CAT3; LEIP CAT03; 4.0

cr.; A-F or Audit; prereq Little or no prior formal study of this language or instructor consent; fall, every year)

Introduction to Mandarin Chinese for students with little or no prior study. Emphasis will be on expressions for daily living with appropriate grammar and vocabulary. Writing in the phonetic pin yin system will be introduced as will high frequency characters.

CHIN 1102. Beginning Chinese II: A Practical Introduction to Everyday Mandarin Chinese. (COMM & LAN; LE CAT3; LEIP

CAT03; 4.0 cr.; A-F or Audit; prereq 1101; spring, every year)

Introduction to Mandarin Chinese for students with little prior study. Emphasis will be on expressions for daily living with appropriate grammar and vocabulary. Writing in the phonetic pin yin system will be introduced as will high frequency characters.

CHIN 1103. Beginning Chinese III: A Practical Introduction to Everyday Mandarin Chinese. (COMM & LAN; LE CAT3; 4.0 cr.; A-F or Audit; prereq 1102 or equivalent, or instructor consent; fall, every year)

Continued introduction to Mandarin Chinese for students with six credits prior study. Emphasis on expressions for daily living with appropriate grammar and vocabulary. Writing in the phonetic pin yin system will be introduced as will high frequency characters.

CHIN 1104. Beginning Chinese IV: A Practical Introduction to Everyday Mandarin Chinese. (COMM & LAN; LE CAT3; 4.0 cr.; A-F or Audit; prereq 1103 or equivalent, or instructor consent; spring, every year)

Continued introduction to Mandarin Chinese for students with nine credits prior study. Emphasis on expressions for daily living with appropriate grammar and vocabulary. Writing in the phonetic pin yin system will be introduced as will high frequency characters.

CHIN 1201. Intermediate Chinese I: Mandarin Chinese. (COMM & LAN; LE CAT3; LEIP CAT03; 4.0 cr.; A-F or Audit; prereq 1104 or equivalent or instructor consent; fall, every year)

Consolidation and enrichment of previously acquired abilities speaking and understanding Mandarin Chinese. Emphasis on oral and aural skills, vocabulary building, some reading and writing in the phonetic pin yin system with high frequency characters.

CHIN 1202. Intermediate Chinese II: Mandarin Chinese. (COMM & LAN; LE CAT3; LEIP CAT03; 4.0 cr.; A-F only; prereq 1201 or equivalent; spring, every year)

Consolidation and enrichment of previously acquired abilities speaking and understanding Mandarin Chinese. Emphasis on oral and aural skills, vocabulary building, some reading and writing in the phonetic pin yin system with high frequency characters.

CHIN 3042. Aspects of Chinese Cultures: Interface between Traditions and Contemporary Values. (4.0 cr.; A-F or Audit; spring, every year)

Survey of aspects of Chinese civilization and cultures. Students will examine diverse cultural values in the international community and work toward a sense of culturally responsive citizenship in the current global society. Taught in English.

Civil Engineering (CE)

Swenson College of Science and Engineering

CE 1000. History of Structures.

(HUMANITIES; 3.0 cr.; A-F or Audit; fall, every year)

This course will study structures of historical significance. The social and economic importance of each structure as well as the merits of the engineering design of each structure will be considered. Students will learn to evaluate qualitatively how load is transferred in typical structures, for example, cable-stayed and suspension bridges. The styles of major contemporary structural designers will be

examined; for example, the work of Eiffel, Roebling, Eads, Ammann and Maillart. Local structures, such as the Duluth lift bridge, will also be studied.

CE 1025. Introduction to Civil Engineering. (1.0 cr.; A-F or Audit; prereq Civil Engineering students only; fall, spring, every year)

Introduction to transportation, water resources, structures, and geotechnical design. Introduction to ethics, professionalism, globalization, and contemporary issues in civil engineering. Introduction to the design process.

CE 2017. Engineering Mechanics: Statics and Mechanics of Materials. (5.0 cr.; A-F or Audit; prereq MATH 1297, PHYS 2011 or 2013 and 2014; credit will not be granted if already received for ENGR 2015 and ENGR 2016 combined.; fall, spring, every year)

Vector algebra. Applications of equations of equilibrium to analysis of simple engineering structures and machines. Nature and influence of friction. Elementary theory of statically determinate framed structures. Introductory treatment of stress and strain at a point. Stress-strain relation in two dimensions. Axial loading, torsion, shear and bending moment diagrams, bending stresses, deflection of determinate and indeterminate beams, instability.

CE 2425. Geologic Principles for Civil Engineers. (4.0 cr.; A-F or Audit; prereq credit will not be granted if already received for CE 2435 or CE 3425 or GEOL 1110; fall, spring, every year)

The course presents an introduction of geology for civil engineers. The theory component of the course presents a comprehensive survey of Earth's composition, structure, and dynamics to develop an understanding of internal processes, plate tectonics, and surface processes as a framework for geological history and development of life (this component follows the same structure of the course GEOL 1110 - Geology and Earth Systems). The lab component of the course focuses on the application of geological science principles to topics that are relevant to the civil engineering profession. These topics include identification of mineral and rock samples in a context of construction materials or materials existing as part of foundations or excavations of civil engineering structures; topographic and geologic maps; description of rock mass and rock structures and computational engineering geology problems.

CE 3015. CAD & Engineering Drawing.

(3.0 cr.; A-F or Audit; prereq 2017, BSCE candidate; fall, spring, every year)

Introduction to both hand and computer aided drafting. Hand drafting will include orthographic projections, multiple views, sectional views and isometric projections. Computer aided drafting will focus on the use of AutoCAD. This will include drawing procedures and tools, dimensioning, scaling, and plotting.

CE 3016. Surveying . (2.0 cr.; A-F or Audit; prereq Math 1297, BSCE candidate; summer, every year)

Fundamentals of observing distances, elevations, and angles. Traversing. Irregular

areas. Circular and parabolic curves. Earthwork including mass diagrams. Construction staking.

CE 3025. Environmental Engineering. (3.0 cr.; A-F only; prereq Chem 1151 or 1153 and 1154, CE 3221, BSCE candidate; fall, spring, every year)

Introduction to environmental engineering systems and infrastructure. Fundamentals including application of mass/energy balances and equilibrium to environmental systems. These concepts applied to environmental topics: risk assessment, water quality modeling, water/wastewater treatment, air quality modeling, municipal/hazard solid waste management.

CE 3026. Project Management. (3.0 cr.; A-F or Audit; prereq BSCE candidate; fall, spring, every year)

Study of basic concepts and models for successful management of projects in engineering. Topics discussed include: engineering economics, project delivery process, bid development, cost estimation, life cycle cost evaluation, contract structure, scheduling, resource allocation and LEED requirements.

CE 3027. Infrastructure Materials. (4.0 cr.; A-F or Audit; prereq 2017, BSCE candidate; fall, spring, every year)

Introduction to the behavior and structure of civil engineering materials, including laboratory investigation of physical and mechanical. Materials examined include concrete, steel, wood, asphalt and polymers.

CE 3115. Structural Analysis. (3.0 cr.; A-F or Audit; prereq 2017, Math 3280 (concurrent), BSCE candidate; fall, spring, every year)

Introduction to the behavior of structures. Students will learn about the loads on structures, and how to determine the path of these loads through the structure. Topics include: truss analysis, shear and moment diagrams, deflections, analysis of indeterminate structures, influence lines, and shear and moment envelopes.

CE 3221. Fluid Mechanics. (3.0 cr.; A-F or Audit; prereq 2017, Math 3280 (concurrent), BSCE candidate; fall, spring, every year)

Properties of fluids, fundamental of fluid flow including energy and momentum principles, applications to pipes and open channels, steady and unsteady flow, dimensional analysis, fluid measurement techniques, and pump performance.

CE 3225. Hydraulics and Hydrology. (4.0 cr.; A-F or Audit; prereq 3221, Math 3280 (concurrent), BSCE candidate; fall, spring, every year)

Introduction to hydrologic analysis including precipitation, infiltration, hydrology analysis, stream routing, groundwater, and well hydrology. Fundamentals of hydraulic analysis, types of flow hydraulic devices, pipe, and open channel flow, uniform and varied flow.

CE 3316. Transportation Engineering. (4.0 cr.; A-F or Audit; prereq BSCE candidate; fall, spring, every year)

Introduction to transportation systems, driver behavior, vehicle characteristics, and principles

of highway network planning. Introduction to roadway and intersection design methods, traffic signal operation and timing optimization methods. Fundamental of traffic flow theory.

CE 3426. Soil Mechanics. (4.0 cr.; A-F or Audit; prereq 2017, 3425 or 2425 or 2435, BSCE candidate; fall, spring, every year) Study of soil as an engineering material including description and classification of soils, total and effective stresses and pore water pressure in soils, and soil behavior as applied to conditions of engineering significance. This involves the characteristics of water flow through soils, soil bearing capacity, soil consolidation and settlement, soil shear strength, lateral earth pressure and slope stability analysis in soils.

CE 4096. Cooperative Education I. (1.0 cr. [max 3.0 cr.]; A-F or Audit; prereq CE upper division student, instructor consent; no grad credit; fall, spring, summer, every year) Practical work experience with an employer closely associated with students academic area. Arranged by mutual agreement among student, department and employer. Formal written report of work completed must be submitted to the department at the end of the experience.

CE 4115. Design of Steel Structures. (3.0 cr.; A-F or Audit; prereq 3115, BSCE candidate, no grad credit; spring, every year) The design of steel components and structures based on applicable design codes. This includes: tension members, compression members, beams, beam-columns, composite members, and connections.

CE 4126. Design of Concrete Structures. (3.0 cr.; A-F or Audit; prereq 3115, BSCE Candidate, no Grad cr; spring, every year) The design of concrete structures based on applicable codes. Topics covered include: design of beams and slabs to resist moment and shear, design of columns, reinforcement detailing, and deflection control.

CE 4128. Prestressed Concrete Structures. (3.0 cr.; A-F or Audit; prereq 4126; fall, spring, offered periodically) Design and behavior of prestressed concrete structures: materials and systems (including specifics for precast and post-tensioned members), losses, flexure, shear, bond, deflections, partial prestressing, continuous beams.

CE 4137. Advanced Structural Analysis and Design. (3.0 cr.; A-F or Audit; prereq 4126, 4115, no grad credit; fall, every year) Advanced topics in both structural analysis and design. Topics include: matrix analysis, introduction to finite elements, design of prestressed concrete, design of two way concrete slabs, and design of steel plate girders.

CE 4215. Hydraulic Design. (3.0 cr.; A-F only; prereq 3225, no Grad credit; fall, every year) Application of hydraulic and hydrologic engineering data and methods for design of hydraulic structures including storm sewers,

conveyance channels, flow control structures, detention and wet ponds, culverts, bridges, and dams. This course will make use of computer simulation models used in engineering design and include applications to stormwater managements.

CE 4226. Water Resources Engineering. (3.0 cr.; A-F only; prereq 3225, no Grad cr; spring, every year) Application of engineering economics, risk analysis, and operations research to the planning and management of water systems; major topics include flood control, hydroelectric power, water supply, multiobjective planning, sustainability and climate change.

CE 4237. Water Quality Engineering. (3.0 cr.; A-F or Audit; prereq 3025 or instructor consent; no grad credit; fall, odd years) Applied analysis of water quality in natural systems. Review of mass-transport processes and approaches for solving water quality problems in lakes, estuaries, rivers, groundwater, and soil-sediment with TMDL (Total Maximum Daily Load) and remediation design applications. Applications in water and wastewater treatment.

CE 4255. Senior Design. (4.0 cr.; A-F only; prereq instructor consent, no Grad cr; fall, spring, every year) Formal written and oral reports describing design project. Complete professional documentation of results.

CE 4315. Traffic Systems Operations and Safety. (3.0 cr.; A-F or Audit; prereq 3316, no grad credit; spring, every year) Theories of traffic flow modeling and simulation. Traffic analysis process with computer-aided simulation tools. Methodologies to determine optimum intersection signal timing plans and freeway ramp control. Procedures to identify and improve safety problems on different types of highways. Statistical methods to quantify the effectiveness of certain safety measures will be discussed.

CE 4316. Pavement Design and Rehabilitation. (3.0 cr.; A-F or Audit; prereq 2017, 3027 and 3316; no grad credit; fall, every year) Analysis, behavior, performance, and structural design of pavements for highways and airfields will be discussed. Prominent pavement distress mechanisms, their causes, and remedial measures will be presented. Other topics include climate factors, rehabilitation, sustainability, and renewability in pavement engineering, life cycle design economics, and traffic loadings.

CE 4318. Pavement Repair, Maintenance, Preservation and Management Systems. (3.0 cr.; A-F or Audit; prereq 3027, 3316 or instructor consent; no grad credit; fall, offered periodically) This course covers the technical and financial strategies to extend the life of highway and airfield pavements. The course topics will include: assessment of pavement functional and structural condition, suitability of pavement maintenance and repair techniques, use

of pavement preservation processes, and application of asset management to extend the life of pavement infrastructure. Significant course emphasis will be on use of real life case-studies and applying various aspects of pavement repair. Maintenance and preservation to best manage the pavement infrastructure. The course will utilize the software PAVER to teach the pavement management system.

CE 4326. Highway Planning and Design. (3.0 cr.; A-F or Audit; prereq 3316; no grad credit; fall, spring, every year) This course aims to provide an in-depth knowledge on highway network planning and design methodologies. Current planning and design methods for roadways will be introduced and used for class projects. The potential interrelationship between design parameters and traffic operation/safety will also be introduced for each design element.

CE 4415. Geotechnical Design. (3.0 cr.; A-F or Audit; prereq 3426, no grad credit; fall, spring, every year) Study of geotechnical engineering topics related to design and construction of structures in contact with soils such as shallow and deep foundations, pile foundations and earth retaining structures. Also covered are topics related to site characterization and subsoil exploration and methods for ground improvement and modification.

CE 4420. Advanced Soil Mechanics. (3.0 cr.; A-F or Audit; prereq 3426, 4415 (concurrent registration is acceptable) or instructor consent; no grad credit; spring, offered periodically) This course will cover advanced topics related to the behavior of cohesive and cohesionless soils. Topics to be covered include: stress and strength concepts; measurement devices; shear strength of sands, gravels, and rockfills; shear strength of saturated clay; and shear strength of silts.

CE 4421. Applied Geostatistics. (3.0 cr.; A-F or Audit; prereq MATH 1297 or STAT 2411 or STAT 3411 or instructor consent; no grad credit; spring, offered periodically) The course teaches theoretical and practical aspects of geostatistics; with primary focus on analysis of information gathered in site investigations for civil engineering projects, although the concepts taught in the course also have direct application in economic geology and ore-mining investigations. Theoretical aspects of the course center on description and modeling of spatial variability and interpolation attributes of interest at unsampled locations; they also focus on sampling design and incorporation of different types of information (continuous, categorical) in geostatistical prediction. Practical implementation of concepts taught involves use of geostatistical packages in the software R and Matlab (also commercial software packages commonly used in the civil and mining engineering industry such as ArcGIS, Vulcan, etc., will be addressed.)

CE 4422. Numerical Modeling in Geotechnical Engineering. (3.0 cr.; A-

F or Audit; prereq 3426, 4415 (concurrent registration acceptable) or instructor consent; no grad credit; spring, offered periodically)

This course covers theoretical and practical aspects of numerical modeling of problems in geotechnical engineering, using the finite element and finite difference methods, as implemented in commercial packages such as Abaqus and FLAC. The emphasis is on the solution of typical soil mechanics and geotechnical design problems. These include determining stresses in soils; solving shallow and deep foundation problems; seepage and consolidation problems; lateral earth pressure, retaining wall and slope stability problems; and seismic wave propagation in soils.

CE 4426. Rock Mechanics. (3.0 cr.; A-F or Audit; prereq 3426; no grad credit; fall, spring, offered periodically)

Study of rock as an engineering material, including physical and mechanical characterization of intact rock and rock masses as they relate to civil and mining engineering applications. This also includes the study of effect of jointing and water in a rock mass, foundations of civil and mining engineering structures in rock, stability of cuts in rock, and excavation and support of surface and underground and openings in rock. Laboratory testing is included in this course.

CE 4436. Design of Underground and Surface Excavations in Rock. (3.0 cr.; A-F or Audit; prereq 4426; no grad credit; fall, spring, offered periodically)

Study of planning, design and construction methods of underground and surface excavations in rock masses with application to civil and mining engineering, including transportation tunnels, underground caverns and open pit excavations for mining.

CE 4515. Sustainable Design and Construction. (SUSTAIN; 3.0 cr.; A-F or Audit; prereq BSCE or BSCE or BSECE or BSIE or BSME; no grad credit; fall, spring, offered periodically)

Introduction to sustainable design and construction including LEED, materials, construction/transportation/production, life-cycle/service, rating systems, codes, regulations, economical issues and social issues.

CE 4596. Cooperative Education II. (2.0 cr.; A-F or Audit; prereq CE upper division, instructor consent; no grad credit; fall, spring, summer, every year)

Continuation of practical work experience with an employer closely associated with students academic area. Arranged by mutual agreement among student, department and employer. Formal written report of work completed must be submitted to the department at the end of the experience.

CE 4991. Independent Study in Civil Engineering. (1.0-4.0 cr.; A-F or Audit; prereq CE upper division status, instructor consent; no graduate credit; fall, spring, summer, every year)

Directed study of special interest topics not available in the standard curriculum. Must be

arranged with instructor before registration. May include readings, research and/or special projects.

CE 4995. Special Topics in Civil Engineering: (Various Titles to be Assigned). (1.0-4.0 cr. [max 12.0 cr.]; A-F or Audit; prereq no grad credit; fall, spring, summer, every year)

Topics not available in the regular department curriculum. Topics may include specialities of the department or visiting faculty.

CE 5027. Advanced Infrastructure Materials. (3.0 cr.; A-F or Audit; prereq Graduate status or instructor consent; spring, odd years)

This course will cover advanced topics related to the behavior of asphalt concrete and Portland cement concrete. Topics to be covered include: properties of asphalt binder; hot mix, warm mix, and cold mix asphalt concrete; Portland cement production and chemistry; concrete durability; and the properties of FRC, FRP, and SCC.

CE 5115. Structural Dynamics. (3.0 cr.; A-F or Audit; prereq 3115 or grad student; fall, spring, offered periodically)

Response of single degree-of-freedom and multiple degree of freedom systems to vibrations, earthquakes, blast and impact.

CE 5127. Bridge Analysis and Design. (3.0 cr.; A-F or Audit; prereq 4115, 4126 or Grad student; fall, spring, offered periodically)

This course will present AASHTO LRFD based highway bridge analysis, design and evaluation.

CE 5128. Prestressed Concrete Structures. (3.0 cr.; A-F or Audit; prereq CE 4126 or grad student; fall, spring, offered periodically)

Design and behavior of prestressed concrete structures: materials and systems (including specifics for precast and post-tensioned members), losses, flexure, shear, bond, deflections, partial prestressing, continuous beams.

CE 5137. Advanced Structural Analysis and Design. (3.0 cr.; A-F or Audit; prereq 4115, 4126; grad student; fall, every year)

Advanced topics in both structural analysis and design. Topics include: matrix analysis, introduction to finite elements, design of prestressed concrete, design of two way concrete slabs, and design of steel plate girders.

CE 5201. Water Policy. (3.0 cr.; A-F or Audit; =[WRS 5101]; prereq graduate student or instructor consent; fall, every year)

Socio-cultural, legal, and economic factors that affect water resources management. historical trends in water policy, resulting water laws in the United States. Federal, state and local institutional structures for water management.

CE 5216. Applications in Environmental Modeling. (3.0 cr.; A-F or Audit; prereq graduate status or instructor consent; spring, offered periodically)

Theory and application of environmental chemodynamics. Transport processes and equilibrium across natural phases including water, air, and soil using analytical and

numerical modeling approaches. Economic and reliability analysis for hydrosystems using linear and non-linear programming with applications to water supply and water excess engineering.

CE 5226. Water Resources Engineering. (3.0 cr.; A-F or Audit; prereq 3225, grad student; spring, every year)

Application of engineering economics, risk analysis, and operations research to the planning and management of water systems; major topics include flood control, hydroelectric power, water supply, multiobjective planning, sustainability and climate change.

CE 5237. Water Quality Engineering. (3.0 cr.; A-F or Audit; prereq 3025 or CHE 2001 or grad student or instructor consent; fall, odd years)

Applied analysis of water quality in natural systems. Review of mass-transport processes and approaches for solving water quality problems in lakes, estuaries, rivers, groundwater, and soil-sediment with TMDL (Total Maximum Daily Load) and remediation design applications. Applications in water and wastewater treatment.

CE 5315. Traffic Systems Operations and Safety. (3.0 cr.; A-F or Audit; prereq 3316 or grad student; spring, every year)

Theories of traffic flow modeling and simulation. Traffic analysis process with computer-aided simulation tools. Methodologies to determine optimum intersection signal timing plans and freeway ramp control. Procedures to identify and improve safety problems on different types of highways. Statistical methods to quantify the effectiveness of certain safety measures will be discussed.

CE 5316. Pavement Design and Rehabilitation. (3.0 cr.; A-F or Audit; prereq 3027, 3316; grad student; fall, every year)

Analysis, behavior, performance, and structural design of pavements for highways and airfields will be discussed. Prominent pavement distress mechanisms, their causes, and remedial measures will be presented. Other topics include climate factors, rehabilitation, sustainability, and renewability in pavement engineering, life cycle design economics, and traffic loadings.

CE 5317. Traffic Flow Theory and Modeling. (3.0 cr.; A-F or Audit; prereq 4315 or grad student; fall, spring, offered periodically)

Vehicle detection and traffic data collection methods. Measure for traffic system effectiveness, drive behavior theory, and microscopic modeling. Macroscopic traffic flow theory and modeling methodologies, simulation models and optimal calibration methods. Application of simulation models.

CE 5318. Pavement Management Systems. (3.0 cr.; A-F or Audit; prereq 3027, 3316 or CE graduate student; fall, offered periodically)

This course covers the technical and financial strategies to extend the life of highway and airfield pavements. The course topics will include: assessment of pavement functional and structural condition, suitability of pavement maintenance and repair techniques, use

of pavement preservation processes, and application of asset management to extend the life of pavement infrastructure. Significant course emphasis will be on use of real life case-studies and applying various aspects of pavement repair. Maintenance and preservation to best manage the pavement infrastructure. The course will utilize the software PAVER to teach the pavement management system. Will require development of a graduate level project, in addition to the undergraduate level requirements of the course.

CE 5326. Highway Planning and Design. (3.0 cr.; A-F or Audit; prereq 3316 or graduate student; fall, spring, every year)

This course aims to provide an in-depth knowledge on highway network planning and design methodologies. Current planning and design methods for roadways will be introduced and used for class projects. The potential interrelationship between design parameters and traffic operation/safety will also be introduced for each design element.

CE 5410. Finite Element Methods for Civil Engineering Applications. (3.0 cr.; A-F or Audit; prereq BSCE or BSME or BSIE or grad student; fall, spring, offered periodically) Theory and application of the finite element method for solving problems in solid mechanics and fluid/heat mechanics, with emphasis on civil engineering applications. The course covers the underlying theory and the implementation of the method using commercially available computer software such as Matlab and Abaqus. Application problems covered in the course include, among others, analysis of elastic structures (beams and trusses and plates) and solid structures (plan strain problems) and steady-state analysis of water and heat flow problems in one and two dimensions.

CE 5420. Advanced Soil Mechanics. (3.0 cr.; A-F or Audit; prereq 3426, 4415 (concurrent registration is acceptable) or CE graduate student; spring, offered periodically)

This course will cover advanced topics related to the behavior of cohesive and cohesionless soils. Topics to be covered include: stress and strength concepts; measurement devices; shear strength of sands, gravels, and rockfills; shear strength of saturated clay; and shear strength of silts. Will require development of graduate project level project, in addition to the undergraduate level requirements of the course.

CE 5421. Applied Geostatistics. (3.0 cr.; A-F or Audit; prereq MATH 1297 or STAT 2411 or 3411 or CE graduate student; spring, offered periodically)

The course teaches theoretical and practical aspects of geostatistics; with primary focus on analysis of information gathered in site investigations for civil engineering projects, although the concepts taught in the course also have direct application in economic geology and ore-mining investigations. Theoretical aspects of the course center on description and modeling of spatial variability and interpolation attributes of interest at unsampled locations;

they also focus on sampling design and incorporation of different types of information (continuous, categorical) in geostatistical prediction. Practical implementation of concepts taught involves use of geostatistical packages in the software R and Matlab (also commercial software packages commonly used in the civil and mining engineering industry such as ArcGIS, Vulcan, etc., will be addressed.) Will require development of a graduate level project, in addition to the undergraduate level requirements of the course.

CE 5422. Numerical Modeling in Geotechnical Engineering. (3.0 cr.; A-F or Audit; prereq 3426, 4415 (concurrent registration acceptable) or CE Graduate Student or instructor consent; spring, offered periodically)

This course covers theoretical and practical aspects of numerical modeling of problems in geotechnical engineering, using the finite element and finite difference methods, as implemented in commercial packages such as Abaqus and FLAC. The emphasis is on the solution of typical soil mechanics and geotechnical design problems. These include determining stresses in soils; solving shallow and deep foundation problems; seepage and consolidation problems; lateral earth pressure, retaining wall and slope stability problems; and seismic wave propagation in soils. Will require development of a graduate level project in addition to the undergraduate level requirements of the course.

CE 5426. Rock Mechanics. (3.0 cr.; A-F or Audit; prereq 3426, Grad Student; fall, spring, offered periodically)

Study of rock as an engineering material, including physical and mechanical characterization of intact rock and rock masses as they relate to civil and mining engineering applications. This also includes the study of effect of jointing and water in a rock mass, foundations of civil and mining engineering structures in rock, stability of cuts in rock, and excavation and support of surface and underground and openings in rock.

CE 5436. Design of Underground and Surface Excavations in Rock. (3.0 cr.; A-F or Audit; prereq 4426; grad student; fall, spring, offered periodically)

Study of planning, design and construction methods of underground and surface excavations in rock masses with application to civil and mining engineering, including transportation tunnels, underground caverns and open pit excavations for mining.

CE 5515. Sustainable Design and Construction (SUSTAIN). (3.0 cr.; A-F or Audit; prereq BSCE or BSCE or BSECE or BSIE or BSME or Grad student; meets DLE req of Sustainability; fall, spring, offered periodically)

Introduction to sustainable design and construction including LEED, materials, construction/transportation/production, life-cycle/service, rating systems, codes, regulations, economical issues and social issues.

CE 5555. Project Credits: Master of Engineering (Civil). (3.0-6.0 cr. ; A-F or Audit; prereq Civil Engineering MEng Student; fall, spring, summer, every year) Master of Engineering project work as determined by faculty advisor and student with approval by the department director of graduate studies.

CE 5991. Graduate Independent Study in Civil Engineering. (1.0-12.0 cr. ; A-F or Audit; prereq CE MEng candidate, instructor consent; fall, spring, summer, every year) Directed study of special interest topics not available in the standard curriculum. Must be arranged with instructor before registration. May include readings, research and/or special project.

CE 5995. Special Topics in Civil Engineering:(Various Titles to be Assigned). (1.0-4.0 cr. [max 12.0 cr.]; A-F or Audit; prereq grad student; fall, spring, summer, every year) Topics not available in the regular department curriculum. Topics may include specialties of the department or visiting faculty.

CE 8094. Civil Engineering Master's Project. (1.0-6.0 cr. [max 24.0 cr.]; S-N or Audit; prereq Graduate student; fall, spring, summer, every year)

Master's project: Research or independent study in geotechnical, structural, transportation, and water resources and environmental engineering. Investigations, reports, tests, or designs are acceptable.

CE 8777. Thesis Credits: Master's. (1.0-12.0 cr. [max 24.0 cr.]; No Grade Associated; prereq graduate student; max 12 cr per semester or summer, 10 cr total required (Plan A only); fall, spring, summer, every year) Master's thesis credits.

Coaching (CC)

College of Education and Human Service Professions

CC 3117. Functional Anatomy and Sport Injury Management. (3.0 cr.; A-F or Audit; =[CHEM 2522, CHEM 2532, CC 3116]; prereq Minimum 30 credits, current Red Cross First Aid and CPR card or Hlth 1600; fall, spring, summer, every year)

Functional anatomy, care and prevention of sport injuries, emergency care and external support application. Principles and techniques appropriate for coaches, recreational personnel, pre-professional physical therapists and nurses.

CC 3150. Coaching Methods. (3.0 cr.; A-F or Audit; prereq Coaching minor or instructor consent; fall, spring, summer, every year) Study and application of educational methods in an athletic setting. Skill development, learning styles, communication skills, technology skills and practice development as it pertains to sport.

CC 3160. Psychological Aspects of Coaching and Athletic Performance. (3.0 cr.; A-F or Audit; prereq Coaching minor or instructor consent; spring, every year)

Psychological techniques and interventions to enhance athletic performance. Emphasizes the implementation of mental skills that enhance athletic performance into sport practice by the coach and/or athlete.

CC 3161. Administrative Aspects of Coaching.

(3.0 cr.; A-F or Audit; prereq Coaching minor or instructor consent; fall, summer, every year)

Examines state governing organizations, budgeting, scheduling, insurance, contest administration, and public relations procedures in athletic programs.

CC 3170. Coaching and Officiating Football.

(2.0 cr.; A-F or Audit; prereq Coaching minor or instructor consent; spring, offered periodically) Systems of offense and defense, strategy, and methods of organizing practices and working with team members.

CC 3171. Coaching and Officiating Basketball.

(2.0 cr.; A-F or Audit; prereq Coaching minor or instructor consent; fall, offered periodically)

Fundamentals, styles of offense and defense, training suggestions.

CC 3172. Coaching and Officiating Volleyball.

(2.0 cr.; A-F or Audit; prereq Coaching minor or instructor consent; spring, offered periodically)

Coaching and officiating offenses and defenses; conditioning programs; coaching and officiating philosophies.

CC 3173. Coaching and Officiating Baseball.

(2.0 cr.; A-F or Audit; prereq Coaching minor or instructor consent; spring, offered periodically) Fundamentals, practice sessions, training techniques, and offensive and defensive strategies.

CC 3174. Coaching and Officiating Soccer.

(2.0 cr.; A-F or Audit; prereq Coaching minor or instructor consent; spring, offered periodically) Fundamental skills, systems of offense and defense, strategy and rules of the game, methods of organizing practices.

CC 3175. Coaching and Officiating Ice Hockey.

(2.0 cr.; A-F or Audit; prereq Coaching minor or instructor consent; fall, offered periodically)

Fundamental skills, systems of offense and defense, strategy and rules of the game, methods of organizing practices.

CC 3178. Coaching and Officiating Track and Field.

(2.0 cr.; A-F or Audit; prereq Coaching minor or instructor consent; spring, offered periodically)

Fundamentals, mechanical analysis of events, training techniques and strategies.

CC 3179. Coaching and Officiating Softball.

(2.0 cr.; A-F or Audit; prereq Coaching minor or instructor consent; spring, offered periodically) Fundamentals, practice sessions, training techniques, and offensive and defensive strategies.

CC 3991. Independent Study.

(1.0-4.0 cr.; A-F or Audit; prereq Coaching minor and instructor consent; fall, spring, every year)

A coaching methods experience. Directed individual study must be arranged with the instructor before registration.

CC 3997. Coaching Practicum. (2.0 cr.; S-N only; prereq Coaching minor and instructor consent; fall, spring, summer, every year)

Supervised coaching in a school or agency setting. Coaching practicum must be arranged with the instructor before registration.

College of Liberal Arts (CLA)

College of Liberal Arts

CLA 1199. Applied Leader(ship) Practicum.

(1.0-3.0 cr.; S-N only; prereq instructor consent; summer, every year)

Course for students who are RockStars at Bulldog Welcome Week. For information on being a RockStar contact the UMD Office for Students in Transition.

CLA 2102. Leader(ship): Theory and Practice.

(3.0 cr.; A-F only; prereq Minimum 30 credits; credit will not be granted if already received for Comm 2200 or Mgts 4431 or MAPL 5307; spring, summer, every year)

Theories, research, and complexity of leader and leadership activities in group, organizational, and community contexts. Topics include leadership emergence, transactional and transformational perspectives, followership, power, creativity, ethics, and shared leadership.

Communication (COMM)

College of Liberal Arts

COMM 1000. Human Communication Theory.

(COMM & LAN; LE CAT3; 3.0 cr.; A-F or Audit; fall, spring, every year)

Introduction to fundamental concepts, models, and theories of human communication. Issues concerning verbal and nonverbal symbolic processes, language and meaning, and the relationship between communication and understanding. Communication processes and problems in various contexts.

COMM 1010. Persuasion. (SOC SCI; LE CAT6; 3.0 cr.; A-F or Audit; fall, spring, offered periodically)

Introduction to the analysis of social scientific persuasion techniques used to influence attitudes, perceptions, knowledge, and behavior of others in society.

COMM 1112. Public Speaking. (COMM & LAN; LE CAT3; 3.0 cr.; A-F or Audit; =[COMM 1511]; fall, spring, every year)

Application of the theoretical bases of rhetoric to the public speaking situation.

COMM 1222. Interpersonal Communication.

(COMM & LAN; LE CAT3; LECD CAT03; 3.0 cr.; A-F or Audit; fall, spring, every year) Analysis of the role communication plays in interpersonal relationships.

COMM 1500. Media and Society.

(HUMANITIES; LE CAT8; 3.0 cr.; A-F or Audit; fall, spring, summer, offered periodically) Historical survey of media genres, and examination of influence of contemporary media on society.

COMM 1511. Honors: Public Speaking.

(COMM & LAN; LE CAT3; 3.0 cr.; A-F only; =[COMM 1112]; prereq Honors student; fall, spring, offered periodically)

Application of the theoretical bases of rhetoric to the public speaking situation.

COMM 1600. Argumentation and Debate: A Practical Approach. (LOGIC & QR; 3.0 cr.; A-F or Audit; fall, spring, every year)

Utilizes a symbolic action approach to introduce the theory and practice of argumentation, particularly within practical contexts; aiming at the related goals of making students more effective arguers, more critical consumers of arguments, and more critical thinkers generally.

COMM 1625. Philosophy and Rhetoric.

(HUMANITIES; 3.0 cr.; A-F or Audit; fall, spring, every year)

Introduction to the philosophy and history of rhetoric from ancient to modern times, including rhetorics role in reasoning about values, defining the duties and methods of citizenship, and shaping self-awareness.

COMM 2025. Communication Inquiry: Rhetorical and Historical Methods.

(3.0 cr.; A-F or Audit; prereq Communication major, minimum 30 credits; fall, spring, every year) Exploration/survey of rhetorical and historical approaches to understanding the role that communication plays in social influence.

COMM 2030. Communication Inquiry: Social Scientific Methods.

(3.0 cr.; A-F or Audit; prereq Comm major, minimum 30 credits; fall, spring, every year)

Introduction to social scientific inquiry related to the study of communication, and will provide an overview of research methods and an introduction to statistics.

COMM 2101. Foundations of Mass Communication.

(SOC SCI; LE CAT8; 3.0 cr.; A-F or Audit; fall, spring, summer, offered periodically)

Theories, research, regulation, and ethical concerns surrounding contemporary mass media. Identifies U.S. media's role within the international marketplace. Survey of contemporary media content, industry structures, technology, and delivery systems.

COMM 2102. Media Effects.

(SOC SCI; LE CAT8; 3.0 cr.; A-F or Audit; fall, every year)

Theory and research on the effects of media. Topics include media violence effects, sexual media content, fright reactions to media, news and political content effects, the impact of stereotyping, advertising effects, and the impact of new media technologies.

COMM 2505. Analysis of Public Discourse.

(3.0 cr.; A-F or Audit; prereq 1112; fall, spring, every year)

Guided investigation of public discourse within selected periods. Topics vary.

COMM 3115. Persuasion and Argumentation in Public Speaking.

(3.0 cr.; A-F or Audit; prereq 1112; fall, spring, every year) Advanced theories. Developing persuasive strategies, carefully managing logical and argumentational structures within the speech,

and fostering critical thinking tools in creation, analysis, and evaluation of persuasive speech.

COMM 3116. Professional Communication. (3.0 cr.; A-F or Audit; prereq 1112; fall, spring, every year)

Theory and practice of communication skills related to the workplace. Skill development in presentational speaking and vocational interviewing.

COMM 3200. Interpersonal Communication Theory. (3.0 cr.; A-F or Audit; prereq 1000 or 1222; fall, spring, every year)

Role of communication in developing, maintaining, and changing personal relationships.

COMM 3205. Relationship Communication. (3.0 cr.; A-F or Audit; prereq 1222; fall, spring, summer, every year)

Study of advanced interpersonal communication skills in context of family and gender issues.

COMM 3210. Group Communication. (3.0 cr.; A-F or Audit; prereq Minimum 30 credit, communication major or minor or instructor consent; fall, spring, summer, every year)

Small group approaches to problem management. Useful for anyone intending to participate in decision-making groups.

COMM 3211. Communication and Technology in the Information Age. (3.0 cr.; A-F or Audit; fall, spring, offered periodically)

Explores communication technologies in the information society; introduces students to new technologies used in contemporary organizations; explores implications of those technologies for human communication; and provides hands-on experience within a theoretical framework.

COMM 3215. Conflict Management. (3.0 cr.; A-F or Audit; prereq Minimum 30 credits, communication major or minor or instructor consent; fall, spring, offered periodically)

Application of interpersonal conflict management theory and skills to small group, organizational, and community conflicts.

COMM 3220. Communication in Organizations. (3.0 cr.; A-F or Audit; prereq Minimum 30 credits or instructor consent; fall, spring, every year)

Relationship between communication and organization design. Emphasis on development and impact of organization culture. Communication issues, including power, networks, gender, race, and decision making. Explores qualitative and field research.

COMM 3223. Communication and Creativity. (3.0 cr.; A-F or Audit; prereq Minimum 30 credits or instructor consent; fall, spring, summer, offered periodically)

Examines the relationship between communication and creative processes in an array of contexts, including artistic, professional, social, interpersonal and civic arenas. Content includes techniques of deliberate creativity; analysis of cognitive theory as it relates to creativity, addressing both "rational" (critical) and "non-rational" (intuitive) approaches to risk-taking and exploration.

COMM 3295. Special Topics: Interpersonal Communication (Various titles to be assigned). (3.0 cr. [max 12.0 cr.]; A-F only; prereq no grad credit; fall, spring, offered periodically)

Interpersonal communication topics not included in regular curriculum.

COMM 3300. Teaching Assistantship in Communication. (1.0-3.0 cr. [max 6.0 cr.]; S-N or Audit; prereq Minimum 60 credits,

Communication major or minor, instructor consent, may not be applied to elective credit for a Communication major or minor; fall, spring, summer, every year)

Practical experience in teaching beginning courses in the department. Students serve as intern teachers assisting the instructor in administration of the course. Application deadline is one week before beginning of registration for following semester.

COMM 3310. Research Assistant in Communication. (1.0-3.0 cr. ; S-N only; prereq instructor consent; fall, spring, summer, every year)

Practical experience in assisting communication faculty in ongoing research projects. Comm 3310, 4394 and 4397 carry variable credit, only some of which may count toward the comm major or minor. While all credits for these courses apply to the 120 cr required for graduation, the max number of credits from these courses (either one course or combined from the two courses) that may apply to the student's major or minor is six (6).

COMM 3395. Special Topics: (Various Titles to be Assigned). (3.0 cr. [max 15.0 cr.]; A-F or Audit; spring, offered periodically)

Topics not included in regular curriculum.

COMM 3400. Health Communication. (3.0 cr.; A-F only; fall, spring, every year)

Survey course examines the critical role communication plays in health promotion, specifically in the area of doctor-patient interaction and health campaigns. Important communicative issues such as the social construction of health, the role of culture in health and healing, health disparities, media literacy, and social support are addressed.

COMM 3405. Health Campaigns. (3.0 cr.; A-F or Audit; spring, every year)

Survey course examines how individual and community models of health behavior change are used to design, implement, and evaluate campaigns that promote healthy behaviors and reduce high-risk health behaviors.

COMM 3505. Media Communications. (3.0 cr.; A-F or Audit; prereq WRIT 1120; fall, spring, every year)

Survey of journalistic, critical, public relations and advertising writing techniques. Students write radio essays, newsletter articles, news stories, press releases. They also prepare communication strategies for a mini advertising campaign, write a movie review and develop a feature article for a newspaper.

COMM 3510. Ethics in Human Communication. (3.0 cr.; A-F or Audit; prereq 1112; credit will not be granted if already

received for CLA 1101; fall, spring, offered periodically)

Examination of the recurring ethical questions faced by people as we communicate both in interpersonal/non-professional contexts and as practitioners in communication professions.

COMM 3525. Deciding What's News. (3.0 cr.; A-F or Audit; fall, spring, summer, every year)

Review history of news in the United States, examine definitions of news, engage in critical evaluations of news in its various genres (news magazines, infotainment, investigative journalism, checkbook journalism, tabloid journalism, etc.).

COMM 3535. Intercultural Communication. (CDIVERSITY; LE CAT6; LEIP CAT06; 4.0 cr.; prereq credit will not be granted if already received for 2929; fall, spring, summer, every year)

This is a skills course in which students learn how to engage in effective intercultural communication and relationships. Students apply what they are learning by participating in intercultural communication with classmates from a wide variety of cultures. Students learn about variations in cultural practices and values and how social, political and economic forces have both been influenced by and influence those cultures.

COMM 3550. Children and Media. (3.0 cr.; A-F or Audit; fall, spring, every year)

Theory and research on the impact of media on children.

COMM 3555. Mass Media Addiction. (3.0 cr.; A-F or Audit; summer, offered periodically)

Examines the research and theory related to the social, psychological, and communicative rationales for becoming addicted to the mass media, centering on tele-visual media, including the internet.

COMM 3560. Video Game Entertainment. (3.0 cr.; A-F or Audit; fall, summer, every year)

Research and theory on video games, including work on content, uses, and effects. Overviews of game history, industry economics, design, and policy. Hands-on exposure to game technologies. Information about careers in video games.

COMM 3595. Special Topics: Media Communication. (3.0 cr. [max 12.0 cr.]; A-F only; fall, spring, offered periodically)

Media communication topics not included in regular curriculum

COMM 3605. Public Relations. (3.0 cr.; A-F or Audit; fall, spring, offered periodically)

Examines functions of public relations in society and surveys concepts, theories, and principles of effective, ethical public relations.

COMM 3612. Rhetorical Criticism. (3.0 cr.; A-F or Audit; prereq 1112, minimum 60 credits; fall, spring, every year)

Survey of approaches to rhetorical analysis of communicative acts, events, and artifacts.

COMM 3620. Controversy in the Boundary Waters. (SUSTAIN; 3.0 cr.; A-F or Audit; summer, every year)

Considers the rhetorical and political processes conditioning the debate over the Boundary

Waters Canoe Area's wilderness designation. Culminates in a class field trip to the BWCA, and a group project pertaining to contemporary environmental rhetoric.

COMM 3625. Rhetoric of Globalization. (GLOBAL PER; 3.0 cr.; A-F only; prereq 1112; fall, spring, summer, offered periodically) Study and reflection of global civil society, with special focus on the ways that new and changing forms of communication have altered the meaning of a democratic press, civic participation, human rights and shared experience.

COMM 3695. Special Topics in Rhetoric Communication. (3.0 cr. [max 12.0 cr.]; A-F only; fall, spring, offered periodically) Rhetoric topics not included in regular curriculum.

COMM 3700. Interpersonal Influence. (3.0 cr.; A-F or Audit; fall, spring, every year) Review of social scientific theories and research on person-to-person persuasion techniques used to influence attitudes, perceptions, knowledge, and behavior of others. Focus is on theoretical processes and effects on individuals and society in a variety of contexts.

COMM 4394. Directed Research in Communication. (1.0-3.0 cr. ; A-F only; prereq Minimum 60 credits, communication major, instructor consent; fall, spring, summer, every year) Individual research project, written under the supervision of a regular faculty member, to result in a research paper. COMM 3310, 4394 and 4397 carry variable credit, only some of which may count toward the communication major or minor. While all credits for these courses apply to the 120 credits required for graduation, the maximum number of credits from these courses that may apply to the student's major or minor is six (6).

COMM 4397. Internship in Communication. (1.0-8.0 cr. ; S-N only; prereq Minimum 79 credits, communication major/minor (20 credits in major), 2.50 GPA in major/minor; no grad credit; fall, spring, summer, every year) Students work in pre-approved program with a public agency, private organization, or other service agency; work must be in specific area of communication. Application deadline is one week before beginning of registration for following semester. Comm 3310 and 4397 carry variable credit, only some of which may count toward the comm major or minor. While all credits for these courses apply to the 120 cr required for graduation, the max number of credits from these courses (either one course or combined from the two courses) that may apply to the student's major or minor is three (3).

COMM 4399. Directed Projects in Communication. (1.0-3.0 cr. [max 6.0 cr.]; S-N only; prereq Minimum 60 credits, communication major, instructor consent; may not be applied to elective credit for communication major or minor; no grad credit; fall, spring, summer, every year)

Individual projects in the communication discipline, undertaken under the supervision of a regular faculty member.

COMM 4500. History of Rhetoric. (3.0 cr.; A-F or Audit; prereq 1112 or instructor consent; no Grad credit; fall, spring, offered periodically) Development of rhetorical thought as expressed by representative writers.

COMM 4505. Media Theory and Research. (3.0 cr.; A-F or Audit; prereq 1500 or 2101, minimum 60 credits or instructor consent; no Grad credit; fall, spring, every year) Theoretical concepts and research perspectives currently used to understand intricacies of a mediated society. Introduction and application of basic research methods to study questions concerning impact of media on society and individuals.

COMM 4949. Intercultural Hawaiian Experience. (4.0 cr.; S-N only; =[FST 4006]; prereq instructor consent; no grad credit; fall, spring, offered periodically) Taught on site in Hawaii. Practice of intercultural communication at culturally diverse sites. Students will immerse themselves in Non-European/American cultures and participate in intercultural communication with members of those cultures. Offered at various sites within the U.S. and internationally.

COMM 5000. Senior Seminar. (3.0 cr. [max 6.0 cr.]; A-F or Audit; prereq 1000, 1112 or 1115, 2025, 2030 with a C or better; Min 90 cr, Comm major, instructor consent; fall, spring, summer, every year) Advanced study and individual research on a selected topic or theme in communication; senior seminar course for communication majors.

COMM 5391. Independent Study in Communication. (1.0-3.0 cr. [max 6.0 cr.]; A-F or Audit; prereq instructor consent required; fall, spring, summer, every year) Individual research project written under supervision of communication graduate examining faculty member, to result in a research project.

Communication Sciences and Disorders (CSD)

College of Education and Human Service Professions

CSD 1100. Phonetics. (LE CAT3; 2.0 cr.; fall, spring, every year) Study and practice of International Phonetic Alphabet. English and non-English speech sounds as they occur separately and in connected speech. Variations in speech production as related to regional and/or class distinctions.

CSD 2230. Introduction to Human Communication Disorders. (SOC SCI; LE CAT8; CDIVERSITY; LECD CAT08; 3.0 cr.; fall, spring, every year) Receptive and expressive human communication disorders. Importance of communication to human behavior; influence that communication disorders exert on broad

spectrum of human activities. Professional roles and responsibilities of speech-language pathologists and audiologists.

CSD 2400. Clinical Observation of Communication Disorders. (1.0 cr.; A-F or Audit; prereq 2230 or instructor consent; fall, spring, every year) All undergraduate students majoring in Communication Sciences and Disorders are expected to complete 25 hours of clinical observation prior to enrollment in clinical practicum. These observations may be live or video recorded sessions that occur in a variety of clinical settings. This course will provide students with an opportunity to observe the assessment and treatment of individuals with communication disorders that encompass all ages and across the big nine categories of communication disorders.

CSD 3103. Anatomy of Speech and Hearing Mechanisms. (3.0 cr.; A-F only; prereq CSD candidate or instructor consent; fall, every year) Anatomy and physiology as they relate to hearing and speech processes including respiration, phonation, and articulation.

CSD 3130. Language Development and Disorders. (4.0 cr.; A-F only; prereq Pre-IESE major or pre-UECH, or instructor consent; summer, every year) Normal processes of language development in children. Incidence, etiology, diagnosis, and intervention strategies for children with language disorders.

CSD 3131. Language Development. (4.0 cr.; A-F or Audit; prereq CSD candidate or instructor consent; fall, every year) Emphasis on the acquisition and development of language, verbal and nonverbal, as children learn to communicate effectively by selecting the most appropriate communication strategies.

CSD 3150. Fundamentals and Clinical Applications of Speech Science. (3.0 cr.; A-F or Audit; prereq CSD candidate or instructor consent; fall, every year) Basic principles of speech science including, acoustic characteristics of speech; physiology of respiration, phonation, and resonance; and theories of speech perception and production. Clinical and research applications of speech science will also be discussed.

CSD 3160. Fundamentals of Hearing Science. (3.0 cr.; A-F only; prereq 3103, CSD candidate or instructor consent; spring, every year) Introductory study of acoustics and psychoacoustics.

CSD 3200. Articulation and Phonological Disorders. (3.0 cr.; A-F only; prereq 1100, 2230, CSD candidate or instructor consent; fall, every year) Differential diagnosis, assessment, and treatment considerations for articulation and phonological disorders. Outside observation required.

CSD 3232. Language Disorders. (3.0 cr.; A-F or Audit; prereq 3131, CSD candidate or instructor consent; spring, every year)

Focuses on the functional applications in the assessment and intervention of language disorders including a review of the various formal and informal assessment tools, and the approaches to language intervention.

CSD 3241. Foundations of Treatment in Communication Disorders. (3.0 cr.; A-F or Audit; prereq 3103, 3131, 3150, 3200, CSD candidate or instructor consent; spring, every year)

Focuses on foundational principals of treatment, applicable to a variety of communication disorders.

CSD 4000. Introduction to Applied Statistics for the Communication Sciences. (3.0 cr.; A-F or Audit; prereq CSD major; no grad credit; fall, every year)

Descriptive statistics; sampling techniques and statistical inference; applications of simple and factorial design; analysis of variance; nonparametric statistics; and introductory correlational analysis used in the behavioral sciences.

CSD 4010. Introduction to Formative Assessment. (1.0 cr.; A-F or Audit; prereq CSD candidate or instructor consent, no grad credit; fall, every year)

Introduction to the ongoing process of developing and updating an undergraduate student portfolio that may be used for purposes of reflection and self assessment, documentation of professional organization designated competencies, and/or application to graduate programs.

CSD 4011. Formative Assessment II. (1.0 cr.; A-F or Audit; prereq CSD 3241 and 4010 or instructor consent, no grad credit; spring, every year)

Undergraduate students in CSD present their completed portfolio, highlight achievements toward program standards, their self-awareness of learning and growth during their education. This course is to be taken in the final semester of the undergraduate program, and follows Formative Assessment I.

CSD 4097. Introduction to Clinical Practicum in Communication Disorders.

(1.0 cr.; A-F only; prereq CSD candidate, C grade or better in 3241, 25 hours clinical observation; summer, every year)

Clinical practicum with speech, language, and/or hearing impaired persons in an on-campus clinic under supervision of an ASHA-certified speech-language pathologist. (1 hr seminar per wk)

CSD 4197. Clinical Practicum in Communication Disorders. (2.0 cr.; A-F only; prereq 3241 with C grade or better, CSD candidate or instructor consent, no Grad credit; fall, spring, summer, every year)

Clinical practicum with speech, language, and/or hearing impaired individuals in the on-campus clinic under the supervision of an ASHA-certified speech-language pathologist. (1 hr seminar per wk)

CSD 4200. Introduction to Fluency Disorders. (3.0 cr.; A-F or Audit; prereq 2230, CSD candidate or instructor consent, no grad credit; spring, every year)

Etiologies, characteristics, and development of stuttering and other fluency disorders.

CSD 4297. Advanced Clinical Practicum in Communication Disorders. (3.0 cr.; A-F or Audit; prereq 4197 with C grade or better, CSD candidate or instructor consent, no grad credit; spring, every year)

Clinical practicum with speech, language, and/or hearing impaired individuals in the on-campus clinic, under the supervision of an ASHA certified speech-language pathologist, with expectation for increased level of independence than demonstrated in CSD 4197.

CSD 4400. Hearing Disorders and Evaluation. (3.0 cr.; A-F only; prereq 3103, 3160, CSD candidate or instructor consent; fall, every year)

Characteristics, development, and etiologies of typical auditory pathologies. Overview of basic hearing assessment and diagnostic techniques. Clinical observation required.

CSD 4500. Voice Disorders. (3.0 cr.; A-F or Audit; prereq CSD candidate; fall, every year)

Theoretical and practical study of voice and voice disturbances in children and adults.

CSD 5010. Portfolio Development I. (0.5 cr.; A-F only; prereq CSD Grad student or instructor consent; fall, every year)

Introduction to the ongoing process of developing and updating a graduate student portfolio that may be used for purposes of reflection and self assessment, documentation of professional organization designated competencies. Used for ASHA standards

CSD 5091. Independent Study. (1.0-3.0 cr. [max 6.0 cr.]; prereq CSD candidate with 90 cr or CSD Grad student; fall, spring, every year)

Directed study, readings, and/or projects of student interest in communication disorders.

CSD 5095. Special Topics: (Various Titles to be Assigned). (0.5-3.0 cr. [max 6.0 cr.]; fall, spring, summer, offered periodically)

Special topics of interest to speech-language pathologists, audiologists, special educators, and related professionals. Workshop and seminar format.

CSD 5097. Off campus Professional Practicum in Communication Sciences and Disorders. (2.0-6.0 cr. [max 12.0 cr.]; A-F or Audit; prereq instructor consent; summer, every year)

Speech-language pathology practicum in an off-campus setting under an ASHA-certified language pathologist. This experience focuses on special interests of the individual student, and allows for comparison of practice settings to prior clinical experiences.

CSD 5100. Research Methods in Communication Disorders. (3.0 cr.; A-F only; prereq CSD Grad; fall, every year)

Especially designed for new CSD graduate students to introduce them to the research process. Topics will include generating a research question, experimental designs, data collection, analysis, and interpretation, and writing the research paper. Students will

conduct a guided class research project and begin their Plan B project.

CSD 5142. Introduction to Diagnosis of Communication Disorders. (3.0 cr.; A-F or Audit; prereq CSD Graduate or instructor consent; credit will not be granted if already received for 4142; fall, every year)

General issues of evaluation and diagnosis of communication disorders pertinent to all age groups and disorders.

CSD 5195. Special Topics: (Various Titles to be Assigned). (0.5-3.0 cr. [max 18.0 cr.]; A-F or Audit; prereq instructor consent; fall, spring, summer, every year)

Special topics of interest to speech-language pathologists, audiologists, special educators, and related professionals. Workshop and seminar format. Topics vary and will be announced in class schedule.

CSD 5200. Dysphagia. (3.0 cr.; prereq CSD grad or instructor consent; summer, every year)

Anatomy and physiology of normal and disordered deglutition. Etiology, diagnosis, and management of swallowing disorders, including head and neck cancer.

CSD 5205. Pediatric Dysphagia. (1.0 cr.; A-F or Audit; prereq CSD Graduate Student or instructor consent; summer, every year)

Students will learn the anatomy and physiology of normal pediatric swallowing; study etiology, assessment, diagnosis, and management of pediatric swallowing and feeding disorders.

CSD 5230. Advanced Applications in Communication Modalities. (4.0 cr.; prereq CSD grad or instructor consent; summer, every year)

Advanced seminar and clinical practicum of augmentative and alternative communication (AAC) systems, assistive technologies and visual communication modalities. The decision-making process for identifying AAC candidates, selecting appropriate communication modality systems and developing effective communication programs and strategies involving visual communication modalities.

CSD 5250. Seminar in Augmentative and Alternative Communication. (1.0 cr.; A-F only; prereq CSD grad student or instructor consent; fall, spring, every year)

Examines the assessment and treatment issues for speech language pathologists working with individuals requiring augmentative and alternative communication systems.

CSD 5260. Seminars in Orofacial Disorders. (2.0 cr.; A-F only; prereq 3103; summer, every year)

This course will focus on the origin and potential effects of craniofacial disorders on an individuals feeding, communication, and psychosocial development. Surgical procedures aimed at repairing craniofacial disorders and at improving velopharyngeal function will be discussed. The role of the speech language pathologist on the interdisciplinary team that cares for the individual with craniofacial disorders will be reviewed. This will include describing the primary responsibilities of the SLP as

well as important interactions with other team members. The role of the other team members in the management of care for the individual with craniofacial disorders will also be described.

CSD 5301. Language Disorders in Infants, Toddlers, and Preschoolers. (2.0 cr.; A-F or Audit; prereq CSD grad student or instructor consent; spring, every year)

Advanced study of language disorders in individuals birth to 6 years old. The course includes an examination of etiology, diagnosis, clinical techniques, and study of relevant research.

CSD 5302. Language Disorders in School-Age Children. (2.0 cr.; A-F or Audit; prereq CSD grad student or instructor consent; fall, every year)

Advanced study of language disorders in individuals 6 to 21 years old. The course includes an examination of etiology, diagnosis, clinical techniques, and study of relevant research.

CSD 5400. Rehabilitative Procedures for the Hard of Hearing. (3.0 cr.; A-F only; prereq 4400, CSD candidate or CSD grad or instructor consent; spring, every year)

Theories, principles, and methods regarding current approaches to aural rehabilitation of hard-of-hearing children and adults.

CSD 8099. Projects in Communication Disorders. (2.0 cr.; A-F only; prereq CSD grad student or instructor consent; fall, spring, every year)

Plan B project or individual research under faculty supervision.

CSD 8205. Advanced Fluency Disorders. (3.0 cr.; prereq 4200 or equiv, CSD grad student or instructor consent; spring, every year)

Differential diagnosis, assessment, and treatment considerations for developmental stuttering and other fluency disorders.

CSD 8210. Professional Issues in Speech-Language Pathology. (1.0 cr.; prereq CSD grad student or instructor consent; fall, every year)

Identification and discussion of current issues and trends in the profession of speech-language pathology. Topics include professional work settings, credentialing agencies and requirements, federal and state laws influencing delivery of services, advocacy organizations, securing employment.

CSD 8230. Neurogenic Language Disorders. (4.0 cr.; prereq CSD Grad student or instructor consent; fall, every year)

Advanced study of diagnosis, treatment, and research of acquired language disorders resulting from neurological impairment: aphasia, right brain damage, dementia, and traumatic head injury.

CSD 8231. Neurogenic Speech Disorders. (3.0 cr.; prereq CSD grad student or instructor consent; spring, every year)

Advanced study of neuroanatomical bases for motor speech disorders; diagnostic and

therapeutic procedures used in speech disorders related to central and peripheral nervous system damage.

CSD 8232. Mgmt of Communication Disorders in Persons with Tracheostomy, Ventilator Dependency, & Laryngectomy. (1.0 cr.; A-F only; prereq CSD grad student or instructor consent; summer, every year)

Advanced study of the effects of tracheostomy tubes, ventilators and laryngectomies on the production of speech; diagnostic and therapeutic procedures used in working with individuals with trach vents, or laryngectomies.

CSD 8235. Counseling Applications in Communication Disorders. (2.0 cr.; prereq CSD grad student, at least 4 cr of 8097 or instructor consent; fall, every year)

Applications of interviewing and counseling theories and behaviors to field of speech-language pathology.

CSD 8297. Audiology Practicum. (1.0-2.0 cr. [max 4.0 cr.]; S-N only; prereq 5400, 8400, CSD grad student or instructor consent; Cannot apply more than 2 cr to a graduate program; fall, spring, every year)

Clinical assessment and rehabilitative experiences in an on-campus clinic under supervision of an ASHA-certified audiologist.

CSD 8333. FTE: Master's. (1.0 cr.; No Grade Associated; prereq Master's student, adviser and DGS consent; fall, spring, summer, every year) (no description)

CSD 8397. On-Campus Graduate Internship in Communication Disorders I. (3.0 cr. [max 6.0 cr.]; A-F or Audit; prereq CSD grad student, instructor consent; fall, spring, every year) Supervised clinical internship in on-campus clinic under supervision of an ASHA-certified speech-language pathologist. Includes 1 hr seminar per wk to focus on application of clinic methods.

CSD 8497. On-Campus Graduate Internship in Communication Disorders II. (4.0 cr. [max 8.0 cr.]; A-F or Audit; prereq 8397, instructor consent; fall, spring, every year)

Supervised clinical internship in on-campus clinic under supervision of an ASHA-certified speech-language pathologist, with focus on managing increased diverse caseload and applying tenets of evidence-based practice to clinical decision-making.

CSD 8597. Part-Time CSD Graduate Internship in Education Settings. (0.0-5.0 cr. ; A-F or Audit; prereq 5260, 8497 and instructor consent; fall, spring, every year)

Part-time speech-language pathology internship in an education setting under an ASHA-certified speech-language pathologist with focus on expanding application of principles of clinical practice to working with children in the school system.

CSD 8697. Part-Time CSD Graduate Internship in Medical Setting. (5.0 cr. [max 10.0 cr.]; A-F or Audit; prereq 5205, 5260, 8232, 8497 and instructor consent; fall, spring, every year)

Part-time speech-language pathology internship in a medical setting under an ASHA-certified speech-language pathologist with focus on expanding application of principles of clinical practice to working with patients in medical settings. Depending on placement, internship may involve working with children and/or adults.

CSD 8797. Full-Time CSD Graduate Externship in Education Settings . (6.0 cr.; A-F or Audit; prereq 5260, 8697 and instructor consent; fall, spring, every year)

Full-time speech-language pathology externship in an education setting under an ASHA-certified speech-language pathologist. This full-time placement allows the student to experience the rigors of full-time service delivery and actively participate in all aspects of clinical practice in education settings. Special focus is on refining social/cultural competence and formative assessment in clinical practice.

CSD 8897. Full-Time CSD Graduate Externship in Medical Settings . (6.0 cr.; A-F or Audit; prereq 5205, 5260, 8232, 8597 and instructor consent; fall, spring, every year)

Full-time speech-language pathology externship in a medical setting under an ASHA-certified speech-language pathologist. This full-time placement allows the student to experience the rigors of full-time service delivery and actively participate in all aspects of clinical practice in medical settings. Special focus is on refining social/cultural competence and formative assessment in clinical practice.

CSD 8997. Graduate Practicum in Communication Disorders. (1.0 cr. [max 2.0 cr.]; A-F or Audit; prereq CSD grad student, instructor consent; summer, every year)

Supervised graduate clinical practicum under the supervision of an ASHA-Certified speech-language pathologist. Focus is on increasing proficiency to provide students with an opportunity to develop increased independence with clinical skills and establish a breadth and depth of knowledge in providing diagnostic and treatment services under the guidance of ASHA certified professionals. Focus is on increasing speed and efficiency of clinical performance and justifying clinical services.

Computer Science (CS)

Swenson College of Science and Engineering

CS 1101. Introduction to Web Programming. (LOGIC & QR; 3.0 cr.; A-F or Audit; prereq 1 year high school algebra or Math 1005 or instructor consent; fall, spring, every year)

Introduction to the development of content for the World Wide Web. Static Web development introducing HTML and CSS. Dynamic Web development introducing the JavaScript programming language, including syntax of scripting, variables, expressions, controls structures, functions, and objects. For students with no prior programming experience.

CS 1121. Introduction to Programming in Visual BASIC.NET. (LOGIC & QR; LE CAT3; 3.0 cr.; A-F or Audit; =[FMS 2225]; prereq 1 yr high school algebra or instructor consent; fall, spring, every year)

Introduction to programming in the modern Visual BASIC language. Projects are developed in a .NET environment using the Visual Studio. Includes GUI interface development and expert-driven Windows programming. Major topics include variables, datatype, arithmetic expressions, control structures, arrays and database file processing. For students with no prior programming experience.

CS 1141. Introduction to Programming in C#. (3.0 cr.; A-F or Audit; prereq 1 year high school algebra or instructor consent; spring, every year)
Introduction to programming in the C# (read as C sharp) programming language. C# is a simple, object-oriented programming language based on C++. This course will cover data representation, operators, expressions, control structures, arrays and programming with C#. Requires implementation of significant programming projects.

CS 1301. Introduction to 3D Game Development: Learning to Program Computers by Creating Video Games. (LOGIC & QR; LE CAT3; 4.0 cr.; A-F or Audit; fall, every year)
Introduces skills used to solve problems with computers. Students learn fundamental computer programming skills through the development of 3D animation and 3D games.

CS 1411. Introduction to Programming in Matlab. (4.0 cr.; A-F or Audit; prereq Math 1296 or 1596 or instructor consent; fall, spring, every year)
An introduction to programming in the Matlab language. Topics covered will include the creation of algorithms, function definition, basic programming statements, input and output, mathematical operations, matrix manipulation, and representing data. As time allows, additional coverage of plotting methods, data structures using cellular arrays and other advanced topics.

CS 1511. Computer Science I. (LOGIC & QR; LE CAT3; 5.0 cr.; A-F or Audit; =[CS 1581, CS 1211]; prereq 3 1/2 yrs high school math or instructor consent; fall, spring, every year)
Introduction to the discipline of computer science. Emphasis on problem analysis, design, and development using event-driven programming in a graphical user interface environment. Programming concepts include control structures, arrays, recursion, pointers, classes and introduction to the object-oriented approach.

CS 1521. Computer Science II. (5.0 cr.; A-F or Audit; prereq 1511 or 1581; fall, spring, every year)
Continuation of introduction to computer science. Methods for procedural and data abstraction. Focus on classical data structures, procedural and data abstraction, and the abstract data type. Introduction to software engineering technique. Algorithm analysis, principles of object-oriented programming issues in ethical use of computers. Requires implementation of significant programming projects.

CS 1581. Honors: Computer Science I. (LOGIC & QR; LE CAT3; 5.0 cr.; A-F or Audit; =[CS 1511, CS 1211]; prereq Honors student, 3 1/2 yrs high school math; fall, every year)
Similar to 1511, but in greater depth and with more challenging assignments. For high-ability students.

CS 2121. Introduction to Programming in Java. (LOGIC & QR; LE CAT3; 3.0 cr.; A-F or Audit; prereq 3 yrs high school math, or instructor consent; spring, every year)
Introduction to the Java language including data types, variables, operators and expressions, control structures and arrays. Design and implementation of graphical user interface Java applets for web-based applications.

CS 2511. Software Analysis and Design. (4.0 cr.; prereq 1521 or instructor consent; fall, spring, every year)
Techniques for analyzing, designing, and creating medium-scale software through object-oriented design and implementation. Analysis and use of data structures. Introduction to design patterns. Emphasis on polymorphism and abstraction to increase software modularity, reusability, and flexibility.

CS 2521. Computer Organization and Architecture. (4.0 cr.; prereq 1521, Math 1296 or instructor consent; fall, spring, every year)
Internal representation of programs and data. Computer organization and introduction to computer architecture. Machine and assembly language programming. Data and procedural structures. Addressing methods. Systems software including linking and loading. Introduction to hardware performance analysis and measurements.

CS 3011. Information Technology Hardware and Software. (4.0 cr.; A-F or Audit; prereq FMIS 3201 or FMIS 2201 or LSBE 1101, 1521 or instructor consent; fall, every year)
Principles and application of telecommunication and computer systems hardware and software focusing on coding of data and programs, system hardware organization, and operating systems.

CS 3111. Computer Ethics. (HUMANITIES; 4.0 cr.; A-F or Audit; prereq WRIT 3100 or 3110 or 3121 or 3130 or 3140 or 3150 or 3160 or Engr 4001, minimum 60 credits or instructor consent; fall, spring, every year)
Ethical issues posed by computer use, including those related to networking, intellectual property, privacy, crime and security, risk and reliability, and effects on work and wealth. Includes significant writing and a class presentation

CS 3121. Interactive Multimedia Technology. (4.0 cr.; A-F or Audit; prereq FMIS 3201 or FMIS 2201 or LSBE 1101, 2511 or instructor consent; fall, every year)
Fundamentals of multimedia computing and interactive technologies; digitizing and manipulating images, audio, and video materials; perception, cognition, and communication issues; software engineering, design, and analysis; web-related languages

(e.g., JavaScript, HTML, CSS); media formats and compression; copyright and ethics. Includes practical labs and authoring a large-scale project.

CS 3211. Database System Concepts. (4.0 cr.; A-F or Audit; prereq FMIS 3201 or FMIS 2201 or SBE 1101, 2511 or instructor consent; fall, offered periodically)
Design and use of database management systems. Emphasis on the relational data model, SQL, integrity constraints, relational database design, file structures, indexing, query processing, and optimization. Oracle-based laboratory work.

CS 3221. Operating Systems Practicum. (4.0 cr.; A-F or Audit; prereq 2511, 3011 or instructor consent, CIS majors only, minimum 60 credits; spring, offered periodically)
Hands-on introduction to operating systems and tools. Systems administration experience with operating systems such as Linux, Unix, or Windows. Concepts of processor management and scheduling, memory management, file systems.

CS 3512. Computer Science Theory. (4.0 cr.; A-F or Audit; prereq 1521, Math 1296 or 1596 or instructor consent; fall, spring, every year)
Sets, relations, functions. Recursive definitions of functions and sets. Proof methods, including mathematical and structural induction, diagonalization. Program correctness, asymptotic time/space complexity. Formal language theory, including regular languages and expressions, deterministic/nondeterministic finite automata, Kleene's Theorem.

CS 3996. Internship in Computer Science. (1.0-3.0 cr. ; S-N or Audit; prereq Computer science junior, instructor consent; fall, spring, summer, every year)
Practical, independent computer science experience in commercial, industrial, or educational setting. Department approval required before beginning internship.

CS 4411. Data Communications and Network Technology. (4.0 cr.; A-F or Audit; prereq 2511, 3011 or instructor consent, CIS majors only, minimum 60 credits; spring, offered periodically)
In-depth experience with telecommunications fundamentals, including voice-video-data transmission in LAN and Internet. Network protocol analysis and implementation. Network layered architecture and abstractions. Installation, configuration, systems integration, and management of the technologies.

CS 4531. Software Engineering. (4.0 cr.; A-F or Audit; prereq 2511 or instructor consent; fall, spring, offered periodically)
Recognition of conditions for production of high quality software. Use of current software development technology. Organization and management of software development projects. Includes a significant team project.

CS 4611. Database Management Systems. (4.0 cr.; A-F or Audit; prereq 2511, 2521 or instructor consent; spring, offered periodically)
Study of database management fundamentals focusing on the relational data model.

Topics include database organization, file organization, query processing, concurrency control, recovery, data integrity, optimization and view implementation.

CS 4821. Computer Security. (4.0 cr.; A-F or Audit; prereq 2511, 2521, 3512 or instructor consent; credit will not be granted if already received for 4711; fall, spring, offered periodically)

Entropy and the underlying characteristics of text. Encryption-basic techniques based on confusion and diffusion and modern day encryption. Access, information flow and inference control. Program threats and intrusion detection. Network and Internet security. Firewalls, trusted systems, network authentication.

CS 4991. Independent Study. (1.0-4.0 cr. [max 8.0 cr.]; A-F or Audit; prereq instructor consent; fall, spring, every year)
Directed study of special interest topics not available in standard curriculum. Must be arranged with instructor before registration. May include readings, research, or special projects.

CS 4993. Seminar. (1.0 cr.; A-F or Audit; prereq 2511, Comm 1112, Comp 3130 or 3150, CS or CIS major and 90 credits; no grad credit; fall, spring, every year)
Written report and oral presentation of a topic relating to the social and ethical implications of computing.

CS 4994. Honors Project. (2.0-3.0 cr.; A-F or Audit; prereq Consent of computer science honors program committee; fall, spring, every year)
Required for students who wish to participate in the computer science honors program. Students must complete a research project under supervision of a faculty adviser.

CS 4995. Special Topics: (Various Titles to be Assigned). (1.0-4.0 cr. [max 8.0 cr.]; A-F or Audit; prereq instructor consent; fall, spring, offered periodically)
Study of selected topic announced in [Class Schedule].

CS 5511. Theory of Computation. (4.0 cr.; A-F or Audit; prereq 3512, Math 3326 or instructor consent; spring, every year)
Mathematical theory of computation and complexity. Deterministic and nondeterministic Turing machines, Church-Turning Thesis, recursive and recursively enumerable languages. Undecidable problems, Rice's Theorem. Time and space complexity, reducibility, completeness for complexity classes, Cook's Theorem, P versus NP, Savitch's Theorem, complexity hierarchy.

CS 5521. Advanced Data Structures. (4.0 cr.; A-F or Audit; prereq 2511, 3512, Math 3326 or instructor consent; fall, every year)
Survey of advanced data structures and algorithms such as heaps and heap sort, quicksort, red-black trees, B-trees, hash tables, graph algorithms, divide and conquer algorithms, dynamic programming, and greedy algorithms. Methods for proving correctness and asymptotic analysis.

CS 5541. Artificial Intelligence. (4.0 cr.; A-F or Audit; prereq 2511, 3512 or instructor consent; fall, offered periodically)
Principles and programming methods of artificial intelligence. Knowledge representation methods, state space search strategies, and use of logic for problem solving. Applications chosen from among expert systems, planning, natural language understanding, uncertainty reasoning, machine learning, and robotics. Lectures and labs will utilize suitable high-level languages (e.g., Python or Lisp).

CS 5551. User Interface Design. (4.0 cr.; A-F or Audit; prereq 2511, Math 2326 or 3326 or 4326 or instructor consent; fall, offered periodically)
Design and layout of interactive programs using components, containers, events, menus, and dialogs. The use of graphics primitives, color and images; giving user feedback and help. Rapid prototyping and interface management systems. Design for accessibility and usability.

CS 5621. Computer Architecture. (4.0 cr.; A-F or Audit; prereq 2521 or instructor consent; spring, every year)
Advanced concepts in processor and computer system organization and their impact on performance. Exploitation of parallelism, multilevel memory organization, system interconnection, and input-output organization.

CS 5631. Operating Systems. (4.0 cr.; A-F or Audit; prereq 2511, 2521 or instructor consent; fall, spring, every year)
Operating system as resource manager. Processor management and scheduling, deadlocks, concurrency, memory management and protection and security as applied in modern operating systems. Concepts are illustrated via laboratory assignments which heavily emphasize concurrency.

CS 5641. Compiler Design. (4.0 cr.; A-F or Audit; prereq 2511, 2521, 3512 or instructor consent; fall, offered periodically)
A selection from the following topics: finite-state grammars, lexical analysis, and implementation of symbol tables. Context-free languages and parsing techniques. Syntax-directed translation. Run-time storage allocation. Intermediate languages. Code generation methods. Local and global optimization techniques.

CS 5651. Computer Networks. (4.0 cr.; A-F or Audit; prereq 2511, 2521 or instructor consent; fall, every year)
Introduction to computer networking, network programming, networking hardware and associated network protocols. Layered network architecture, network services, and implementation of computer networking software.

CS 5721. Computer Graphics. (4.0 cr.; A-F or Audit; prereq 2511, Math 2326 or 3326 or 4326 or instructor consent; fall, offered periodically)
Mathematics for computer graphics, basic raster algorithms, 2D and 3D transformations, viewing and shading. The graphics pipeline including visible surface determination, shading, ray-tracing, texture mapping, and clipping. Data structures including triangle meshes, scene graphs, bounding volume

hierarchies. Real-time graphics applications using software systems such as Op.

CS 5741. Object-Oriented Design. (4.0 cr.; A-F or Audit; prereq 2511, 3512 or instructor consent; fall, spring, offered periodically)
Overview of software design and design methods, focusing on object-oriented design. Impact of object and class organization on software maintenance and reusability. Implementation of a significant project using object-oriented methods and tools.

CS 5751. Introduction to Machine Learning. (4.0 cr.; A-F or Audit; prereq 2511, 3512, Stat 3611, Math 2326 or 3326 or 4326 or instructor consent; spring, offered periodically)
Survey of methods in machine learning including supervised and unsupervised methods. Topics covered may include clustering, decision trees, neural networks, support vector machines, genetic algorithms and reinforcement learning. Theoretical concepts associated with machine learning.

CS 5761. Introduction to Natural Language Processing. (4.0 cr.; A-F or Audit; prereq 2511, 3512 or instructor consent; fall, offered periodically)
Techniques for creating computer programs that analyze, generate, and understand natural human language. Topics include syntactic analysis, semantic interpretation, and discourse processing. Applications selected from speech recognition, conversational agents, machine translation, and language generation. Substantial programming project required.

CS 5991. Independent Study. (1.0-4.0 cr. [max 8.0 cr.]; A-F or Audit; prereq instructor consent; fall, spring, summer, offered periodically)
Directed study of special interest topics not available in the standard curriculum. Must be arranged with the instructor in advance of registration. May include readings, research, or special projects.

CS 5994. Advanced Topics in Computer Science. (4.0 cr.; A-F or Audit; prereq Grad student or instructor consent; fall, spring, offered periodically)
Research-oriented study of topics of current academic or industrial interest, such as parallel algorithms, VLSI design, computational geometry, logic programming languages, program correctness, information retrieval systems, and decision support systems.

CS 8333. FTE: Master's. (1.0 cr.; No Grade Associated; prereq Master's student, adviser and DGS consent; fall, spring, every year) (No description)

CS 8511. Advanced Theory of Computation. (4.0 cr.; prereq 4511 or instructor consent; fall, spring, offered periodically)
Mathematical theory of computability and computational complexity. Deterministic and nondeterministic Turing machines. Recursive and recursively-enumerable languages. Undecidable problems, Rice's Theorem, the Church-Turing thesis. Time and space complexity. P-time reductions, completeness for complexity classes, Cook's Theorem, P=NP, and the polynomial hierarchy.

CS 8561. Human Computer Interaction. (4.0 cr.; A-F only; prereq 5551 or 5721; fall, every year)

Introduction to the software algorithms, hardware components, and concepts for building and evaluating virtual environments for effective human-computer interaction (visual, auditory, haptic, and mechanical aspects). Includes the perceptual components for constructing effective human-computer interaction with a virtual environment.

CS 8621. Advanced Computer Architecture. (4.0 cr.; A-F or Audit; prereq 5621, 5631 or instructor consent; fall, spring, offered periodically)

Algorithmically-specialized functional units. Principles of advanced memory subsystem organization, including virtual memory and caches. Novel hardware technologies. Foundations of parallel architectures: from supercomputers to cluster environments. Advanced hardware/software performance analysis.

CS 8631. Advanced Systems Programming. (4.0 cr.; A-F or Audit; prereq 5631, 5641 or instructor consent; fall, spring, offered periodically)

Overview of systems programs with emphasis on unifying themes common to major application areas, such as compiler construction, operating systems, and networks. Advanced study of practical aspects of one of these systems, including a substantive software development project.

CS 8721. Advanced Computer Graphics. (4.0 cr.; A-F or Audit; prereq 5721 or instructor consent; fall, spring, offered periodically)

Contemporary computer graphics techniques. Focus on advanced graphics algorithms and programming, curve and surface representations, physically based rendering, visible surface determination, illumination, texturing, and real time rendering.

CS 8731. Information Retrieval. (4.0 cr.; prereq 5731 or instructor consent; fall, spring, offered periodically)

Methods, major models, and theoretical issues in automatic processing and retrieval of text. Statistical and syntactic approaches, very large database issues (data mining), distributed retrieval, web retrieval and relevant applications.

CS 8751. Advanced Machine Learning. (4.0 cr.; A-F or Audit; prereq 5751 or instructor consent; fall, spring, offered periodically)

Survey of emerging research topics in machine learning and data mining plus the relation of machine learning to fields such as bioinformatics. Topics drawn from emerging techniques such as support vector machines, ensemble methods and Bayesian networks.

CS 8761. Natural Language Processing. (4.0 cr.; A-F or Audit; prereq 5761 or instructor consent; grad student; fall, spring, offered periodically)

Techniques to analyze, generate, and understand human language via computational techniques. This course focuses on empirical approaches to lexical and syntactic analysis,

semantic interpretation, and discourse processing. Applications include part-of-speech tagging, parsing, lexical acquisition, and machine translation.

CS 8771. Advanced Computational Logic. (4.0 cr.; A-F or Audit; prereq 4511 or instructor consent; grad student; fall, spring, offered periodically)

Mathematically sound reintroduction to classical logic. Syntax, semantics, and proof theory for propositional and first-order logic. Soundness and completeness. Incompleteness. Additional topic(s) from among: automated theorem proving, second-order logic, nonmonotonic logics and knowledge representation, logic programming.

CS 8777. Thesis Credits: Master's. (1.0-24.0 cr. [max 50.0 cr.]; No Grade Associated; prereq Max 18 cr per semester or summer; 10 cr total required (Plan A only); fall, spring, every year) (No description)

CS 8993. Seminar. (1.0 cr. [max 3.0 cr.]; A-F or Audit; prereq instructor consent; fall, spring, every year)

Presentation and discussion of basic ethical theories, case studies dealing with ethical issues facing the computing professional in his/her life as a practitioner, and the development of research proposal which meets the requirements and standards of the department and serves as the foundation of and guideline for the development of the graduate research project (i.e., thesis).

CS 8995. Special Topics: (Various Titles to be Assigned). (1.0-4.0 cr. [max 8.0 cr.]; A-F or Audit; prereq CS Grad student, instructor consent; fall, spring, offered periodically) Topics not available in standard curriculum. Topic announced in [Class Schedule].

Criminology (CRIM)

College of Liberal Arts

CRIM 1301. Introduction to Criminology. (SOC SCI; LE CAT8; 4.0 cr.; A-F or Audit; prereq credit will not be granted if already received for SOC 1301; fall, spring, every year) Analysis of social justice with emphasis on criminal justice system in United States. Nature and extent of crime; social factors related to criminal behavior.

CRIM 2311. Criminological Theory. (4.0 cr.; A-F or Audit; prereq 1301, 15 credits; credit will not be granted if already received for SOC 2311; fall, spring, every year) Examination of the major theories of crime causation. Specific theories include macro and micro sociological explanations, as well as biological and psychological perspectives. Discussion includes the history, social context, and policy implications of each theory.

CRIM 3322. Law and Society. (3.0 cr.; A-F or Audit; prereq 30 credits or instructor consent; credit will not be granted if already received for SOC 3322; fall, spring, offered periodically) Complexities, organization, and elements of legal systems, particularly in the United States. Legal theory used to explain the "working" of the law, historical development of law, current

issues in law, and overall interrelationship between law and society.

CRIM 3324. Sociology of Criminal Law. (3.0 cr.; A-F or Audit; prereq 30 credits or instructor consent; credit will not be granted if already received for SOC 3324; fall, every year) Nature, goals, and problems in administration of the American criminal judicial process.

CRIM 3328. Delinquency and Juvenile Justice. (3.0 cr.; A-F or Audit; prereq 30 credits or instructor consent; credit will not be granted if received for SOC 3328; fall, spring, offered periodically) Delinquency in contemporary American society. Major issues concerning causes, prevention, and treatment of juvenile offenders. Focus on U.S. juvenile justice system.

CRIM 3336. Crime and the Media. (3.0 cr.; A-F or Audit; prereq Minimum 30 credits or instructor consent; credit will not be granted if already received for SOC 3336; fall, spring, summer, offered periodically)

Examines the relationship between crime, criminal justice and the media. It explores how news and entertainment media portray criminals, crime and the criminal justice system, and the effects of these portrayals on the justice system and society.

CRIM 3338. Sociology of Gangs. (3.0 cr.; A-F or Audit; prereq 30 credits or instructor consent, credit will not be granted if already received for SOC 3338; summer, offered periodically)

Street and prison gangs in America at the national, state, and local level. Sociological research and theories relative to gang formation and the economics related to street and prison gangs.

CRIM 3344. Law Enforcement and Society. (3.0 cr.; A-F or Audit; prereq 30 credits or instructor consent; credit will not be granted if already received for SOC 3344; fall, spring, offered periodically)

Role of police and relationship of law enforcement to the community; focuses on crime prevention.

CRIM 3350. Psychopathology and Crime. (3.0 cr.; A-F or Audit; prereq Criminology or Sociology major with minimum 30 credits; fall, spring, offered periodically)

This course introduces students to the various types of psychopathology and their relationships to crime. Students consider the concept of "abnormality," as viewed by the public, the mental health field, and the criminal justice system. Students learn about a wide range of psychopathologies and apply this knowledge to exploring how various types of criminal activity are related to symptoms of mental disorders.

CRIM 3355. Criminal Forensic Psychology. (3.0 cr.; A-F or Audit; prereq minimum 30 credits, Crim major; fall, spring, summer, offered periodically)

This course introduces students to the interface of psychology and law, with a specific focus on criminal forensic psychology. The primary goal of this course is to introduce students to the roles and responsibilities of forensic

psychologists in the realms of criminal and victim psychology, police and investigative psychology, legal psychology, and correctional psychology.

CRIM 3361. Correctional Continuum. (3.0 cr.; A-F or Audit; prereq Sophomore or higher or instructor consent; credit will not be granted if already received for SOC 3361; fall, spring, offered periodically)

Analysis of the range of sanctions and programs in corrections. Topics include both community-based and institutional corrections, as well as juvenile and adult corrections.

CRIM 3369. Correctional Assessment and Intervention. (3.0 cr.; A-F or Audit; [SOC 3365]; prereq Minimum 30 credits or instructor consent; credit will not be granted if already received for SOC 3369; fall, spring, offered periodically)

Issues germane to intervention with criminal offenders. Philosophical (should we intervene?) and pragmatic (what, if anything "works") debates are reviewed, and both punishment oriented and rehabilitative intervention programs are discussed.

CRIM 3375. Restorative Justice. (3.0 cr.; A-F only; prereq Minimum 60 credits or instructor consent; credit will not be granted if already received for SOC 3375; fall, spring, offered periodically)

Examines the principles and practices of restorative justice. Covers early and contemporary philosophies and practices, as well as domestic and international examples.

CRIM 3380. Death Penalty. (3.0 cr.; A-F or Audit; prereq minimum 30 credits; fall, spring, offered periodically)

This course provides students with a broad survey of the death penalty as a penal sanction and the controversies and issues which surround it. Key topical areas covered are history and foundations, legal landscape, execution and death penalty processes, contemporary issues including innocence, cost, discrimination and deterrence, and perspectives and voices surrounding the death penalty.

CRIM 3395. Special Topics: (Various Titles to be Assigned). (1.0-3.0 cr. [max 6.0 cr.]; A-F or Audit; prereq 30 credits or instructor consent; maximum 6 credits allowed between SOC 3395 and CRIM 3395; fall, spring, summer, offered periodically)
Contemporary topics in criminology.

CRIM 4305. Mentally Ill Offenders in the Criminal Justice System. (3.0 cr.; A-F or Audit; prereq Criminology or Sociology majors with minimum 60 credits; no grad credit; fall, spring, offered periodically)

This course provides a broad survey of mentally ill offenders. Students explore the stigma and needs of this population. The course focuses on the treatment and management of mentally ill offenders, including recent innovations, at each stage of the criminal justice system.

CRIM 4323. Women and Justice. (3.0 cr.; A-F or Audit; prereq 1301 or SOC 1101 or CSt 1101 or Anth 1604, 60 credits, or instructor

consent, no grad credit; credit will not be granted if already received for SOC 4323; fall, spring, offered periodically)

Women's involvement in the civil and criminal justice systems, both historic and contemporary, primarily in the United States. Attention given to women as criminal and civil defendants, issues of women's civil rights, and to women practitioners within each system. Intersection of social class, gender and race/ethnicities.

CRIM 4340. Race, Crime and Justice. (3.0 cr.; A-F or Audit; prereq 1301 or SOC 1101 or Anth 1604 or CSt 1101, 60 credits or grad student or instructor consent; credit will not be granted if already received for SOC 4340; fall, spring, summer, offered periodically)

Examines the intersection of race/ethnicity, gender, and class within the U.S. criminal justice system, with some attention given to global trends and international comparisons. Considers the racialized effects of crime control and criminal justice practices, including law enforcement, prosecution, sentencing, police-minority community relations, and the disproportionate representation of racial/ethnic groups in the prison system. Explores attitudes and perceptions of crime from the perspective of racial/ethnic minorities, and differential crime rates among majority/minority groups.

CRIM 4350. Corporate and Governmental Deviance. (3.0 cr.; A-F only; prereq Minimum 60 credits or instructor consent; credit will not be granted if already received for SOC 4350; fall, spring, offered periodically)

Examination of theories and research relating to deviant and criminal behavior within large scale formal organizations, particularly governmental and business organizations. Causes and consequences, efforts at social control, barriers to social control, prospects for change. Genocide and the emergence of international law.

CRIM 4382. Victimology. (3.0 cr.; A-F or Audit; prereq 1301 or SOC 1101, 60 credits; no grad credit; credit will not be granted if already received for SOC 4382; fall, spring, offered periodically)

Extent, nature, and forms of criminal victimizations; profiles of crime victims; coping strategies; victims' rights; impact of victimizations on victims and nonvictims; victim attitudes about crime and interactions with justice system; evaluation of victim service programs.

CRIM 4384. Child Abuse and Child Protection in Minnesota. (3.0 cr.; A-F or Audit; prereq 90 credits or Grad Student or instructor consent; credit will not be granted if already received for SOC 4384; spring, every year)

Examine how our legal system and community discovers and protects neglected or abused children. Provide understanding of juvenile court, the role of forensic science, social workers, police, teachers, nurses, physicians, and other professionals mandated to report suspected abuse.

CRIM 4391. Independent Study in Criminology. (1.0-6.0 cr.; A-F or Audit;

prereq instructor consent; maximum 6 credits allowed between SOC 4991 and CRIM 4391, no grad credit; fall, spring, summer, every year)
Directed reading, research, or involvement in social action leading to preparation of a paper or other product.

CRIM 4395. Special Topics: (Various Titles to be Assigned). (1.0-3.0 cr. [max 6.0 cr.]; A-F or Audit; prereq 90 credits or Grad Student or instructor consent; maximum 6 credits allowed between SOC 4395 and CRIM 4395; fall, spring, offered periodically)
Proseminar on contemporary topics. Course announced in Class Schedule.

CRIM 4399. Honors Project Criminology. (1.0-8.0 cr. [max 16.0 cr.]; A-F or Audit; prereq 90 credits, approval by department honors program director, no grad credit, maximum 8 credits allowed between SOC 4999 and CRIM 4399; fall, spring, summer, every year)
Advanced individual project in any area of criminology, demonstrating sound theoretical and research foundations and resulting in a written report.

CRIM 4910. Teaching Assistantship in Criminology. (1.0-3.0 cr.; A-F or Audit; prereq 60 credits, instructor consent, no grad credit, maximum 3 credits allowed between SOC 4997, SOC 4910 and CRIM 4397, CRIM 4910; fall, spring, every year)
Practical experience in teaching-related activities in criminology courses.

CRIM 8333. FTE: Master's. (1.0 cr.; No Grade Associated; prereq Master's student, adviser and DGS consent; fall, spring, summer, every year)
(No description)

CRIM 8600. Practicum in Criminology. (1.0-15.0 cr.; S-N or Audit; prereq Grad student or instructor consent; fall, spring, summer, every year)
Supervised direct experience in a criminal justice agency and a concurrent seminar which focus on identification, application, and evaluation of the implementation of concepts, principles, theories and best practices in criminal justice. Experience in law enforcement agencies, juvenile courts, probation and parole departments, correctional institutions, delinquency control programs and public or voluntary agencies. Orientation sessions precede placement. Student must submit internship application during the first 30 days of the preceding spring or fall semester.

CRIM 8777. Thesis Credits: Master's. (1.0-18.0 cr. [max 50.0 cr.]; No Grade Associated; prereq Max 18 cr per semester or summer; 10 cr total required (Plan A only); fall, spring, summer, every year)
(No description)

CRIM 8900. Directed Readings. (1.0-6.0 cr.; A-F or Audit; prereq Grad student or instructor consent; fall, spring, offered periodically)
Students conduct intense and detailed reading in a topic area of their choice under the guidance of a professor.

Cultural Entrepreneurship (CUE)

College of Liberal Arts

CUE 1001. Culture Industry and Creative Economy. (GLOBAL PER; 3.0 cr.; A-F or Audit; fall, spring, every year)

This course is an introduction to the history and contemporary scope of the culture industry, and the closely associated creative economy. Topics discussed include tourism, sports, arts and entertainment, mass media, and the food and beverage industry.

CUE 1111. Creative Problem Solving. (3.0 cr.; S-N or Audit; fall, spring, every year)

This course provides students the change to explore and engage with contemporary and historic practice in the creative fields, principally in art and design through a series of personal and creative activities. The course promotes the exploration of new media as well as traditional practice through personal involvement in creativity and creative practice. Central to the mission of the course is the development of personal traits of: creativity, thoughtful analysis, ingenuity, experimentation and the ability to solve problems. It will challenge students to move outside of their existing comfort zone and to recognize the value of that exploration. It will help students understand the important of diverse ideas, and to convey that understanding to others. The goal of this course is to create a lasting, permanent, and integrated connection between the student, their own creativity, and the creative fields.

CUE 3001. Foundations of Cultural Entrepreneurship and Culture Management I. (3.0 cr.; A-F or Audit; prereq 1001, CUE major; fall, every year)

This first of two entrepreneurship courses exposed students to the key concepts of the culture industry and creative economy, introduces them to key business and information system principles, guides them to the establishment of a business plan and covers the basic and fundamental of entrepreneurial finance.

CUE 3002. Foundations of Cultural Entrepreneurship and Culture Management II. (3.0 cr.; A-F or Audit; prereq 3001; spring, every year)

This second of two entrepreneurship courses exposes students to the key concepts of the culture industry and creative economy, and introduces them to key business and information system principles. Specifically, it guides students from a business plan to actual business implementation, covering a variety of topics, from sales, inventory management and banking, to personnel management and data analysis.

CUE 4001. Entrepreneurial Finance for Creative Industries. (3.0 cr.; A-F or Audit; prereq CUE 3002, no grad credit; fall, every year)

This course focuses on the financing issues facing new business ventures in the culture industry/creative economy and examines financing from the perspective of both the entrepreneur and the employee in these

ventures. Students will learn how to analyze financial statements, create financial forecast for the creative industry, and evaluate new creative ventures. They will study the tools and methods used in determining how much money a venture needs in order to be viable and explore tools and approaches used when selling an idea to potential investors. Attention will be devoted to the different types of financing alternatives available to new, young, and small ventures. The venture capital market will be investigated in detail, including self-financing, debt financing, angel financing, and financing from venture capital firms. Students will explore issues involved in negotiating deals and in formulating deal structures and encouraged to understand financing issues and options from the vantage points of the entrepreneur, the lender, and the investor.

CUE 4002. Entrepreneurship, Opportunity and Feasibility. (3.0 cr.; A-F or Audit; prereq CUE 3002, no grad credit; spring, every year)

This course expands students' knowledge of the process of exploring business opportunities and gives them specific quantitative as well as qualitative tools to evaluate the feasibility of new ventures. The primary purpose is to investigate concepts, tools and practices associated with identifying or creating new venture opportunities. Students will explore ways to shape and evaluate the viability of these opportunities by understanding key industry factors, market and competitive factors, and customer needs. Students will gain a better understanding of personal entrepreneurial capacity, team building and management. Student teams will complete two opportunity feasibility assessments.

CUE 4003. Entrepreneurial Ethics and Values. (3.0 cr.; A-F or Audit; prereq CUE 3001, no grad credit; spring, every year)

This course offers an undergraduate introduction to organizational integrity and responsibility and related legal and social issues. Students will acquire an integrated and normatively substantive foundation in business ethics that distinguishes ethical justification from regulation by law and market forces. They will also develop skill for discerning the intrinsic ethical vocation for organizational leadership, develop an awareness of the effects of managerial decision making on the moral rights and interest of oneself and others. Additional, learn to appreciate the normative dimensions of managerial decision making in the context of a complete way of life, including family life, religious traditions, civic responsibilities, global integration and boarder issues of social justice. Students will also become proficient in systematically articulating ethical arguments to justify organizational policies and practices; and to grow in personal commitment to building organizational cultures that promote and reinforce ethical conduct.

CUE 4097. Internship. (2.0 cr. [max 4.0 cr.]; A-F or Audit; prereq 1001, 3001, instructor consent; no grad credit; summer, every year) Students taking this course have been placed in an entrepreneurial internship, following consultation with the CUE director. Students

complete a minimum of 80 hours of work at a selected internship site, observing and participating in the everyday operations of a non-profit or for-profit venture. To receive credit for the internship, students must complete a final report of their activities, and receive a favorable evaluation by their internship supervisor.

Cultural Studies (CST)

College of Liberal Arts

CST 1010. Romanticism and Revolutions. (LE CAT9; 4.0 cr.; A-F or Audit; spring, every year)

Exploration of the changes in the arts and humanities produced by political, scientific, social, and revolutions that spring from the industrial revolution and the Romantic response to that revolution.

CST 1020. Landscapes, Environments, and U.S. Culture. (LE CAT7; 3.0 cr.; A-F or Audit; prereq Credit will not be granted if already received for AmS 1031; fall, offered periodically)

Interdisciplinary study of U.S. landscapes and environments as an index to the diverse cultures of the United States. Readings from travelers, naturalists, ecologists, geographers, poets, and fiction writers; slides of paintings and photographs; films.

CST 1050. Freshman Seminar: Bodies and Culture Through Film. (LE CAT8; 4.0 cr.; A-F or Audit; prereq Freshman, fewer than 30 credits.; fall, spring, offered periodically)

Explores the ways in which our bodies are culturally constructed through gender, race, and sexual orientation. Using documentary film as a primary pedagogical tool, attention will focus on how marginalization is embodied in everyday life.

CST 1101. Introduction to Cultural Studies. (SOC SCI; LE CAT8; CDIVERSITY; 4.0 cr.; A-F or Audit; fall, spring, summer, every year) Examines how cultural practices relate to everyday life by introducing students to each of the four core areas of the Cultural Studies minor: Identity Politics, Media Cultures, Cultures of Space & Place, and Cultures of Science, Technology, & Medicine.

CST 2001. Introduction to Gay Lesbian Bisexual and Transgender Studies.

(CDIVERSITY; LE CAT8; LECD CAT08; 4.0 cr.; A-F or Audit; spring, offered periodically) Examines identity politics, GLBT popular media images and analysis, birth and history of GLBT social movement and intersections with other social movements, HIV/AIDS, policy/legislative issues especially immigration, marriage, adoption, and U.S. military policy; all with international comparative analysis.

CST 3010. Popular Culture in the 1960s.

(3.0 cr.; A-F or Audit; prereq Minimum 30 credits; fall, spring, offered periodically) Interrelationships among the arts, popular culture, politics, and social change as found in literature, theatre, film, photography, painting, and music in the United States during the 1960s.

CST 3030. Science Fiction. (3.0 cr.; A-F or Audit; prereq Minimum 30 credits; fall, spring, summer, every year)

Selected science fiction short stories, novels, films, videos, and music that explore impact of physical, biological, and social sciences in producing changing views of human nature, values, institutions, and societies.

CST 3040. The Music and Lives of the Beatles. (3.0 cr.; A-F or Audit; prereq

Minimum 30 credits; fall, spring, summer, every year)

Impact on our culture of music and lives of the Beatles. Their music; influence on music, fashion, and attitudes; Beatles' movies; interrelationship with political and social movements; later careers; their legacy.

CST 3050. Utopian and Dystopian Images.

(3.0 cr.; A-F or Audit; prereq Minimum 30 credits; fall, spring, offered periodically)

How images and narratives of utopia engage with social problems, including divisions of labor and wealth, gender, race, environmental degradation, crime, violence, war, and human interfaces with technology. Emphasis is on film, fiction, and other cultural representations of utopia and dystopia. Course concepts explore human visions of equality, perfection, power, and freedom.

CST 3080. Cultural Constructions of the Body.

(4.0 cr.; A-F or Audit; prereq Minimum 30 credits or instructor consent; fall, spring, every year)

Contemporary cultural constructions of the human body. How biology and culture intersect in body building, menstruation, childbirth, and tattooing. Students gain skills in reading the body as social text and learn core theoretical approaches to cultural studies of the body.

CST 3095. Special Topics: (Various Titles to be Assigned). (4.0 cr. [max 8.0 cr.]; A-F or Audit; prereq minimum 30 credits; fall, spring, offered periodically)

Special Topics courses will be offered in order to increase possible course offerings in the Cultural Studies minor and give students the opportunity to work with a wide range of interdisciplinary faculty and topics.

CST 3715. Popular Culture. (SOC SCI; 4.0 cr.; A-F or Audit; prereq Minimum 30 credits or instructor consent; fall, spring, summer, offered periodically)

What qualifies as American popular culture, methodologies used to study popular culture, and sociological significance of such study.

CST 4500. The New Commons: Activism, Culture, History. (SUSTAIN; 4.0 cr.; A-F or Audit; prereq Minimum 30 credits; fall, summer, every year)

Recent literature and activism concerning the commons-global and local ways of managing shared resources such as water, seeds, the internet, and wisdom. Includes history of the commons as a concept in anthropology, political theory, and law where the framework of "commons" and "enclosure" are being used to articulate a new paradigm for democracy, economic justice, and cross-cultural communication at a local and global

scale. Help create radio segments on the current state of the commons for broadcast and podcast by UMD's radio station.

CST 4653. Cultural Studies Senior Seminar/ Capstone. (4.0 cr.; A-F or Audit; prereq 1101,

CSt minor, no grad credit; spring, every year) As the capstone for the cultural studies minor, this course asks students to engage with current work produced in the field of cultural studies, including (but not limited to) texts, documentary videos, and experimental films produced for both popular and academic audiences.

CST 4691. Independent Study in Cultural Studies.

(1.0-4.0 cr. [max 8.0 cr.]; A-F or Audit; prereq instructor consent; fall, spring, summer, every year)

Directed reading, research, or involvement in an issue leading to the preparation of a paper or other product.

CST 4910. Teaching Assistant in Cultural Studies.

(1.0-3.0 cr. ; A-F only; prereq Minimum 60 credits, instructor consent, no grad credit; maximum 3 credits between CST 4910 and CST 4997; fall, spring, every year) Practical experience in teaching-related activities in cultural studies courses.

CST 4985. Critical Animal Studies. (4.0 cr.; A-F or Audit; =[SOC 4985]; prereq minimum 90 credits or instructor consent; no grad credit; fall, spring, offered periodically)

This course explores the ways in which animal lives intersect with human lives, including the evolution of social, cultural, scientific, and religious attitudes toward animals. We will examine the dynamics of power and visualization in the ways animals are culturally framed and constructed. Students will also learn to critically analyze a variety of ethical debates about animals in society, such as the eating of animals, animal experimentation, zoos, hunting, ownership, and legal status.

Dance (DN)

School of Fine Arts

DN 1001. Introduction to the World of Dance.

(FINE ARTS; LE CAT9; LEIP CAT09; 3.0 cr.; A-F or Audit; fall, every year)

Appreciation of dance as an art and entertainment form using aesthetic, sociocultural, historical, and genre studies. Video and concert viewing, readings on choreographers and dancers, critiques, and lab experiences.

DN 1011. Tap Dance Fundamentals. (LE

CAT10; 2.0 cr. [max 4.0 cr.]; A-F or Audit; spring, offered periodically)

Fundamental tap dance technique, emphasizing tap dance as a social and performing art form.

DN 1101. Modern Dance Technique I. (FINE ARTS; LE CAT10; 2.0 cr. [max 12.0 cr.]; A-F or Audit; fall, every year)

Beginning work, emphasizing modern dance as a performing art form.

DN 1110. Jazz Dance Fundamentals. (FINE ARTS; 2.0 cr. [max 4.0 cr.]; A-F or Audit; fall, spring, every year)

Beginning work, designed for the student with very minimal or no previous dance experience. Emphasis on introducing basic movement concepts (i.e. placement, musicality) and jazz dance styles.

DN 1111. Jazz Dance Technique I. (FINE ARTS; LE CAT10; 2.0 cr. [max 8.0 cr.]; A-F or Audit; fall, spring, every year)

Beginning work, emphasizing jazz dance as a performing art form.

DN 1121. Tap Dance Technique I. (2.0 cr. [max 8.0 cr.]; A-F or Audit; prereq 4 credits of 1101 or 1111, instructor consent; fall, every year)

Beginning work, emphasizing tap dance as a performing art form.

DN 1131. Ballet Technique I. (FINE ARTS; LE CAT10; 2.0 cr. [max 12.0 cr.]; A-F or Audit; fall, spring, every year)

Beginning work, emphasizing ballet as a performing art form.

DN 2101. Physical Conditioning for Dance.

(1.0 cr. [max 3.0 cr.]; A-F or Audit; prereq Completion of one 1xxx Dance course or instructor consent; spring, offered periodically) Introductory course in physical conditioning specifically aimed at cross training for dancers. Course will include basic anatomy, strengthening, stretching including static and dynamic, and addressing and eliminating muscular imbalances that inhibit proper technique.

DN 3201. Modern Dance Technique II.

(2.0 cr. [max 12.0 cr.]; A-F or Audit; prereq instructor consent; spring, every year)

Intermediate work, emphasizing modern dance as a performing art form.

DN 3211. Jazz Dance Technique II. (2.0 cr.

[max 18.0 cr.]; A-F or Audit; prereq instructor consent; spring, every year)

Intermediate work in lyrical and percussive jazz dance techniques.

DN 3221. Tap Dance Technique II. (2.0 cr.

[max 8.0 cr.]; A-F or Audit; prereq 1121 or instructor consent; spring, every year)

Intermediate work, emphasizing tap dance as a performing art form. Tap dance composition and development of improvisational skills.

DN 3231. Ballet Technique II. (2.0 cr. [max

12.0 cr.]; A-F or Audit; prereq instructor consent; fall, every year)

Intermediate work, emphasizing ballet as a performing art form.

DN 3241. Social Dance for the Stage. (1.0 cr.

[max 2.0 cr.]; A-F or Audit; prereq minimum 60 credits, BFA Theatre major, instructor consent; fall, every year)

An introduction to, and instruction in, social dance forms commonly used in theatrical staging and musical theatre choreography, including historical and cultural context.

DN 3401. Dance Composition. (3.0 cr.; A-F or Audit; prereq instructor consent; spring, offered periodically)

Study and development of dance choreography through creative experiences.

DN 3611. Dance History. (3.0 cr.; A-F or Audit; prereq 1001 or instructor consent; spring, offered periodically)
Religious, social, political, and artistic forces that have contributed to development of dance in Western civilization, emphasizing Romantic era through present.

DN 3991. Independent Study in Dance. (1.0-3.0 cr. [max 6.0 cr.]; A-F or Audit; prereq instructor consent; undergrads may not take more than 6 credits in 3991 and 5991 combined; fall, spring, every year)
Directed readings and projects arranged between student and faculty mentor.

DN 3995. Special Topics (Various Titles to be Assigned). (1.0-9.0 cr. ; A-F or Audit; fall, spring, summer, offered periodically)
Special topics to be assigned.

DN 4116. Musical Theatre Audition Techniques. (3.0 cr.; A-F or Audit; prereq instructor consent, no grad credit; spring, offered periodically)
Advanced dance, song, acting, and marketing capstone course for professionally oriented musical theatre student.

DN 4311. Jazz Dance Technique III. (2.0 cr. [max 12.0 cr.]; A-F or Audit; prereq instructor consent; no grad credit; fall, every year)
Advanced work, emphasizing jazz dance as a performing art form.

DN 4331. Ballet Technique III. (2.0 cr. [max 12.0 cr.]; A-F or Audit; prereq 3231, instructor consent; no grad credit; spring, every year)
Advanced work, emphasizing ballet as a performing art form.

DN 4901. Intern Teaching Dance. (2.0 cr. [max 6.0 cr.]; A-F or Audit; prereq 3201 or 3211 or 3221 or 3231, instructor consent; no grad credit; fall, spring, every year)
Practical experience teaching introductory level dance classes. Students serve as intern teachers assisting instructor in administration of course.

DN 5991. Independent Study in Dance. (1.0-3.0 cr. [max 6.0 cr.]; A-F or Audit; prereq instructor consent; undergrads max 6 cr in 3991 and 5991 combined; fall, spring, every year)
Advanced directed readings and projects arranged between student and faculty mentor.

DN 5997. Internship in Professional Dance. (1.0-12.0 cr. ; A-F or Audit; prereq department approval; 1 cr for each 45 hrs of work; fall, spring, every year)
Internship with a cooperating professional, commercial, or regional dance company.

Early Childhood Studies (ECh)

College of Education and Human Service Professions

ECH 2010. Foundational Issues in Early Childhood Studies. (3.0 cr.; A-F or Audit; fall, spring, every year)
Historical and cultural perspectives of Early Childhood Studies. Theoretical models for the education of young children from

birth through age eight will be addressed through professional exploration. Methods for facilitating child development as well as strategies for collaborating with families and communities will be discussed. Practicum experience with young children will provide a hands on experience for the students.

ECH 2015. Literature for Young Children. (3.0 cr.; A-F or Audit; fall, spring, summer, every year)
Introduces professionals who work with children from birth through age eight to literature for young children. Criteria for selecting book and non-book materials will be presented, discussed and utilized when examining, selecting, and reading such materials. Strategies for sharing the books and non-book materials with children and for integrating the materials into day care, preschool, and primary settings will be explored.

ECH 2025. Educating the Human Brain. (SOC SCI; 3.0 cr.; A-F or Audit; fall, spring, summer, every year)
Issues related to early brain development and the biological underpinnings of early emotional and cognitive development. A biological view of attachment and social vulnerability.

ECH 3021. Teaching Mathematics: Birth-Age Eight. (4.0 cr.; A-F or Audit; prereq Admission to the ECh program; spring, every year)
Development and instruction in play-based and problem-based mathematics in birth to age 8 settings. Methods, materials, and research findings related to teaching of mathematics. Practicum required.

ECH 3022. Literacy for Young Children: Teaching Reading, Writing, Speaking, and Listening. (4.0 cr.; A-F or Audit; prereq Admission to the ECh program; spring, every year)
Prepares professionals who work with children from birth to age eight to introduce and teach developmentally appropriate skills and strategies related to reading, writing, speaking, and listening. Course assignments will be linked to practicum experiences. Practicum required.

ECH 3030. Inquiry, Social Studies, and Science Learning: Birth-Age Eight. (5.0 cr.; prereq ECh major, 2010, 3010, Must be taken either after or concurrently with ECH 4011 and SpEd 3105; spring, every year)
Exploratory and socially sensitive environments for children from birth through age 8; inquiry, physical knowledge, social processes in children's play; planning, implementing, evaluating culturally and developmentally appropriate science and social studies learning experiences; integrated, thematic curricula and use of technology to enhance learning. Practicum required.

ECH 3050. Observing and Guiding Behavior: Birth-Age Eight. (4.0 cr.; prereq UECh major, 2010, 3010, SpEd 3103; spring, every year)
Observing, recording, and guiding behaviors in children from birth through age eight. Focuses

on informal methods for observation. Practicum is required. Use of technology for behavioral observation.

ECH 3055. Creative Expressions and Emergent Literacy: Birth - Age 8. (4.0 cr.; A-F or Audit; prereq Admission to the UECh program; spring, every year)
Exploration of developmentally appropriate methods and materials for the integration of art, music and movement experiences ages birth-age 8. An emphasis on using the arts to support development of concept of print, the alphabet, vocabulary, phonemic awareness, comprehension, motivation, and other literacy skills. This course will involve some field work.

ECH 3060. Teaching Culturally and Linguistically Diverse Children. (3.0 cr.; A-F or Audit; prereq Admission to the ECh program or instructor consent; spring, every year)
Provides Unified Early Childhood Education students with knowledge and skills to teach a variety of young diverse learners. The different groups the course will target include children learning English as a second language, urban, rural, gifted, and talented learners.

ECH 3104. Family Partnerships. (1.0 cr.; A-F or Audit; prereq Admission to the UECh program; spring, every year)
Practicum experience in which students partner with a young child and their family. Through this experience, students practice advocacy skills, integrate theory in early childhood, and observe children in the context of the family.

ECH 4009. Leadership in Early Childhood Studies. (3.0 cr.; A-F or Audit; prereq Admission to UECh program; no grad credit; spring, offered periodically)
Develops knowledge and competencies in the area of educational leadership, including development and administration of early childhood programs, professionalism, ethics and social policy.

ECH 4010. Infant and Early Childhood Perceptual and Psychomotor Development. (2.0 cr.; A-F or Audit; prereq Unified early childhood major, no grad credit; fall, every year)
Issues related to typical and atypical perceptual and psychomotor development in children from birth to age eight will be examined. The interaction of the mover with the contextual features of the environment and the demands of the movement task will provide an opportunity to explore developmentally appropriate methods and materials for the integration of physical activities and movement for children's overall growth.

ECH 4011. Parent Education. (4.0 cr.; A-F or Audit; prereq Must be taken either after or concurrently with ECH 3030, SpEd 3105, instructor consent; no grad credit; fall, offered periodically)
Planning, presenting, and evaluating educational programs for parents; adult learning and development; philosophy of Minnesota early childhood family education program; teaching strategies; curriculum development.

ECH 4251. Parenting. (3.0 cr.; A-F or Audit; prereq UECh major, Educ 1000 or Psy 2021 or Psy 3371 or instructor consent; no grad credit; summer, offered periodically)
Parent-child interaction, roles and responsibilities throughout the life cycle; analysis of parenting strategies; contemporary variation of family cultures, structures and lifestyles; sources of education and support.

ECH 4400. Professional Development Seminar. (1.0 cr. [max 3.0 cr.]; A-F or Audit; prereq instructor consent; no grad credit; spring, every year)
Professional development through documentation, reflection, synthesis of learning as related to standards. Development of process and product portfolios. Presentation of and dialogue about emergent learning.

ECH 4600. Student Teaching in Early Childhood/Primary. (3.0-12.0 cr. ; S-N only; prereq 3005, 3007 or instructor consent; no grad credit; fall, spring, every year)
Application of skills, understanding, and knowledge related to working with children from birth through age eight.

ECH 4610. Professional Issues Seminar in Early Childhood Education. (1.0 cr.; prereq 4600; no grad credit; fall, spring, every year)
Reflections on current issues and ethical dilemmas in field of early childhood education, birth through age eight; preparation for professional job-seeking and interviewing.

ECH 4991. Independent Study. (1.0-6.0 cr. ; A-F or Audit; prereq instructor consent; no grad credit; fall, spring, every year)
Individualized reading and research in a special topic.

ECH 4993. Special Area Project. (1.0-4.0 cr. ; A-F or Audit; prereq instructor consent; no grad credit; fall, spring, every year)
Independent project for advanced students to substantially further their theoretical knowledge base or professional competencies in early childhood, birth through age eight.

ECH 5050. Observing and Guiding Behavior: Birth-Age Eight. (4.0 cr.; prereq 2010, 3010, SpEd 3103; summer, offered periodically)
Observing, recording, and guiding behaviors in children from birth to age eight. Focuses on informal methods for observation. Practicum is required. Use of technology for behavioral observation.

ECH 5993. Special Area Project. (1.0-4.0 cr. ; A-F or Audit; fall, spring, every year)
Independent project for advanced students to substantially further their theoretical knowledge base or professional competencies.

ECH 5995. Special Topics: (Various Titles to be Assigned). (1.0-6.0 cr. [max 96.0 cr.]; A-F or Audit; prereq Grad student or post-baccalaureate status; summer, every year)
Special topics in early childhood education to meet needs and interests of different groups of students.

ECH 7030. Cognitive Development. (4.0 cr.; A-F or Audit; prereq Collegiate grad program

admission or instructor consent; summer, offered periodically)
Issues related to early brain development and the biological underpinnings of early emotional and cognitive development. A biological view of attachment and social vulnerability will also be addressed.

ECH 7031. Critical Connections During the Early Years. (3.0 cr.; A-F or Audit; prereq 7030, collegiate grad program admission or instructor consent; summer, offered periodically)
Issues related to quality care and appropriate support for young children, as well as the role of attachment, and the role teachers, parents and community members play in the facilitation of the development of social skills for young children.

ECH 7032. Competent Child. (3.0 cr.; A-F or Audit; prereq 7030, collegiate grad program admission or instructor consent; summer, offered periodically)
Addresses the role early childhood education plays in the facilitation of early regulation, coping strategies, and the development of social and emotional competence within the context of adult relationships.

ECH 7033. The Child as a Citizen. (4.0 cr.; A-F or Audit; prereq 7030, collegiate grad program admission or instructor consent; summer, offered periodically)
Children in the context of the family and community. Focuses on the child as a contributor within the family structure and as a member of the greater society. Issues of gender, culture and early citizenship will be discussed as well as the emergence of developmental skills related to these issues.

Economics (ECON)

Labovitz School of Business and Economics

ECON 1003. Economics and Society. (SOC SCI; LE CAT8; 3.0 cr.; A-F or Audit; prereq Cannot apply credit to economics major or minor or BA or BBA majors; spring, every year)
General description of U.S. economy and analysis of contemporary economic problems. Introduction to major economic issues and problems of the day, providing a simple framework used by economists for analysis.

ECON 1022. Principles of Economics: Macro. (SOC SCI; LE CAT6; 3.0 cr.; A-F or Audit; prereq Minimum 15 credits or department consent; fall, spring, summer, every year)
Analyzing overall performance of an economic system. National income accounting and theory, unemployment, inflation, fiscal policy, money, monetary policy, economic growth, international trade, non-U.S. economies, and real-world application of these concepts.

ECON 1023. Principles of Economics: Micro. (SOC SCI; LE CAT6; 3.0 cr.; A-F or Audit; prereq Minimum 15 credits or department consent; fall, spring, summer, every year)

Analyzing free enterprise system through study of product and resource markets. Supply and demand, utility, production and cost, market structure, resource use, market failures, regulatory role of government, and real-world application of these concepts.

ECON 2030. Applied Statistics for Business and Economics. (LOGIC & QR; 3.0 cr.; A-F or Audit; prereq minimum 30 credits, LSBE student, pre-business or pre-accounting or Econ BA major or Econ minor or Accounting minor or Business Admin minor; credit will not be granted if already received for Econ 2020, Stat 1411, Stat 2411, Stat 3611, Soc 3151, Psy 3020; fall, spring, summer, every year)
Introduction to modern business statistics, emphasizing problem solving through statistical decision making using case studies. Topics include organization and presentation of data, summary statistics, probability theory, distributions, statistical inference including estimation, hypothesis testing, introduction to regression and correlation, introduction to use of computers in statistical analysis.

ECON 3022. Intermediate Macroeconomics. (3.0 cr.; A-F or Audit; prereq 1022, 1023, Math 1160 or Math 1296, Econ major or minor or LSBE candidate; fall, every year)
Determinants of national income, employment, and price levels with particular attention to aggregate demand and aggregate supply, and monetary and fiscal policy.

ECON 3023. Intermediate Microeconomics. (3.0 cr.; A-F or Audit; prereq 1022, 1023, Math 1160 or Math 1296, Econ major or minor or LSBE candidate; spring, every year)
Behavior of households as consuming units and suppliers of resources; analysis of decision making by firms under various market conditions.

ECON 3030. Econometrics I. (3.0 cr.; A-F or Audit; prereq 1022, 1023, (2030 or Stat 1411 or Stat 2411 or Stat 3611), Math 1160 or Math 1296, Econ major or minor or LSBE candidate; fall, every year)
Techniques used in analyzing economic and business data; emphasis on computer methods and research applications. Analysis of variance, qualitative data analysis, modeling, regression, residual and influence analysis, time series.

ECON 3031. History of Economic Thought. (LE CAT7; 3.0 cr.; A-F or Audit; prereq 1003 or 1022, 1023; fall, summer, every year)
Development of economic ideas, principles, and systems of analysis from early times to present, emphasizing personalities and historical events surrounding development of economic thought.

ECON 3150. Development Economics. (3.0 cr.; A-F or Audit; prereq 1022, 1023; spring, every year)
Overview of the conceptual meaning of economic growth and development, problems facing developing countries, economic models underlying different development paths. Exploration of socio-historical and economic reasons for lack of development in selected

areas and policy options to promote economic progress.

ECON 3311. Money and Banking. (3.0 cr.; A-F or Audit; prereq 1022, Econ major or minor or LSBE candidate; fall, spring, every year)
Role of financial institutions and markets, emphasis on Federal Reserve System and its control of commercial banking system, monetary theory and policy, and international economics.

ECON 3314. Sports Economics. (3.0 cr.; A-F or Audit; prereq 1022, 1023, Econ major or minor or LSBE candidate; fall, every year)
This course will introduce and apply microeconomic concepts to issues that arise or pertain to the business and practice of sports. The relevant areas of microeconomics include industrial organization, antitrust, game theory, labor, public finance and urban economics. When and where possible, current real world applications of economics in the sporting world will be discussed.

ECON 3402. Global Economic Issues. (3.0 cr.; A-F or Audit; prereq LSBE candidate; cannot apply credit to econ major or minor; fall, every year)
Application of economic theory of markets to analyze major issues shaping the future of the world economy. Emphasizes globalization of markets and the institutions involved in coordinating economic policies among world economies

ECON 3512. Managerial Economics. (3.0 cr.; A-F or Audit; prereq 1023, (2030 or Stat 3611), minor or LSBE cand; fall, every year)
Application of economic theory to management decision making and policy formulation within the firm. Demand analysis, production and cost analysis, price analysis, capital budgeting. Strategic interaction of firms.

ECON 3721. Natural Resource and Energy Economics. (3.0 cr.; A-F or Audit; prereq 1023, preferred but not required: 3023; credit will not be granted if already received for ECON 4721; spring, odd years)
Microeconomic analysis of natural resource and energy markets. Role of these resources in production processes and waste generation, use and pricing of nonrenewable and renewable resources over time, resource availability, sustainable development, and ecological economics.

ECON 3777. Environmental Economics. (3.0 cr.; A-F or Audit; prereq 1023, preferred but not required: 3023; credit will not be granted if already received for ECON 4777; spring, even years)
Microeconomic analysis of environmental quality as an economic good. Pollution control, benefit-cost analysis, valuation methodologies and their application to air and water quality, hazardous waste management, preservation, and global pollutants.

ECON 3821. Labor Economics: Theory and Issues. (3.0 cr.; A-F or Audit; prereq 1023, preferred but not required 3023, Econ major or minor or LSBE cand; fall, every year)
Labor markets from theoretical and institutional perspectives, including wage theories, labor

supply, labor demand and employment, human capital investments, and occupational choice.

ECON 3910. Economics of Health Care. (3.0 cr.; A-F or Audit; prereq 1022, 1023, Econ major or minor or LSBE cand; fall, spring, every year)
Explores the health care sector and health policy issues from an economic perspective. Topics to be examined include the demand for health and medical care services, health insurance markets, federal health insurance programs, and the pharmaceutical industry.

ECON 4040. Econometrics II. (3.0 cr.; A-F or Audit; prereq 3030 or Stat 5511 or MKTG 3761; spring, odd years)
Development and application of tools of economic research and analysis; emphasis on critical thinking using computer-based statistical methods. Econometrics (theory and practice), applied research techniques, economic forecasting, and time series analysis. Research report.

ECON 4213. Mathematical Economics. (3.0 cr.; A-F or Audit; prereq 1022, 1023, Math 1160 or Math 1296; fall, even years)
Application of fundamentals of differential and integral calculus and linear algebra to static, comparative static, and dynamic topics in microeconomics and macroeconomics.

ECON 4315. Monetary Theory and Policy. (3.0 cr.; A-F or Audit; prereq 3022; spring, even years)
Development of monetary theory and implications of theory for Federal Reserve System's control of money supply and financial institutions, money market strategy, and monetary policy, including goals, targets, and indicators.

ECON 4397. Economics Internship. (3.0 cr.; S-N only; =[ECON 4497]; prereq Econ major, 3022, 3023, instructor consent; no grad credit; fall, spring, summer, every year)
Following written approval of proposal, student engages in supervised program of half-time work experience in public agency, private business, or other organization. Advance, concurrent, and follow-up written and oral presentations required. 20 hr per wk over 15 wk period.

ECON 4410. International Economics . (3.0 cr.; A-F or Audit; prereq 1022, 1023, 3022 or 3023, no grad credit; spring, odd years)
Classical and modern theory of international trade. Extension, empirical verification, and applications of modern theory. Alternative theories of international trade. Concept and measurement of balance of payments. Methods of balance of payments adjustments. Alternative international monetary systems. Selected current issues.

ECON 4512. Firm Decision and Strategy. (3.0 cr.; A-F or Audit; prereq 3023, 3030 or STAT 5511; no grad credit; spring, even years)
Applied microeconomics combining topics that focus on decision-making faced primarily by private institutions from the Managerial and Industrial Organization fields. Topics include demand for products, production and costs, pricing and output decision, and antitrust law.

ECON 4570. Public Finance. (3.0 cr.; A-F or Audit; prereq 1022, 1023; spring, odd years)
Theory and practice of determining governmental expenditures and revenues, including consideration of public goods, welfare economics, raising of revenues, debt policy, and economic stabilization.

ECON 4613. The Economics of Antitrust and Regulation. (3.0 cr.; A-F or Audit; prereq 1023, 3023; spring, odd years)
Alternatives open to a free-enterprise economy when economic goals have not been satisfactorily achieved by the private sector. Public regulation and antitrust legislation and enforcement examined as a means of social control when unacceptable market failures exist.

ECON 4935. Urban/Regional Economics. (3.0 cr.; A-F or Audit; prereq 1003 or 1022, 1023, preferred but not required 3023; fall, every year)
Allocation of unevenly distributed and imperfectly mobile resources. Alternative theories relating to urban and regional growth processes. Analysis of intraregional structures as contributors to growth process. Selected economic problems unique to urban communities.

ECON 4991. Independent Study. (1.0-6.0 cr. ; A-F or Audit; prereq Economics major, 12 credits of Econ 3xxx or above, instructor consent; fall, spring, summer, every year)
For students wishing to do special work in areas useful to individual programs and objectives and not available in regular course offerings.

Education (EDUC)

College of Education and Human Service Professions

EDUC 1000. Human Development. (3.0 cr.; A-F or Audit; fall, spring, every year)
Patterns and theories of development from conception through late adulthood emphasizing early childhood through adolescence; analysis of individual, family, and environmental factors which affect development over the life span.

EDUC 1100. Human Diversity. (CDIVERSITY; LE CAT8; LECD CAT08; 3.0 cr.; A-F or Audit; fall, spring, every year)
Cultural, physical, socially constructed, and psychological differences in people. Social, political, and economic implications of human diversity in modern society. Practicum in community agency.

EDUC 1101. Education in Modern Society. (HUMANITIES; LE CAT7; 3.0 cr.; A-F or Audit; fall, spring, summer, every year)
Survey of educational institutions and practices used in different sectors of society. Historical and philosophical foundations of American education.

EDUC 1201. Managing Planet Earth. (SUSTAIN; LE CAT8; 3.0 cr.; A-F or Audit; fall, spring, summer, every year)
Environmental education; exploration of key concepts and principles that govern how nature

works; potential solutions to environmental and resource problems.

EDUC 1302. Topics in Academic Reading

I. (2.0 cr. [max 4.0 cr.]; A-F or Audit; prereq This course was previously offered as LANG 1302; instructor consent; maximum of 4 credits between EDUC 1302 and LANG 1302; fall, every year)

Topics in Academic Reading I focuses on critical reading in a particular field, building an academic context for language development. Students read, take notes, study terminology, develop ideas, and organize, extend, and articulate opinions about the readings through writing and discussion. Course activities will center around reading authentic college texts in an academic area (ex. the social sciences). This is intended to be a learning-community paired course.

EDUC 1555. Orientation to Korea. (3.0 cr.; A-F or Audit; summer, every year)

This course provides an introduction to Korean culture, tradition, and the Korean educational system. Students will learn some basic speaking skills to support travel in Korea as a first time visitor.

EDUC 2000. Technology for Teaching and Learning.

(3.0 cr.; A-F or Audit; prereq minimum 12 credits; fall, spring, every year) Using technology tools to enhance student learning in kindergarten through grade 6, including interactive whiteboards, tablet computers, other technology tools. Creating, teaching and assessing lessons; differentiating instruction with technology.

EDUC 2001. Teaching with Tablet Computers and Other Mobile Devices.

(1.0 cr.; A-F or Audit; fall, every year) Using tablet computers and other mobile devices in K-12 schools for assessment, collaboration, individualization of learning, creativity, student engagement and research. Advantages and disadvantages. Critical evaluation of apps for various purposes.

EDUC 2301. English for Academic Writing .

(3.0 cr. [max 6.0 cr.]; A-F or Audit; prereq This course was previously offered as LANG 2301; instructor consent; maximum of 6 credits between EDUC 2301 and LANG 2301; fall, every year)

Academic writing for students who are not native speakers of English. Build fluency, comfort with summarizing, quoting, using sources to develop an organized essay; practice drafting and revising; sentence-level editing.

EDUC 2302. Topics in Academic Reading II.

(3.0 cr. [max 6.0 cr.]; A-F or Audit; prereq This course was previously listed as LANG 2302; maximum of 6 credits between EDUC 2302 and LANG 2302; spring, every year)

Topics in Academic Reading II focuses on critical reading in a particular field, building an academic context for language development. Students read, take notes, study terminology, develop ideas, and organize, extend, and articulate opinions about the readings through writing and discussion. Course activities will center around reading authentic college texts

in an academic area (ex. the social sciences). For students whom English is not the first language.

EDUC 2303. Academic Interactions: Listening and Speaking in the College Classroom.

(3.0 cr.; A-F or Audit; prereq This course was previously listed as LANG 2303; instructor consent; maximum of 5 credits between EDUC 2303 and LANG 2303; fall, summer, every year)

English for advanced listening/speaking in the college classroom, for international, non-native speakers of English: lecture comprehension; language and strategies for negotiating group work, leading discussions, giving presentations, and other forms of class participation. Course includes orientation to U.S. classroom, campus life and student services.

EDUC 2304. Editing for Writers. (2.0 cr. [max 4.0 cr.]; A-F or Audit; prereq This course was

previously listed as LANG 2304; maximum of 4 credits between EDUC 2304 and LANG 2304; fall, spring, every year)

This language course focuses on editing for grammatical accuracy and academic style. Students will examine features of formal academic writing, study grammar, take useful grammar notes, practice with a variety of sentence structures, and develop strategies for editing and proofreading. Can be taken concurrently with Writ. 1120. For students for whom English is not the first language.

EDUC 3340. Interacting with Diverse Families.

(3.0 cr.; A-F or Audit; =[EDUC 5340]; prereq Credit will not be granted if credit has been received for EDUC 5340.; fall, every year)

Issues relating to working with and advocating for families from diverse backgrounds and/or with diverse needs. Emphasis on linguistically diverse families, immigrant families, families headed by single parents, members with a disability and families headed by lesbian/gay parents.

EDUC 3381. Teaching American Indian Students in the Elementary Classroom.

(2.0 cr.; A-F or Audit; prereq Elementary education major; credit will not be granted if already received for ELED 3381; fall, spring, every year)

Survey of contemporary Indian education; evaluation of one's attitudes toward Indian students; direct interaction with Indian parents and students; development of culturally sensitive teaching plans regarding Indians.

EDUC 3412. The Computer in Education.

(4.0 cr.; A-F or Audit; prereq Pre education or education majors or candidates; fall, spring, summer, every year)

Introduction to computer use in instructional settings. PC and Mac platforms. Develops basic skills using software commonly used by educators. Teaching strategies using computer-based instruction.

EDUC 4040. World Language Teaching Methods.

(4.0 cr.; A-F or Audit; =[LANG 4044]; prereq FR 2301 or GER 2301 or SPAN 2301 or equivalent, admission to EdSe program or instructor consent; grad credit;

credit will not be granted if already received for LANG 4044; fall, every year)

This course prepares teacher candidates with the necessary information, resources, and skill to become teachers of world languages in K-12. Content focus will include various teaching methods and approaches, fundamentals of language learning, and program components such as assessment, proficiency, and language standards. Students will develop their skills in planning and implementing language programs through lesson and unit planning, and micro-teaching experience.

EDUC 4110. Advanced Earth Science for Teachers.

(2.0 cr.; A-F or Audit; prereq AST 1040, EDSE 3204, GEOL 1110, 2110 or 2120 or 3210; teaching science majors or grad student or instructor consent; no grad credit, credit will not be granted if already received for GEOL 4110; spring, every year)

Investigative approach to secondary school teaching of modern earth science curricula, including aspects of astronomy, meteorology, oceanography, and geology, the latter with an emphasis on plate tectonics. (2 hrs lect)

EDUC 4226. Geometry for Teachers in Grades 5-8.

(3.0 cr.; A-F or Audit; prereq Math 1141 or 1296; spring, summer, every year) The development of geometry concepts through investigations of geometric relationships and informal properties provides the basis for examining the teaching and learning of geometry in grades 5-8.

EDUC 4227. Number Theory for Teachers in Grades 5-8.

(3.0 cr.; A-F or Audit; prereq Math 1141 or 1296; fall, every year) The development of number concepts and theories through investigations and applications of discrete mathematics strategies provides the basis for examining the teaching and learning of number theory in grades 5-8.

EDUC 4228. Teaching Mathematics with Technology.

(3.0 cr.; A-F only; prereq Math 1141 or 1296; fall, summer, every year) Using mathematics-based technology such as computer software, calculators, and Internet applets to examine the teaching and learning of mathematics.

EDUC 4229. Teaching Middle School Mathematics.

(2.0 cr.; A-F or Audit; prereq Instructor consent; no grad credit; summer, every year)

The development of middle school concepts through problem-based investigations and applications of standards provides the basis for examining the teaching and learning of mathematics in grades 5 - 8

EDUC 4234. Science, Technology, and Society.

(SUSTAIN; 3.0 cr.; A-F or Audit; prereq Minimum 30 credits, no grad credits; fall, spring, summer, every year)

Nontechnical study of historical and cultural impact of natural science and technology on the earth and its inhabitants.

EDUC 4300. American Education System.

(2.0-3.0 cr. [max 6.0 cr.]; A-F or Audit; prereq instructor consent; no grad credit; spring, every year)

This course provided an opportunity for international exchange students and UMD students to compare teaching methods and philosophies. The international students will develop an understanding of American education and increase their knowledge of appropriate instructional skills, strategies, and attitudes for being a teaching in a globalized classroom. The course includes a clinical experience in a P-12 setting.

EDUC 4347. Second Language Acquisition & ELL: How Second Languages are Learned & Methods for Teaching. (2.0 cr.; A-F or Audit; prereq IESE candidate, 3326; no grad credit; credit will not be granted if already received for ELED 4347; fall, spring, every year)

English language learners are increasing as a significant demographic in US P-16 classrooms. This course provides a theoretical and research-based introduction to Second Language Acquisition, including description of theoretical, pedagogical and policy issues. Candidate will learn classroom methodology for instruction ELL, and best practices for developing literacy skills in diverse classrooms, with attention to oral, written, academic literacy, and reading comprehension.

EDUC 4381. Teaching Indigenous Students. (2.0 cr.; A-F or Audit; prereq EDSE 4100; no grad credit; credit will not be granted if already received for EDUC 5381.; fall, spring, every year)

Survey of contemporary and historical Indian education; evaluation of attitudes toward Indian students: direct interaction with Indian parents and students; development of culturally sensitive teaching plans; specific cultural characteristics of indigenous groups; examination of American Indian outcomes.

EDUC 4500. Professional Issues and Ethics. (1.0 cr.; A-F or Audit; prereq Admission to the elementary education program, successful completion of courses in block one and block two, no grad credit; fall, spring, every year) Provides an overview of several topics affecting practicing teachers including: employment preparation (resume, cover letter, interviewing skills), licensure application, professional organizations, professional codes of ethics, and district procedures. Offered concurrent with student teaching in order to provide options for discussion during practica.

EDUC 4650. Student Teaching in Parent Education. (1.0-3.0 cr. ; S-N or Audit; prereq Admission to parent education program; no grad credit; spring, offered periodically) Application of knowledge, understandings, and skills related to working with adult learners in parent education or early childhood/family education programs.

EDUC 4991. Independent Study. (0.5-3.0 cr. [max 6.0 cr.]; A-F or Audit; prereq instructor consent; no grad credit; fall, spring, every year) Directed independent study, readings, and/or projects of interest to education students.

EDUC 4993. Special Area Project. (1.0-4.0 cr. ; A-F or Audit; prereq instructor consent; no grad credit; fall, spring, summer, every year)

Independent project for advanced students to substantially further their theoretical knowledge base or professional competencies.

EDUC 4995. Education Special Topics. (1.0-4.0 cr. ; A-F or Audit; summer, offered periodically) Special topics as assigned

EDUC 5128. Urban Education. (3.0 cr.; fall, spring, summer, offered periodically) Combines on-site experience in an urban educational setting with reading and reflection. Develops knowledge, skills, attitudes, motivation, and commitment to work individually and collectively with poor children in urban schools.

EDUC 5226. Geometry for Teachers in Grades 5 - 8. (3.0 cr.; A-F or Audit; prereq Math 1141 or 1296 or 1596; spring, summer, every year) The development of geometry concepts through investigations of geometric relationship and informal properties provides the basis for examining the teaching and learning of geometry in grades 5 - 8.

EDUC 5227. Number Theory for Teachers in Grade 5 - 8. (3.0 cr.; A-F or Audit; prereq Math 1141 or 1296 or 1596; fall, summer, every year) The development of number concepts and theories through investigations and applications of discrete mathematics strategies provides the basis for examining the teaching and learning of number theory in grades 5 - 8.

EDUC 5228. Teaching Math and Technology. (3.0 cr.; A-F or Audit; prereq Math 1141 or 1296 or 1596; fall, summer, every year) Using mathematics-based technology such as computer software, calculators, and applets to examine the teaching and learning of mathematics.

EDUC 5229. Teaching Middle School Mathematics. (2.0 cr.; A-F or Audit; summer, every year) The development of middle school concepts through problem-based investigations and applications of standards provides the basis for examining the teaching and learning of mathematics in grades 5 - 8.

EDUC 5295. Special Topics: (Various Titles to be Assigned). (0.5-4.0 cr. [max 8.0 cr.]; A-F or Audit; summer, every year) Current issues in Education to meet needs and interests of various groups, particularly practicing professionals.

EDUC 5320. History of U.S. Education: Practice, Policy, and Reform and the Shaping of American Education. (3.0 cr.; A-F or Audit; prereq grad student or minimum 90 credits; summer, odd years) History of Education is a survey course in which students examines significant paradigmatic shifts in U.S. education from the Federalist period to the present. Topics examined include the aims of education for society, the definition and role of teacher in education as an institution, and the influences

of such things as technologies in shaping education.

EDUC 5340. Interacting With Diverse Families. (3.0 cr.; A-F or Audit; =[EDUC 3340]; prereq 90 cr or instructor consent; fall, every year) Issues relating to working with and advocating for families from diverse backgrounds and/or with diverse needs. Emphasis on linguistically diverse families, immigrant families, families headed by single parents, families with members with a disability, families headed by lesbian/gay parents.

EDUC 5381. Teaching Indigenous Students. (2.0 cr.; A-F or Audit; prereq credit will not be granted if already received for EDUC 4381.; fall, spring, summer, every year) Survey of contemporary Indian education; evaluation of one's attitudes toward Indian students; direct interaction with Indian parents and students; development of culturally sensitive teaching plans regarding Indians.

EDUC 5401. Creative and Intellectually Gifted Children. (2.0 cr.; A-F or Audit; fall, spring, summer, every year) Identification, characteristics, and service needs of creative and intellectually gifted children; various programs to meet needs.

EDUC 5412. The Computer in Education. (4.0 cr.; A-F or Audit; fall, spring, summer, every year) Introduction to computer use in instructional settings. PC and Mac platforms. Develops basic skills using software commonly used by educators. Teaching strategies using computer-assisted instruction.

EDUC 5413. Teaching With Technology. (4.0 cr.; A-F or Audit; prereq 3412 or 5412, min 60 cr or coll grad or instructor consent; fall, spring, summer, every year) Develops basic computer and educational technology skills focusing on using microcomputers for communications.

EDUC 5414. Using Technology for the Administrative Tasks of Teaching. (4.0 cr.; A-F or Audit; prereq Min 60 cr or coll grad; 3412 or 5412, 5413 or instructor consent; fall, spring, summer, every year) Develops basic computer and educational technology skills focusing on using microcomputers for administrative tasks of teaching.

EDUC 5415. Teaching Online and Hybrid Courses. (4.0 cr.; A-F or Audit; prereq Min 60 cr or coll grad, 3412 or 5412, 5413, 5414 or instructor consent; spring, summer, offered periodically) Designing completely online courses and hybrid (partially face-to-face and partially online) courses. Instructional design, methods of teaching, creating learning activities, technology tools, social dimensions, assessment of student learning.

EDUC 5417. Teaching Elementary Keyboarding and Computer Applications Practicum. (1.0 cr.; S-N or Audit; =[EDUC 3417]; prereq 3416 or 5416, pre EIED, EIED,

pre UECh, UECh or non degree cand; fall, spring, offered periodically)

Supervised practicum in elementary schools with a specific focus on elementary keyboard and computer applications. Supervision conducted by University faculty in conjunction with licensed elementary teacher or the school's designated elementary computer instructor.

EDUC 5560. Current Research and Issues in Science Education. (2.0-3.0 cr. [max 6.0 cr.]; A-F or Audit; prereq MEd student; offered summer only, instructor consent; fall, spring, offered periodically)

Examines science education research literature. Trends in research and teaching.

EDUC 5570. Exemplary Models for Science Education. (2.0-3.0 cr. [max 6.0 cr.]; A-F or Audit; prereq MEd student, instructor consent; summer, offered periodically)

Emphasis on hands-on and/or integrated curriculum models.

EDUC 5600. Practicum in Education.

(1.0-12.0 cr. ; S-N or Audit; fall, spring, every year)

Arranged opportunity for persons interested in gaining practical experience in a nontraditional educational program under direction and supervision of faculty. Location, type of experience, duration of experience, and assessment are determined in consultation with faculty supervisor.

EDUC 5850. Classroom Learning

Applications. (2.0 cr.; A-F or Audit; prereq Admission to MEd or instructor consent; fall, summer, offered periodically)

Cognitive processes in education in preparation for developing curriculum and teaching. Emphasis on application of brain-based learning theory to development of knowledge systems in education.

EDUC 5990. Research Project. (1.0-6.0

cr. [max 36.0 cr.]; S-N only; prereq Instructor consent; fall, spring, summer, every year)
Faculty-supervised research project required for MEd

EDUC 5991. Independent Study. (0.5-4.0 cr. [max 8.0 cr.]; A-F or Audit; fall, spring, summer, every year)

Directed independent study, readings, and/or projects of interest to students in education.

EDUC 5993. Special Area Project. (0.5-4.0 cr. [max 14.0 cr.]; A-F or Audit; fall, spring, summer, every year)

Independent project for advanced students to substantially further their theoretical knowledge base or professional competencies.

EDUC 5995. Special Topics: (Various Titles to be assigned). (0.5-4.0 cr. [max 16.0 cr.]; A-F or Audit; fall, spring, summer, every year)
Topics selected from education to meet needs and interests of different groups of students.

EDUC 7001. Introduction to Graduate Study. (2.0 cr.; A-F or Audit; prereq MEd candidate or instructor consent; credit will not be granted if already received for EHS 7001; fall, spring, summer, offered periodically)

Expectations of graduate study, scholarly writing and online learning. Develop skills in using the Internet for scholarly research and writing, culminating in writing of a literature review.

EDUC 7002. Human Diversity and Exceptionality. (2.0 cr.; A-F or Audit; prereq MEd candidate or instructor consent; credit will not be granted if already received for EHS 7002; fall, spring, offered periodically)

Stresses the importance of diversity and exceptionality in educational settings, and its relevance to teaching and learning strategies, assessment, and professional community building. The concepts of privilege and power will be explored from the standpoint of the educator and his/her role in the educational setting.

EDUC 7004. Foundations of Educational

Research. (4.0 cr.; A-F or Audit; prereq M.SpEd student or MEd student or instructor consent; credit will not be granted if already received for EHS 7004; fall, spring, offered periodically)

Provides foundational knowledge in being a consumer of and conducting scholarly educational research. Designed to provide an orientation to existing educational research and research methods, with a focus on defining a topic, writing a problem statement, and investigating current literature and research on that topic. Includes emphasis on ethical and responsible research protocol with underlying foundations in social justice and reform.

EDUC 7005. Teaching and Learning in a Systems Context. (3.0 cr.; A-F or Audit;

prereq Ed.D. student or instructor consent; credit will not be granted if already received for EHS 7005; spring, summer, offered periodically)

Provides an in depth investigation of systems theory in an educational context: teaching and learning systems in curriculum, in teaching methods, educational administration and leadership, and educational change. History, current theory, application and tools of systems thinking will be studied.

EDUC 7006. Ethics and Professionalism in Education. (2.0 cr.; A-F or Audit; prereq MEd

cand or instructor consent; credit will not be granted if already received for EHS 7006; fall, spring, offered periodically)

Offers a synthesis of previous courses, reviewed from the context of ethics and ethical dilemmas that touch on diversity, systems change, educators' roles, professional competencies, and leadership roles.

EDUC 7008. Foundations of Teaching and Learning: Curriculum Theory and Design.

(4.0 cr.; A-F or Audit; prereq MEd student or instructor consent; credit will not be granted if already received for EHS 7008; fall, spring, summer, offered periodically)

Broad-based foundational course designed to study advanced learning theory and curriculum design, and develop skills in critical analysis of teaching application and student outcomes. Focuses on the importance of working in the context of a professional community.

EDUC 7009. Assessment of Learning. (3.0 cr. [max 12.0 cr.]; A-F or Audit; prereq MEd candidate; credit will not be granted if already received for EHS 7009; fall, spring, summer, offered periodically)

Focuses on the design and application of appropriate learning assessment strategies that consider the pedagogical intent, state, federal, and subject standards, and the diversity for all learners. Teaching theory and practice will be viewed in the context of learning assessment.

EDUC 7011. Integrated Research in

Practice. (3.0 cr.; A-F or Audit; prereq 7004 or instructor consent; fall, spring, every year)

Provides in depth knowledge and skills in quantitative, qualitative and mixed methods research methodology, and is designed to guide students through the process of designing and conducting a scholarly research project.

EDUC 7018. Basic Statistics for Educational

Research. (3.0 cr.; A-F or Audit; prereq Graduate student or instructor consent; summer, odd years)

Focuses on the essential concepts in educational statistics including when to use basic statistical tests and how to interpret the results. The topics include measurement scale, reliability and validity, sampling, descriptive statistics, the normal curve and standard scores, measuring relations, and inferential statistics.

EDUC 7030. World Indigenous Language

Revitalization. (4.0 cr.; A-F only; prereq 7008; spring, offered periodically)

Survey course on world language revitalization, special emphasis on indigenous languages. Includes basic introduction to language acquisition, readings from Hawaii, New Zealand, and indigenous nations within the US; principles of endangered language revitalization, context specific circumstances of several indigenous languages.

EDUC 7032. Instructional Materials Design for Indigenous Language Revitalization.

(3.0 cr.; A-F only; prereq 7030; spring, offered periodically)

Curriculum development and materials design for indigenous language revitalization. Builds on students' prior knowledge of planning and on proficiency in a language other than English. Includes design of curriculum and materials, such as creation of books, audio and video production with Elders and native communities, strategic design of materials as related to language and content objectives.

EDUC 7040. Principles of Adult Education.

(3.0 cr.; A-F or Audit; summer, offered periodically)

Philosophy and application of adult education principles.

EDUC 7120. Models of Indigenous

Leadership. (3.0 cr.; A-F or Audit; prereq grad student; summer, offered periodically)

The course will examine Indigenous leadership models throughout history: traditional leadership, leadership during the period of colonialism, contemporary leadership, and the future of Indigenous leadership. Leadership

in Indigenous contexts, colonized leadership, power, Indigenous sovereignty, hereditary leadership, military leadership and spiritual leadership will be examined. Emphasis will be placed on the place of Indigenous leadership models within a contemporary context.

EDUC 7130. Indigenous Knowledge and Worldview. (3.0 cr.; A-F or Audit; prereq grad student; summer, offered periodically) This course focuses on how different Indigenous peoples know and learn about the world. The diverse metaphysical experiences of various tribal peoples are explored as a means of demonstrating the range of beliefs and ways of knowing within Indigenous life. Perspectives on language, experience, and philosophical views of language, culture, and land are considered with respect to both contemporary and traditional environments. Indigenous research paradigms and methodologies are explored as a means of helping students contextualize research interest.

EDUC 7140. Transformational Leadership. (3.0 cr.; A-F or Audit; prereq grad student; summer, offered periodically) The course will examine transformational leadership theory and its application in Indigenous organizations and communities, with particular application in educational settings. Topics include the theory and nature of transformational leadership, predictors, correlates and measuring transformational leadership, developing transformational leadership, transformational leadership and performance, stress, and gender; transformational leadership in organizational cultures and policies; transformational leadership and decision making; the future of transformational leadership.

EDUC 7160. Culture, Language and Society. (3.0 cr.; A-F or Audit; prereq grad student; summer, offered periodically) This course will explore the relationship between language, culture, and society as it pertains to the experiences of Indigenous peoples from around the world. Critical topics of exploration include semiotics, socio-cultural dimensions of language use, identify, and the connection between society and schooling in language and culture revitalization. General definitions and associated interrelationships of language, culture, and society will be explored from Western and Indigenous perspectives.

EDUC 7444. Principles of Program Evaluation in Educational Settings. (3.0 cr.; A-F or Audit; prereq Acceptance to Master's of Special Education program; fall, spring, offered periodically) Models, theories, and philosophies of program evaluation in education settings; evaluation of general and special education curriculum; specific strategies for family and professional involvement in educational planning, implementation, and evaluation.

EDUC 8001. Historical, Social, and Philosophical Foundations of Education. (3.0 cr.; A-F only; prereq Ed.D. majors or instructor consent; summer, odd years) Survey of the historical, social, and philosophical issues in education, in order to

prepare and build a foundation for doctoral level students in education.

EDUC 8003. Educational Policy. (3.0 cr.; A-F only; prereq Ed.D. majors or instructor consent; spring, even years) Modes of educational policy analysis; assessment of educational policy in its political, cultural, and economic contexts; and techniques for effective communication about education policy.

EDUC 8005. Curriculum: Theory into Practice. (3.0 cr.; A-F only; prereq Ed.D. majors or instructor consent; fall, odd years) Overview of curriculum mapping, methods for analysis of scope and sequence and articulation, current curriculum theory, standards, and curriculum audit strategies, purposes and responsibilities.

EDUC 8007. Research on Knowledge and Learning in Education. (3.0 cr.; A-F only; prereq Ed.D. majors or instructor consent; summer, odd years) An exploration of theoretical definitions of knowledge and a review of research on the processes of learning.

EDUC 8009. Distance Education: From Theory to Practice. (3.0 cr.; A-F only; prereq Ed.D. majors or instructor consent; fall, odd years) Theoretical framework, historical development and practical applications of different models of distance education. Topics: theory and perspectives, adult education principles, course design, teaching strategies, assessment, and current and emerging technologies applied to distance education.

EDUC 8015. Research Design. (3.0 cr.; A-F only; prereq Psy 5052 or equiv, Ed.D. majors or instructor consent; summer, even years) An overview of research designs that span qualitative, quantitative, and mixed methods. The learners will critically examine and select the appropriate research methodology based on a specific question, hypothesis, or problem statement; and interpret and evaluate various research studies.

EDUC 8016. Theory and Practice of Qualitative Research Methods. (3.0 cr.; A-F only; prereq 8015 or equivalent, Ed.D. majors or instructor consent; fall, even years) Qualitative research traditions and methods, and practice with the skills and attitudes necessary to successfully conduct qualitative research.

EDUC 8017. Theory and Practice of Quantitative Research Methods. (3.0 cr.; A-F only; prereq 8015 or equivalent, Ed.D. majors or instructor consent; spring, odd years) In-depth focus on quantitative research methods. Issues related to data collection methods and analysis using computer software packages.

EDUC 8018. Statistical Analysis in Educational Research. (3.0 cr.; A-F only; prereq Ed.D. major or permission of instructor (Student enrolled in collegiate graduate programs); fall, even years)

Intermediate statistics course for doctoral level students in education and other human service professions; basic concepts of descriptive statistics, graphic representation, probability, statistical inference, significance testing using correlation coefficients, linear regression, t-tests, one-way analysis of variance, factorial analysis of variance, split-plot analysis of variance, and analysis of covariance.

EDUC 8020. Doctoral Seminar. (1.0 cr. [max 6.0 cr.]; S-N only; prereq Ed.D. majors; fall, spring, summer, every year) Review of current research around best practices, or focused strategies for progression with the program or the dissertation.

EDUC 8021. Theories, Principles, and Methodology of Assessment in Organizational Systems. (3.0 cr.; A-F only; prereq Ed.D. majors; fall, even years) Designed to provide an understanding of assessment methods in organizational systems. Examines current practice and theory regarding the use of assessment as feedback to improve system processes.

EDUC 8444. FTE: Doctoral. (1.0 cr.; No Grade Associated; prereq Doctoral student, adviser and DGS consent; fall, spring, summer, every year) (No description)

EDUC 8666. Doctoral Pre-Thesis Credits. (1.0-6.0 cr. [max 12.0 cr.]; No Grade Associated; prereq Max 6 cr per semester or summer; doctoral student who has not passed prelim oral; no required consent for the first two registrations up to 12 cr; departmental consent for the third and fourth registrations up to an additional 12 cr, or 24 cr total (for doctoral students admitted summer 2007 and beyond; doctoral students admitted prior to summer 2007 may register up to 4 times totaling 60 cr); fall, spring, summer, every year) (No description)

EDUC 8888. Thesis Credit: Doctoral. (1.0-24.0 cr. [max 100.0 cr.]; No Grade Associated; prereq Max 18 cr per semester or summer; 24 cr required; fall, spring, summer, every year) (no description)

Education and Human Service Professions (EHS)

College of Education and Human Service Professions

EHS 799. CEHSP Masters Active Status. (0.0 cr.; No Grade Associated; prereq MEd or MSpEd students only; fall, spring, summer, every year) Maintains continuous enrollment for collegiate masters students who have finished required coursework and are finishing the final product. Does NOT include eligibility (athletic, defer loans, etc).

EHS 5595. Special Topics: (Various Titles to be Assigned). (0.5-4.0 cr. [max 16.0 cr.]; A-F or Audit; prereq Course in human dev or ed psy or multicultural ed or spec ed, coll grad student or instructor consent; summer, every year)

Topics announced in [Class Schedule].

EHS 5713. American Indian Culture and Tradition: Oral Tradition and History. (2.0 cr.; A-F or Audit; fall, spring, summer, every year)

Explores historical and current methods and issues in oral tradition and education with emphasis on Woodlands and Plains Indians.

Education, Secondary (EDSE)

College of Education and Human Service Professions

EDSE 3206. Apprenticeship: Secondary School. (2.0 cr.; A-F or Audit; prereq Admission to EdSe program, must be taken either after or concurrently with EDSE 3204; fall, spring, every year)

Fifty hours of experience in a high school, including observing, teaching, tutoring, working with individual students and small groups. Focuses on classroom management, multicultural education, and students with special needs. Weekly seminar.

EDSE 4100. Teaching in a Diverse Society. (3.0 cr.; A-F or Audit; prereq Admission to EdSe program; fall, spring, summer, every year)

Examination of cultural differences; planning instruction to accommodate individual differences in race, gender, ethnic background, cultural background, and physical and mental development; Including the diverse needs of learners in middle school and secondary school settings; integrated and exploratory curriculum, utilization of technology, community resources, structured service learning and humanizing classroom environments and classroom management procedures.

EDSE 4120. Philosophy and Organization of the Middle School. (2.0 cr.; A-F or Audit; prereq Secondary majors admitted to teacher education or pre-elementary education majors, 45 credits; credit will not be granted if already received for 5120; fall, spring, summer, every year)

Philosophies and organization and structure of middle schools. Assessment of benefits, drawbacks, and rationale.

EDSE 4204. Designing Learning Environments and Lessons. (3.0 cr.; A-F or Audit; prereq Admission to EdSe program; no grad credit; fall, spring, every year)

The characteristics of effective teachers, various developmentally appropriate teaching strategies, design of lessons using Universal Backward Design framework, designing effective learning environments, goals and action plans, site data, collaboratively review of student work, collaborative planning, integrated and exploratory curriculum, content standards, teaching with technology, observation skills and teacher readiness will be presented with integration and analysis of materials.

EDSE 4205. Designing Learning Environments and Lessons. (3.0 cr.; A-F or Audit; prereq no grad credit, instructor consent; fall, spring, every year)

A comprehensive course that describes the characteristics of effective teachers, introduces teaching strategies using the Universal Backward Design framework, how to design effective learning environments, how to develop goals and action plans, manage data, review student work, plan lessons, and teach with technology.

EDSE 4212. Literature for Adolescents. (3.0 cr.; A-F or Audit; =[EDSE 4214, EDSE 4215]; prereq Teaching comm arts/lit major, minor or pre students or elem-middle educ comart/lit specialization; fall, spring, every year) Extensive reading in literature written for adolescents; analysis of studies of adolescent choices in literature; principles of selection; critical reading in broad fields of literary, biographical, historical, scientific interests of both genders; pedagogy and critical theory appropriate for adolescent study of literature.

EDSE 4214. Teaching Content-Area Reading. (2.0 cr.; A-F or Audit; =[EDSE 4212, EDSE 4215]; fall, spring, summer, every year) Teaching reading within 5-12 content-area courses as pedagogy for improving literacy. Developing an understanding of the brain, cognition, and reading. Exploration of stages of literacy, methods for promoting reading, and strategies for improving comprehension. Lesson planning for content-area reading. Diverse learners and critical literacy in the content-area classroom.

EDSE 4215. Teaching Reading and Literature: Grades 5-12. (5.0 cr.; A-F or Audit; =[EDSE 4212, EDSE 4214]; prereq Major or pre teaching comm arts/lit students; fall, spring, offered periodically) Teaching procedures, objectives, and materials; emphasis on teaching of reading in various subject-matter fields, practicum experience.

EDSE 4222. Teaching Mathematics: Grades 5-12. (4.0 cr.; A-F or Audit; prereq Admission to EdSe program, 3204 or instructor consent, no grad credit; fall, every year) Standards for secondary mathematics as they apply to learning, teaching, curriculum, and integration of technologies in mathematics grades 5-12; emphasis on use of problematic approach to mathematical sense-making.

EDSE 4244. Teaching Social Studies: Grades 5-12. (3.0 cr.; A-F or Audit; prereq Admission to EdSe program, 3204 or instructor consent; no grad credit; fall, spring, every year) History and philosophy of social studies education; social studies objectives; curriculum design; instructional planning and use of resources; evaluation procedures.

EDSE 4255. Teaching Science: Grades 5-12. (3.0 cr.; A-F or Audit; prereq Admission to EdSe program, 3204 or instructor consent; no grad credit; spring, every year) Historical development of science education. Goals and purposes of science education in secondary schools; methods and materials; evaluation procedures; current trends.

EDSE 4400. Professional Development Seminar for Secondary Education Majors. (1.0 cr. [max 3.0 cr.]; A-F or Audit; prereq

Acceptance into EdSe program; no grad credit; fall, spring, every year)

Professional development for Secondary Education majors through documentation, reflection, synthesis of learning as related to standards. Development of process and product portfolios. Presentation of and dialogue about emergent learning.

EDSE 4501. Adolescent/Adult Development and Learning Theory. (3.0 cr.; A-F or Audit; prereq Admission to EdSe program; no grad credit; fall, spring, every year) Principles of psychology applied to teaching; examination of adolescent growth and development; classroom management.

EDSE 4525. Assessment for Secondary Education . (3.0 cr.; A-F only; prereq instructor consent; no grad credit; fall, spring, every year)

An exploration of topics in responsive and responsible assessment of student learning. Topics include types and appropriate uses of classroom assessment strategies, large-scale and high stakes testing, backwards design, rubrics, checklists, and other evaluative tools and techniques.

EDSE 4600. Student Teaching. (3.0-12.0 cr. ; S-N or Audit; prereq 4100, 4501, appropriate methods course; no grad credit; fall, spring, every year)

Supervised practicum in secondary or middle school under direction of licensed teacher. Demonstration of subject matter, teaching competence, and potential for future improvement.

EDSE 4993. Special Area Project. (1.0-4.0 cr. ; A-F or Audit; prereq instructor consent; no grad credit; fall, spring, every year) Independent project for advanced students to substantially further their theoretical knowledge base or professional competencies.

EDSE 5000. Introduction to Post-Secondary Teaching. (2.0 cr.; A-F or Audit; prereq grad student or community college faculty; fall, every year)

Introduction to Teaching will provide a brief overview of learning theory, student and teacher expectations, development of a syllabus, lesson planning goals, rubrics, assignments, student evaluation/assessment, how to submit grades, online teaching using electronic course platforms, classroom management and other topics pertinent to teaching adult learners. This class will provide support for new graduate teaching assistants and new faculty at community colleges.

EDSE 5204. Designing Learning Enviroments. (3.0 cr.; A-F or Audit; prereq Grad student or new faculty at a community college; instructor consent; fall, spring, every year)

A comprehensive course that describes the characteristics of effective teachers, introduces teaching strategies using the Universal Backward Design framework, how to design effective learning environments, how to develop goals and action plans, manage data, review student work, plan lessons, and teach with technology.

EDSE 5255. Teaching Science Grades 5 - 12. (3.0 cr.; A-F or Audit; prereq 5000, 5204, 5501, 5525; spring, every year)

The course serves to help teacher candidates focus on important elements to teaching of science in secondary and post-secondary education settings. Topics include: historical development of science education, goals and purposes of science education in secondary schools and post-secondary education settings; inquiry, methods and materials' evaluation procedures; current trends; and compare adolescent learning to adult learning of science education.

EDSE 5501. Adolescent/Adult Development and Learning Theory. (3.0 cr.; A-F or Audit; prereq Grad student or faculty at post secondary institution or instructor consent; fall, spring, every year)

Principles of psychology applied to teaching; examination of adolescent growth and development and classroom management. Graduate students will include adult learning theory in terms of growth and development and how to organize and manage post secondary classroom.

EDSE 5525. Assessment for Secondary Education. (3.0 cr.; A-F or Audit; prereq graduate student, faculty at community college or instructor consent; fall, spring, every year)

An exploration of topics in responsive and responsible assessment of student learning. Topics include types and appropriate uses of classroom assessment strategies, large-scale and high stakes testing, backwards design, rubrics, checklists, and other evaluative tools and techniques. Graduate students will complete an adult based project to develop a model of assessment to measure adult learners in their classes.

Educational Administration (EDAD)

College of Education and Human Service Professions

EDAD 5911. Leadership and Personal Growth. (3.0 cr.; A-F or Audit; prereq EdAd lic program or collegiate grad program admission or instructor consent; summer, every year)

An overview of leadership from a theoretical perspective. Learners will begin to see the role and styles of leadership in relationship to the culture of schools and communities.

EDAD 5913. Communication and Community Relations . (3.0 cr.; A-F or Audit; prereq EdAd lic program or collegiate program admission or instructor consent; summer, every year)

Schools' public and media relations, communication needs of internal/external publics, processes to solicit support for initiatives, review of crises plans.

EDAD 5916. Curriculum and Instruction and Assessment. (3.0 cr.; A-F or Audit; prereq EdAd lic program or collegiate graduate program admission or instructor consent; fall, every year)

Overview of curriculum design. Both traditional and backwards design with practice in

mapping, scope and sequence, large-scale testing, assessment of individual and systemic growth, early child education, and providing opportunities for all students.

EDAD 5917. EdAd Technology Seminar. (1.0 cr. [max 10.0 cr.]; S-N or Audit; summer, every year)

Showcases school management systems and innovation in educational technology, research in area schools, and current trends in leadership and educational administration.

EDAD 5918. Continuous Improvement Processes for Schools. (3.0 cr.; prereq EdAd lic program or collegiate graduate program admission or instructor consent; summer, every year)

Examines effective data-driven continuous improvement best practices in schools. Learners will examine strategic planning, accreditation processes, state and federal accountability, AYP, reporting in order to continue funding flow and establishment of effective leadership terms.

EDAD 5919. Superintendency. (3.0 cr.; A-F or Audit; prereq EdAd lic program or collegiate graduate program admission or instructor consent; fall, every year)

Examine the level of decision making that differentiates district administration and responsibility unique to the position including creating district level mission, vision, and strategic planning; contract negotiation; working with local, state, and federal agencies, program coordination at all levels, school board relations, and clear establishment of expectations.

EDAD 5920. Problem Solving for Principals: Student Discipline and Behavior Management. (3.0 cr.; A-F or Audit; prereq EdAd lic program or collegiate graduate program admission or instructor consent; fall, every year)

Case-study based course will examine theories of behavior management and evaluate the effectiveness of discipline approaches through lenses of development, culture, leadership styles and legal aspects of discipline for all students.

EDAD 5921. Principalship. (3.0 cr.; A-F or Audit; prereq EdAd lic program or collegiate graduate program admission or instructor consent; fall, every year)

Orients individuals to the responsibilities of the principal's positions in schools and districts.

EDAD 5922. Problem Solving for Superintendents. (3.0 cr.; A-F or Audit; prereq EdAd lic program or collegiate grad program admission or instructor consent; summer, every year)

Presents solutions and pathways for superintendents, including labor relations, contract negotiations, bonds and referenda, policy creation and relationships with school boards and communities.

EDAD 5923. Field Exploration. (2.0 cr.; S-N only; prereq EdAd lic program or collegiate grad program admission or instructor consent; summer, every year)

Candidates for licensure as educational administrators will experience working in school systems that do not follow the traditional American model of delivery of programs and instruction. Travel is required and 20 hours of internship will be coordinated through the office of the Educational Administration Program Coordinator.

EDAD 5997. Professional Competency Assessment: Principals. (1.0 cr.; A-F or Audit; prereq EdAd lic program or collegiate graduate program admission or instructor consent; fall, every year)

Capstone for the educational administrative program for principals. Learners will complete an electronic portfolio which includes valid evidence of competency for each core leadership and principal's competencies required for certificate approval. Candidates will prepare for final panel presentations.

EDAD 5998. Professional Competency Assessment: Superintendents. (1.0 cr.; A-F or Audit; prereq EdAd Lic program or collegiate graduate program admission or instructor consent; fall, every year)

Learners will complete an electronic portfolio which includes valid evidence of competency for each Core Leadership and Superintendent's Competencies required for certificate approval. Candidates will prepare for final panel presentations.

EDAD 6990. Internship in Teaching for Administrators. (3.0 cr. [max 9.0 cr.]; A-F or Audit; prereq Admission to the Ed Ad program; fall, spring, every year)

Intended to assist the candidate in meeting the requirements of the Rules of the MN State Board of Education, Chapter 352.0700 ADMINISTRATIVE LICENSURE WITHOUT TEACHING EXPERIENCE. Subp. 3a. Teaching knowledge and skills. An applicant shall demonstrate basic teaching knowledge and skills as required by part 8710.2000.

EDAD 6997. Internship: Principals. (6.0 cr.; S-N only; prereq EdAd lic program or collegiate graduate program or instructor consent; fall, every year)

To place the candidate for licensure with practicing, licensed principals for a minimum of 320 total hours. Candidates must serve 80 hours of internship with a mentor and students that are not at the level of the candidate's teacher licensure.

EDAD 6998. Internship: Superintendents. (6.0 cr.; S-N only; prereq EdAd lic program or collegiate graduate program admission or instructor consent; fall, every year)

Candidates for licensure will be working with a practicing, licensed superintendent for a minimum of 320 total hours. University of Minnesota Duluth candidates are also encouraged to serve additional hours in a situation of alternative delivery.

EDAD 6999. Internship: Principals Additional Field. (4.0 cr.; A-F or Audit; prereq EdAd lic program or collegiate graduate program admission or instructor consent; fall, every year)

Places candidates for additional licensure fields in schools, working with a practicing, licensed principal for a minimum of 40 total hours at the level of the requested additional field.

Electrical Engineering (EE)

Swenson College of Science and Engineering

EE 1001. Introduction to Electrical Engineering. (2.0 cr.; A-F or Audit; prereq CE, ChE, CS, EE, IE, ME majors only; fall, every year)

Definition and description of electrical engineering. Digital and analog systems. Electrical engineering lab equipment and software. Selected specialties. (2 hrs lect)

EE 1201. Science Behind Our Things. (3.0 cr.; A-F only; prereq High school algebra; fall, spring, every year)

Course is designed to provide a basic understanding of the science underlying the operation of many electrical, electronic, and mechanical technological wonders that are integral to our daily lives. Not for science or engineering majors.

EE 1315. Digital Logic. (4.0 cr.; A-F or Audit; prereq CE, ChE, CS, EE, IE, ME majors or instructor consent; fall, spring, every year)

Binary number system and digital coding techniques. Boolean algebra, combinational logic circuits, and minimization techniques. Synchronous sequential circuits and state reduction techniques. Medium Scale Integration (MSI) combinational components.

EE 2006. Electrical Circuit Analysis. (4.0 cr.; A-F or Audit; prereq Phys 2015, Math 3280 (Concurrent registration is allowed); fall, spring, every year)

Basic circuit analysis: resistive circuits, voltage and current sources--independent and dependent. Nodal and mesh analysis. Network theorems. Energy storage elements. RC, RL, and RLC transient and steady state analysis, phasors. SPICE analysis. (3 hrs lect, 3 hrs lab)

EE 2111. Linear Systems and Signal Analysis. (4.0 cr.; A-F or Audit; prereq 2006; fall, spring, every year)

Signal and system modeling concepts, system analysis in time domain, Fourier series and Fourier transform. Discrete time domain signals and systems, Z transform, applications. (3 hrs lect, 3 hrs lab)

EE 2212. Electronics I. (4.0 cr.; A-F or Audit; prereq 2006; fall, spring, every year)

Diodes, BJTs, FETs, ideal operational amplifiers, DC analysis, small signal models, and analysis; single-stage circuits design; power amplifiers. (3 hrs lect, 3 hrs lab)

EE 2325. Microprocessor Systems. (4.0 cr.; A-F or Audit; prereq 1315; fall, spring, every year)

Microcomputer components. Instruction set, machine and assembly language programming. Addressing modes. Signed/unsigned arithmetic. Stack uses. Assembly-level translation of high-level language constructions. Input/Output interfacing. Interrupt programming. (3 hrs lect, 3 hrs lab)

EE 3151. Control Systems. (4.0 cr.; A-F or Audit; prereq 2111; fall, spring, every year) System mathematical modeling: differential equations, Laplace transform, block diagrams, signal flow graphs. System performance characteristics: time response, sensitivity, steady-state error. Stability analysis: Routh-Hurwitz, root locus and Nyquist. State variables. Compensation design, software tools. (3 hrs lect, 3 hrs lab)

EE 3235. Electronics II. (4.0 cr.; A-F or Audit; prereq 2212; fall, spring, every year)

Multistage circuits, frequency analysis, non-ideal operational amplifiers, feedback and stability, oscillators, filters. (3 hrs lect, 3 hrs lab)

EE 3445. Electromagnetic Fields. (3.0 cr.; A-F or Audit; prereq Math 3280, 3298, Phys 2012 or 2015 and 2016; fall, every year)

Fundamentals of electromagnetic analysis. Electrostatic and magnetostatic fields. Introductory numerical analysis of electromagnetic fields. Time-varying fields and potentials. Maxwell's equations and their applications. (3 hrs lect)

EE 4305. Computer Architecture. (4.0 cr.; A-F or Audit; prereq 2325; fall, every year)

Advanced assembly language programming techniques. Memory design principles. Virtual memory. Cache memory. Processor design. Pipelined and Reduced Instruction Set Computers (RISC). Advanced microprocessor features. (3 hrs lect, 3 hrs lab)

EE 4311. Design of Very Large-Scale

Integrated Circuits. (3.0 cr.; A-F or Audit; prereq 3235, (3341 or 4341), or instructor consent; fall, offered periodically) Philosophy of and techniques for designing VLSI circuits in CMOS technology. Full- and semi-custom design techniques. Digital, analog, and hybrid CMOS circuits and systems. Substantial design project required. (3 hrs lect)

EE 4321. Computer Networks. (3.0 cr.; A-F or Audit; prereq 2325; fall, offered periodically) Network classification and services. Protocol and communication architectures. Hardware components: multiplexers, concentrators, bridges, routers, access servers. (3 hrs lect)

EE 4341. Digital Systems. (4.0 cr.; A-F or Audit; prereq 2325, no graduate credit; credit will not be granted if already received for ECE 3341; spring, offered periodically)

Digital logic family characteristics. Medium Scale Integration (MSI) components and applications. Programmable Logic Devices (PLDs). Alternative clocking techniques. Computer arithmetic circuits and memory design. Fundamental mode asynchronous finite-state machine design. (3 hrs lect, 3 hrs lab)

EE 4501. Power Systems. (4.0 cr.; A-F or Audit; prereq 2006; no grad credit; spring, every year)

Fundamentals of rotating machines: DC, synchronous, and induction machines. Transformers. Power system representation. Transmission lines. Power system analysis: stability and dynamic performance. Balanced and unbalanced faults. Power system protection. (3 hrs lect, 3 hrs lab)

EE 4611. Introduction to Solid-State Semiconductors. (3.0 cr.; A-F or Audit; prereq Phys 2012 or 2015; credit will not be granted if already received for ECE 3611; spring, every year)

Fundamentals of solid-state semiconductors and devices. Quantum mechanical concepts and atomic states, solid-state structure, band structure, semiconductor statistics, and transport. (3 hrs lect)

EE 4899. Senior Design Project I. (1.0 cr.; A-F or Audit; prereq WRIT 3130, BSECE or BSEE cand, instructor consent; no grad credit, credit will not be granted if already received for 4951; fall, spring, every year)

Selection and completion of team project approved and supervised by faculty. See also ECE 4999.

EE 4951. ECE Design Workshop. (4.0 cr.; A-F or Audit; prereq WRIT 3130 previous or concurrent registration allowed, BSECE or BSEE cand, instructor consent; no Grad credit; credit will not be granted if already received for 4899; spring, offered periodically)

Study of a selected topic; its application to a design project, completed individually or in a small group. Focuses on a different method each semester offered. Completion satisfies requirement for a senior design project.

EE 4991. Independent Study. (1.0-3.0 cr.; A-F or Audit; prereq instructor consent; does not qualify as EE or ECE technical elective; no Grad credit; fall, spring, offered periodically) Special projects not available in regular curriculum. Independent investigation, research studies, or survey of selected projects or problems.

EE 4999. Senior Design Project II. (3.0 cr.; A-F or Audit; prereq 4899, instructor consent, no Grad credit; credit will not be granted if already received for 4951; fall, spring, every year)

Students present senior design project results in formal written and oral reports after making refinements. Complete documentation of results in professional manner required. Results must be presented in an oral report with other senior project team members. ECE 4899 and ECE 4999 must be completed within one year for credit.

EE 5151. Digital Control System Design.

(3.0 cr.; A-F or Audit; prereq 3151; credit will not be granted if already received for 4151; spring, offered periodically) Digital control system characteristics: transient and steady-state responses, frequency response, stability. Digital control system design using transform techniques. Controllability and observability. Design of digital control systems using state-space methods: pole placement and observer design, multivariable optimal control. Implementation issues in digital control

EE 5211. Advanced Analog Integrated Circuit Design. (3.0 cr.; A-F only; prereq 3235 or equiv; fall, offered periodically)

Provides ECE students with fundamental analysis and design skills for transistor-level analog integrated circuits, such as operational

amplifiers, transconductance amplifiers, bandgap references, amplifier-based filters, analog-to-digital converters, digital-to analog converters and phase-locked loop. Project-oriented with a focus on transistor-level design of analog circuits from transistor sizing to layout in an integrated circuit environment such as Cadence tool sets. The expected outcomes are that students are able to design an analog system of medium complexity at transistor-level.

EE 5315. Multiprocessor-Based System Design. (3.0 cr.; A-F or Audit; prereq 2325; credit will not be granted if already received for 4315; fall, offered periodically)
Parallelism, interconnection networks, shared memory architecture, principles of scalable performance, vector computers, multiprocessors, multicomputers, dataflow architectures, and supercomputers.

EE 5351. Introduction to Robotics and Mobile Robot Control Architectures. (3.0 cr.; A-F or Audit; prereq 3151; spring, offered periodically)
Basic concepts and tools for the analysis, design, and control of robotic mechanisms. Topics include basic robot architecture and applications to dynamical systems, mobile mechanisms, kinematics, inverse kinematics, trajectory and motion planning, mobile robots, collision avoidance, and control architectures.

EE 5477. Antennas and Transmission Lines. (3.0 cr.; A-F or Audit; prereq 3445; credit will not be granted if already received for 4477; spring, offered periodically)
Concepts and theory of antennas and transmission lines; emphasis on design and applications. Topics: nonlinear source and loads, cross talk, interconnecting circuits, line characteristics, radiation, measurements. EM propagation, scattering and antenna design techniques. Numerical analysis of wire, aperture, reflector antennas; diffraction theory.

EE 5501. Energy Conversion System. (3.0 cr.; A-F or Audit; =[ME 5325]; prereq Chem 1151 or 1153 and 1154; fall, every year)
Theory, design and operation of conventional and alternative electrical energy conversion systems. Carbon dioxide cycle, Earth/Sun radiation balance, and environmental impacts. Power delivery systems and integration of conversion systems with the grid. Development of generation portfolios. Impact of energy policies and current energy issues. Case studies.

EE 5522. Power Electronics I. (3.0 cr.; A-F or Audit; prereq 3235; spring, every year)
Power semiconductor devices; traditional power converters; ac-dc converters: half-wave and full-wave rectifiers; dc-dc converters: traditional and transformer derived choppers; dc-ac converters: single-phase and three-phase inverters; ac-ac converters; pulse-width modulation; applications.

EE 5611. Microelectronics Technology. (3.0 cr.; A-F only; prereq 3611 or 4611; fall, offered periodically)
Various fabrication processes in silicon-based microelectronic circuits and devices:

lithography, oxidation, diffusion, thin film deposition, etching and integration of various technologies; material defects analysis and device characterization skills; design of fabrication process with SUPREME IV simulator; fabrication technologies involved in other devices: optical devices, MEMS and semiconductor nanostructures.

EE 5741. Digital Signal Processing. (3.0 cr.; A-F or Audit; prereq 2111; credit will not be granted if already received for 4741; spring, offered periodically)
Discrete linear shift-invariant systems, z- & Fourier transform, sampling, discrete-time processing of signals, reconstruction of analog signals, filters and filter structures in direct, parallel, and cascaded forms, FIR & IIR digital filter design, impulse-invariant, bilinear transform & window functions, FFT, introduction to image processing.

EE 5742. Pattern Recognition and Machine Learning. (4.0 cr.; A-F or Audit; prereq STAT 3611, senior or graduate standing in science or engineering or instructor consent; some basic concepts in linear algebra and probability theory.; fall, spring, even years)
Various methods of pattern recognition, non-parametric techniques, linear discriminant functions, support vector machines, statistical classification, minmax procedures, maximum likelihood decisions and case studies.

EE 5745. Medical Imaging. (3.0 cr.; A-F or Audit; prereq EE (ECE) 2111, Math 3298 or instructor permission; spring, even years)
Introduction to the methods and devices for medical imaging, including x-ray imaging, x-ray computer tomography (CT), nuclear medicine (single photon planar imaging, single photon emission computer tomography (SPECT), and positron emission tomography (PET), magnetic resonance imaging (MRI), and ultrasound imaging. The physics and design of systems, typical applications, medical image processing, and tomographic reconstruction.

EE 5765. Modern Communication. (4.0 cr.; prereq 2111; credit will not be granted if already received for 4765; fall, every year)
Design and analysis of modern communication systems; evaluation of analog and digital modulation techniques. (3 hrs lect, 3 hrs lab)

EE 5801. Introduction to Artificial Neural Networks. (3.0 cr.; A-F or Audit; prereq CS 1521, Math 3280, Stat 3611 or instructor consent; credit will not be granted if already received for 4801; fall, offered periodically)
General techniques and theory of neural networks, their applications and limitations. The course particularly addresses the design issues and learning algorithms for diverse areas of applications.

EE 5831. Fuzzy Set Theory and Its Application. (3.0 cr.; A-F or Audit; prereq CS 1521, Math 3280; credit will not be granted if already received for 5831; fall, offered periodically)
Fuzzy sets and operations on fuzzy sets. Fuzzy relations and the extension principle. Linguistic variable and fuzzy IF-THEN rules. Fuzzy arithmetic. Fuzzy logic and approximate

reasoning. Design of Fuzzy Systems from I/O data. Fuzzy logic-based control. Pattern Classifications.

EE 5995. Special Topics: (Various Titles to be Assigned). (1.0-3.0 cr.; A-F or Audit; prereq instructor consent; fall, spring, offered periodically)
Current problems and research. Discussions, selected reading, and/or invited speakers.

EE 8151. Linear Systems and Optimal Control. (3.0 cr.; A-F only; prereq 3151; spring, even years)
State-space representations of dynamic systems. Input-output stability. Lyapunov stability. Controllability and observability. Minimal realizations. State and output feedback. Pole placement design. State observers. Linear quadratic optimal control: fixed and free end point, finite and infinite horizon. Pontryagin's Minimal Principle. Dynamic programming.

EE 8222. Master's Plan B Research and Design Project. (1.0-3.0 cr.; S-N only; prereq Graduate student, instructor consent; credit will not be granted if already received for 8777; fall, spring, every year)
Provides ECE Plan B graduate students with experience in applying research, analysis, and design skills to a project of current interest to industry. Through the chosen project, the student should demonstrate the ability to achieve results in a fixed time frame and present the results to the department orally and via a technical report.

EE 8315. Embedded Systems and Microcomputer Interfaces Design. (4.0 cr.; A-F or Audit; prereq 2325, 3341, CS 1511, CS 2521; fall, offered periodically)
Introduces students to the design of advanced embedded and microprocessor based system, and microcomputer interfaces, with an emphasis on embedded systems hardware and software design relevant to talking with computer hardware.

EE 8333. FTE: Master's. (1.0 cr.; No Grade Associated; prereq Master's student, advisor and DGS consent; fall, spring, offered periodically)
(No description)

EE 8741. Digital Image Processing. (4.0 cr.; A-F or Audit; prereq 4741; fall, odd years)
Mathematical foundations and practical techniques to process and manipulate images. Students will acquire the ability to analyze two-dimensional images, dealing with mathematical representation of images, image sampling and quantization, Image Transforms, Image Enhancement, Image Restoration, Image Coding, Edge Detection, Texture Analysis, and Compression.

EE 8742. Fundamentals of Signal Detection and Estimation. (3.0 cr.; A-F or Audit; prereq 2111 and Stat 3611 or their equivalents, grad student or instructor consent; spring, odd years)
Study of detection, estimation, and signal representation, detection of signals in noise, estimation of signal parameters, linear

estimation theory. Performance bounds on Estimation and Detection. Kalman-Bucy and Wiener filters. Applications to Multiuser detection, Spectrum estimation, Adaptive Wiener filter, and system identification.

EE 8765. Digital Communications. (3.0 cr.; A-F or Audit; prereq 5765; spring, odd years) Overview of digital data transmission, performance analysis of digital modulation, quadrature multiplexed signaling schemes, signal-space methods in digital data transmission, information theory and block coding, convolutional coding, repeat-request system, spread-spectrum systems, satellite communications.

EE 8777. Thesis Credits: Master's. (1.0-18.0 cr. [max 50.0 cr.]; No Grade Associated; prereq Max 18 cr per semester or summer; 10 cr total required (Plan A only); fall, spring, every year) (No description)

EE 8831. Soft Computing. (3.0 cr.; A-F or Audit; prereq Knowledge of linear algebra and computer programming; fall, offered periodically) Fuzzy set theory, neural networks, genetic algorithms, data clustering techniques, and several stochastic optimization methods that do not require gradient information which is aimed at solving real world decision-making, modeling, and control problem.

Elementary Education (ELED)

College of Education and Human Service Professions

ELED 4600. Student Teaching. (6.0-12.0 cr. ; S-N or Audit; prereq 3381, 4346 and 4347, no grad credit; fall, spring, every year) Demonstrating competence in developing, implementing, and assessing curriculum based on learners' needs and district, state and national standards, exhibiting classroom and behavioral management skills, and collaborating with specialist. Consideration of issues related to the professional status and activity of teachers with reference to philosophical foundations, communication, job seeking skills, and professional organization will be interwoven.

ELED 4650. Student Teaching in Individual Subjects: K-8. (1.0-6.0 cr. [max 7.0 cr.]; S-N or Audit; prereq Art education candidate or music education candidate , or physical education candidate or instructor consent; no grad credit; fall, spring, every year) Student teaching in, e.g., art, music, physical education. Demonstrating subject matter competence, instructional strategies, and management skills; self-evaluation.

ELED 4991. Independent Study. (1.0-6.0 cr. ; A-F or Audit; prereq department consent; no grad credit; fall, spring, offered periodically) Directed independent study, reading, and/or projects in elementary or middle school education of interest to student.

ELED 4993. Special Area Project. (1.0-4.0 cr. ; A-F or Audit; prereq instructor consent; no grad credit; fall, spring, offered periodically)

Independent project for advanced students to substantially further their theoretical knowledge base or professional competencies.

ELED 5695. Special Topics: (Various Titles to be Assigned). (0.5-4.0 cr. [max 8.0 cr.]; A-F or Audit; summer, offered periodically) Current issues in Elementary Education to meet needs and interests of various groups, particularly practicing professionals.

ELED 5993. Special Area Project. (1.0-4.0 cr. ; A-F or Audit; prereq instructor consent; fall, spring, offered periodically) Independent project for advanced students to substantially further their theoretical knowledge base or professional competencies.

Engineering (ENGR)

Swenson College of Science and Engineering

ENGR 1210. Introduction to Engineering. (2.0 cr.; A-F or Audit; prereq Math 1296; fall, spring, every year) An introduction to the engineering profession with an emphasis on mechanical and industrial engineering. Topics include the roles and responsibilities of an engineer, the engineering disciplines, problem solving skills and tools, oral and written communication, teamwork, and the engineering design process.

ENGR 1222. Introduction to Solid Modeling. (2.0 cr.; A-F or Audit; =[IE 2222, IE 1225]; prereq Math 1296, Engr 1210 (co-registration allowed); fall, spring, every year) An introduction to the use of modern solid modeling software. Generating 3D models and detailed 2D engineering drawings of parts, including proper geometric dimensioning and tolerancing. Modeling assemblies of 3D parts, and generating assembly drawings and exploded views.

ENGR 2026. Dynamics. (3.0 cr.; =[ME 2226]; prereq Math 3280; fall, spring, every year) Review of particle dynamics. Mechanical systems and rigid-body model. Kinematics and dynamics of plane systems.

ENGR 4001. Engineering Professionalism. (3.0 cr.; A-F or Audit; prereq BSECE or BSChE or BSIE or BSME student, minimum 60 credits, no grad credit; fall, spring, every year) Relationship of engineering to topics in economics, environment, sustainability, manufacturing, ethics, health and safety, society, and politics. Multidisciplinary engineering design lab experience. Written lab reports, proposals, professional letters, resume. Oral lab progress reports.

Engineering Management (EMGT)

Swenson College of Science and Engineering

EMGT 3010. Introduction to Engineering Management. (3.0 cr.; A-F or Audit; prereq STAT 3411 or 3611, WRIT 1120; fall, every year) Introduction to principles of management and organizational behavior as they apply to the engineering profession. Special emphasis would be on project management, team

building, quality leadership, and the marketing of technology. Group exercises, case studies, extensive writing and speaking assignments.

EMGT 4110. Engineering Professionalism and Practice. (2.0 cr.; A-F only; =[IE 4155, ME 4155, IE 3205]; prereq WRIT 3130 or 3150 or 3180 and BSChE or BSECE or BSIE or BSME candidate within 2 semesters of graduation or instructor consent; no grad credit; fall, spring, every year) Professional responsibilities of engineers and expectations of industry and society. Ethics and law for engineers. Codes of ethics and professional engineering societies. Design, intellectual property, record keeping. Environmental and safety issues in design. Group processes, conflict management. Project management.

EMGT 5110. Management of Engineers and Technology. (3.0 cr.; A-F only; prereq EMgt student or department approval; fall, even years) Managing the synergism of people and technology. Overview of management functions, tools, methods. Planning, organization, leadership, motivation, control, quality, human resources, effective decision making.

EMGT 5120. Advanced Project Management. (3.0 cr.; A-F only; prereq EMgt student or department approval; spring, even years) Project justification and finance. The development and management of project plans and resources. Working with contractors and union personnel. Covers the life cycle of projects. Applications to current practice.

EMGT 5130. Operations Modeling and Analysis. (3.0 cr.; A-F only; prereq EMgt student or department approval; spring, odd years) Modeling and analysis of manufacturing and service systems. Linear programming, network analysis, queuing theory, Markov chains, and non-linear optimization.

EMGT 5160. Quality Management. (3.0 cr.; A-F only; prereq EMgt student or department approval; fall, odd years) Global competitiveness, organizational culture, management role responsibilities, concepts for customer value, strategic management, measurement of customer value, organizing to improve systems, employee involvement, culture change and organizational learning. ISO 9000, quality awards.

EMGT 5220. Innovation Management. (3.0 cr.; A-F only; prereq EMgt student or department approval; fall, spring, offered periodically) Key success factors of technological innovation will be identified by looking at the diverse economic, social, cultural, psychological and technical phenomena that comprise innovation. Questions that will be answered include why certain inventions successfully make it to the market but some others died; why some organizations keep coming up with innovations with tremendous business value but some others stay as followers; how to enhance

creativity at individual, team, organizational, and national levels; what the emerging trend is in today's business innovation environment and how organizations should cope with it, etc.

EMGT 5230. Technical Forecasting. (3.0 cr.; A-F only; prereq EMgt Student or department approval; spring, odd years)
Statistical review, data sources, choosing a forecasting technique, moving averages, smoothing, regression analysis, time series analysis, the Box-Jenkins (ARIMA) methodology.

EMGT 5240. Advanced Operations Management. (3.0 cr.; A-F only; prereq EMgt student or MBA student or department approval; spring, every year)
Emphasis on quantitative methods for designing and analyzing manufacturing and service operations, simulation, and recent paradigms in manufacturing including just-in-time production, synchronous manufacturing, and agile manufacturing. Current competitiveness-enhancing techniques like continuous improvement, benchmarking, and business process re-engineering will also be covered.

EMGT 5250. Legal, Ethical and Environmental Issues in Engineering. (3.0 cr.; A-F only; prereq EMgt student or engineering candidate or department approval; fall, even years)

Covers topics in basic law, contracts, intellectual property, professional ethics, the responsible engineer, moral thinking, risk/safety/liability, employer responsibilities, product liability, and environmental responsibilities. Provides a historical perspective on society's environmental concerns, and discusses federal environmental statutes, our regulatory system, approaches to preventing and mitigating environmental problems, and the elements of an effective environmental management system.

EMGT 5260. Advanced Decision Making for Engineering Managers. (3.0 cr.; A-F or Audit; prereq EMGT student or departmental consent; spring, odd years)

This course introduces students to a variety of tools that help them sharpen the judgment and improve the decision making process. The rational basis behind decisions under certainty, uncertainty, risk and conflicts will be evaluated. The analytical approach to decision making will be presented by combining the qualitative and quantitative aspects of management decisions. Mathematical foundations for conflict resolution in multi-criteria decision making will be introduced. Quantification of subjective judgment, the development of Hierarchical Decision Models and their sensitivity analysis will be covered. Methods to measure inconsistencies in individual and group decisions will also be discussed.

EMGT 5991. Independent Study in Engineering Management. (1.0-4.0 cr. [max 6.0 cr.]; prereq MSEM cand, department approval; fall, spring, summer, every year)
Directed study of special interest topics not available in standard curriculum. Must be

arranged with instructor before registration. May include readings, research and/or special projects.

EMGT 5995. Special Topics: (Various Titles to be Assigned). (1.0-3.0 cr. [max 9.0 cr.]; A-F or Audit; prereq EMgt student or department approval; fall, spring, offered periodically)
Selected current topics in engineering management. (Various titles to be assigned).

EMGT 8310. Project Methodology and Practice. (3.0 cr.; A-F only; prereq 5110, 5120, 5130, 5160; fall, spring, every year)
Applying research, analysis, and management skills to a topic or situation of current interest to industry. Demonstrating the ability to achieve results in a fixed time frame with limited resources.

EMGT 8333. FTE: Master's. (1.0 cr.; No Grade Associated; prereq Master's student, adviser and DGS consent; fall, spring, offered periodically)
(No description)

EMGT 8777. Thesis Credits: Master's. (1.0-18.0 cr. [max 50.0 cr.]; No Grade Associated; prereq Max 18 cr per semester or summer; 10 cr total required (Plan A only); fall, spring, summer, every year)
(No description)

EMGT 8993. Engineering Management Seminar. (1.0 cr. [max 2.0 cr.]; S-N only; prereq Grad student, department approval; fall, spring, every year)
Reports on recent developments in engineering management and on research projects in the department.

EMGT 8994. Directed Research. (1.0-8.0 cr. ; prereq MSEM or grad student, department approval; fall, spring, summer, every year)
Directed research or study on an advanced topic.

English (ENGL) College of Liberal Arts

ENGL 1001. Great American Authors. (HUMANITIES; LE CAT9; 3.0 cr.; A-F or Audit; fall, spring, every year)
Introduction to American authors important for their artistic mastery and/or significant role in American literary history.

ENGL 1101. Literature Appreciation. (HUMANITIES; LE CAT9; 3.0 cr.; A-F or Audit; =[ENGL 1907]; prereq Primarily for nonmajors but also for potential majors and creative writers; fall, spring, offered periodically)
Developing critical reading skills in fiction, poetry, and drama.

ENGL 1507. Time and Place. (LE CAT9; 4.0 cr.; A-F or Audit; fall, spring, offered periodically)
Close reading of selected works about experience of time and place.

ENGL 1535. King Arthur in History, Literature, and Art. (HUMANITIES; LE CAT9; 4.0 cr.; A-F or Audit; fall, spring, offered periodically)

Survey of historical accounts, and literary and artistic treatments of King Arthur in Latin, French, and German sources of the Middle Ages and in selected works in modern Arthurian literature.

ENGL 1575. 20th-Century Literature. (HUMANITIES; LE CAT9; 4.0 cr.; A-F or Audit; prereq Primarily for nonmajors; fall, spring, offered periodically)
Readings primarily in American, British, and Irish literature.

ENGL 1582. Introduction to World Literatures. (HUMANITIES; LE CAT9; GLOBAL PER; LEIP CAT09; 4.0 cr.; A-F or Audit; fall, spring, every year)
Sampling of literary works mainly from Middle East, Africa, Far East, and South America.

ENGL 1583. Introductory Study of Major Topics in Contemporary African Literature. (HUMANITIES; LE CAT9; GLOBAL PER; LEIP CAT09; 4.0 cr.; A-F or Audit; spring, even years)
Introductory study of the major topics in Contemporary African Literature. Draws on literary texts and films to broaden students' understanding of Africa's cultural, social, economic, and political challenges from colonization to globalization.

ENGL 1585. Australian and New Zealand Literature and Culture. (HUMANITIES; LE CAT9; GLOBAL PER; LEIP CAT09; 4.0 cr.; A-F or Audit; fall, spring, every year)
Introduces students to the literature and cultures of Australia and New Zealand, focusing on the formation of national identity, both countries' relationship to Great Britain and the US, conventions like "mateship," and the cultural politics of aboriginal peoples.

ENGL 1666. Tales of Terror. (HUMANITIES; LE CAT9; 4.0 cr.; A-F or Audit; fall, spring, offered periodically)
Gothic masterpieces chiefly from English and American literature, with emphasis on sociological and psychological implications of the genre.

ENGL 1801. Freshman Seminar: American Gothic. (HUMANITIES; LE CAT9; 4.0 cr.; A-F or Audit; prereq Freshman, fewer than 30 credits; fall, spring, offered periodically)
Exploration of the Gothic tradition in American literature from colonial days to the present, with special attention to psychological and cultural implications. Some attention, also, to visual arts, film, and theories of terror, horror, the uncanny, and the grotesque.

ENGL 1802. Freshman Seminar: Asian Culture. (LE CAT7; 4.0 cr.; A-F or Audit; prereq Freshman, fewer than 30 credits; fall, spring, offered periodically)
Exploration of Chinese and Japanese cultures with attention to Confucianism, Taoism, Buddhism, Shinto and arts such as calligraphy, painting, poetry, garden design, and music. Some attention also to political history.

ENGL 1803. Freshman Seminar: Unseen Reality. (HUMANITIES; LE CAT9; 4.0 cr.; A-F or Audit; prereq Freshman, fewer than 30 credits; fall, spring, every year)

Concepts of "the ideal" and "the real" as developed by writers with differing perspectives, in various literary forms (e.g., fiction, non-fiction, poetry).

ENGL 1805. Freshman Seminar: Satire and Humor. (HUMANITIES; LE CAT9; 4.0 cr.; A-F or Audit; prereq Freshman, fewer than 30 credits; spring, every year)

Satire and humor in their historical, social, aesthetic, and intellectual contexts.

ENGL 1907. Introduction to Literature.

(HUMANITIES; LE CAT9; 3.0 cr.; A-F or Audit; =[ENGL 1101]; prereq Primarily for nonmajors; fall, spring, every year)

Literary modes and methods of literary study and interpretation.

ENGL 2571. Contemporary Literature.

(HUMANITIES; LE CAT9; 4.0 cr.; A-F or Audit; fall, spring, every year)

Readings in American and British literature since 1945. Emphases, authors, and titles vary.

ENGL 2581. Women Writers. (HUMANITIES; LE CAT9; LECD CAT09; 4.0 cr.; A-F or Audit; prereq 30 credits or instructor consent; fall, spring, offered periodically)

Feminist reading of selected plays, poetry, prose (including critical works) written by women writers.

ENGL 2922. The Art of the Memoir: Reading and Writing Memoir. (4.0 cr.; A-F or Audit; fall, offered periodically)

Study of the memoir as a literary genre--its conventions, elements, and its historical importance--and as an art form. Use of critical approaches in the reading of memoirs. Directed practice writing the student's own memoir.

ENGL 3115. Writing Fiction. (4.0 cr. [max 8.0 cr.]; A-F or Audit; prereq WRIT 1120, minimum 60 credits (6 credits literature) or instructor consent; fall, every year)

Writing of original fiction, with emphasis on the short story; structure and techniques learned from critical reading and classroom analysis.

ENGL 3121. Writing Poetry. (4.0 cr.; A-F or Audit; fall, spring, offered periodically)

Writing of poetry, with emphasis on techniques learned through critical reading and classroom analysis.

ENGL 3223. Shakespeare. (HUMANITIES; LE CAT9; 4.0 cr.; A-F or Audit; fall, spring, offered periodically)

Introduction to Shakespeare. Selected plays from the histories, comedies, tragedies, and dramatic romances. Aspects of drama, such as structure, language, characterization, theme, and dramatic conventions examined in study of individual plays.

ENGL 3333. Children's Literature: Texts and Contexts. (4.0 cr.; A-F or Audit; fall, offered periodically)

Forms of children's literature, from folk and fairy tales to contemporary stories, poems, and novels for children; major historical, literary and critical issues affecting the production and reception of literature for children.

ENGL 3411. The Modern Short Story. (4.0 cr.; A-F or Audit; prereq Minimum 60 credits

(6 credits literature) or instructor consent; fall, spring, offered periodically)

Study of the genre, emphasizing close reading and interpretation of the elements of short fiction in selected works.

ENGL 3501. British Literature I.

(HUMANITIES; 4.0 cr.; A-F or Audit; prereq Engl major or minor or teach comm art/lit major or minor or elem-middle educ comart/lit specialization; fall, every year)

Chronological study of English literature from beginnings to late-18th century, emphasizing major works, authors, and important literary forms, styles, themes, and movements.

ENGL 3502. British Literature II.

(HUMANITIES; 4.0 cr.; A-F or Audit; prereq Engl major and minor; fall, spring, every year)

Chronological study of English literature from late-18th to late-20th century, emphasizing major works, authors, and important literary forms, styles, themes, and movements.

ENGL 3563. American Literature I.

(HUMANITIES; CDIVERSITY; 4.0 cr.; A-F or Audit; fall, spring, every year)

Historical survey of important authors, movements, conventions, genres, and themes: origins to Civil War.

ENGL 3564. American Literature II.

(HUMANITIES; CDIVERSITY; 4.0 cr.; A-F or Audit; fall, spring, every year)

Historical survey of important authors, movements, conventions, genres, and themes: Civil War to present.

ENGL 3573. Survey of African American Literature. (HUMANITIES; CDIVERSITY; 4.0 cr.; A-F or Audit; fall, odd years)

Survey of African American literatures with an emphasis on cultural and historical contexts. Acritical reading, writing, and discussion of major themes such as slavery, freedom, race, gender, sexuality, class, violence, literacy, home, family, community, double-consciousness, Christianity, and language. Consideration of narrative strategies, literary tradition, and major genres such as songs, sermons, pamphlets, folktales, poetry, novels, drama, life writing, and film.

ENGL 3574. Reconstituting the Past in African Diaspora Literature. (4.0 cr.; A-F or Audit; fall, even years)

Examines how African Diaspora literature engages with the past, with attention to the debate about root vs. route as a foundation of Diasporic identity. Draws on various disciplines (literature, history, cultural studies, sociology, and music) to trace cultural and political imperatives of negotiating the past.

ENGL 3906. Methods of Literary Study. (4.0 cr.; A-F or Audit; prereq WRIT 1120, English major or Teaching Comm Art/Lit major or instructor consent; fall, spring, every year)

Introduction to interpretive and scholarly methods.

ENGL 4097. Internship for English Majors.

(1.0-4.0 cr. [max 8.0 cr.]; S-N only; prereq minimum 60 credits, instructor consent; no grad credit; fall, spring, summer, every year)

Supervised practical experience in an approved business, agency, or organization seeking student interns with strong skills and/or knowledge in English. Placement is in a variety of work fields, including publishing, museumship librarianship, theatre, and public service.

ENGL 4292. Literature into Film. (4.0 cr.; A-F or Audit; prereq Minimum 60 credits (6 credits literature) or instructor consent; spring, offered periodically)

Comparative study of novels and their film adaptations.

ENGL 4375. Drama. (4.0 cr.; A-F or Audit; fall, offered periodically)

Selected playwrights, plays, types, traditions, or periods; relevant theoretical and critical writings. Authors and topics vary.

ENGL 4802. English Language for Educators.

(4.0 cr.; A-F or Audit; prereq LING 1811; no grad credit; credit will not be granted if already received for LING 4802; fall, every year)

Application of linguistic and language learning theories to the teaching of communication arts, with emphasis on preparation of secondary school English teachers. Includes a focus on first and second language acquisition, approaches to language and grammar instruction, and the roles of language and dialect in culture and youth development.

ENGL 4909. Senior Portfolio. (1.0 cr.; S-N or Audit; prereq English major, senior; fall, spring, every year)

Required portfolio and research project undertaken for senior seminar.

ENGL 4931. Practicum in Teaching Literature.

(4.0 cr.; A-F or Audit; prereq 3906, senior, 4 other upper division literature courses and instructor consent; no grad credit; fall, spring, every year)

Assisting in teaching a 1-, 2-, or 3-level literature course; experience preparing course materials; advising students in course; learning about the grading process; experience in lecturing and leading discussions; conferences with professor about teaching issues.

ENGL 5097. Graduate Internship. (1.0-3.0 cr. ; S-N only; prereq 8906, instructor consent; fall, spring, summer, every year)

Supervised practical experience in an approved business, agency, or organization seeking student interns with strong skills and/or knowledge in English. Placement is in a variety of work fields including publishing, museumship, librarianship, theatre and public service.

ENGL 5116. Advanced Writing of Fiction.

(4.0 cr. [max 8.0 cr.]; A-F or Audit; prereq instructor consent; spring, offered periodically)

Writing of original fiction beyond the beginning stages; some experience required.

ENGL 5122. Advanced Writing of Poetry.

(4.0 cr. [max 8.0 cr.]; A-F or Audit; prereq 3121 or instructor consent; fall, spring, offered periodically)

Study of poetics and poetry, with emphasis on student poems.

ENGL 5222. Shakespeare. (4.0 cr.; A-F or Audit; prereq 6 credits literature; fall, offered periodically)

Concentrated study of selected plays, with attention to Shakespearean criticism and scholarship. Recommended as the second course in Shakespeare.

ENGL 5312. Chaucer. (4.0 cr.; A-F or Audit; prereq 6 credits literature; fall, spring, every year)

Introduction to Middle English. Reading and analysis of Chaucer's works, primarily *Canterbury Tales* and *Troilus and Criseyde*.

ENGL 5331. Milton. (4.0 cr.; A-F or Audit; prereq 6 credits literature; fall, spring, offered periodically)

Minor poems, *Areopagitica*, *Paradise Lost*, and *Samson Agonistes*.

ENGL 5375. Modern Poetry. (4.0 cr.; A-F or Audit; prereq 6 credits literature; spring, offered periodically)

Study of modern poetry written in English.

ENGL 5444. Childhood in Literature, History and Culture. (4.0 cr.; A-F or Audit; prereq Junior or senior or grad student or instructor consent; fall, spring, every year)

Examines traditional kinds of children's literary texts, as well as literary and pedagogical theory, advertising, movies, and television to consider childhood as an historical, aesthetic and social construct in Western culture from the eighteenth century to the present.

ENGL 5471. The Novella. (4.0 cr.; A-F or Audit; prereq Minimum 60 credits (6 credits literature) or instructor consent; fall, spring, offered periodically)

In-depth study of selected masterworks of the form.

ENGL 5533. Studies in English Literature Before 1800. (4.0 cr.; A-F or Audit; prereq 6 credits literature; fall, spring, offered periodically)

Intensive study of a theme, literary school or circle, literary genre in historical and cultural context. Topics vary.

ENGL 5541. Restoration and 18th-Century Literature. (4.0 cr.; A-F or Audit; prereq 6 credits literature; fall, spring, offered periodically)

Study of controversies and cultural change evident in English literature, 1660-1800. Such authors as Dryden, Behn, Pope, Fielding, Johnson

ENGL 5561. English Romanticism. (4.0 cr.; A-F or Audit; prereq 6 credits literature; spring, offered periodically)

The Romantic movement in England as reflected in the works of such writers as Wordsworth, Coleridge, Mary Shelley, Keats, Percy Shelley, and Anne Radcliffe.

ENGL 5562. Victorian Literature. (4.0 cr.; A-F or Audit; prereq 6 credits literature; fall, spring, offered periodically)

Cultural and social concerns of Victorian England as reflected in the works of such writers as Tennyson, Arnold, Christina and

D.G. Rossetti, Robert and Elizabeth Barrett Browning, and Samuel Butler.

ENGL 5566. Irish Literary Revival. (4.0 cr.; A-F or Audit; prereq 6 credits literature; spring, offered periodically)

Anglo-Irish literature in its socio-historical context. Such authors as Yeats, Synge, Gregory, Joyce, and O'Casey.

ENGL 5572. American Renaissance. (4.0 cr.; A-F or Audit; prereq 6 credits literature; fall, offered periodically)

American Romanticism and the flowering of American literature from early 19th century to the Civil War (authors and topics vary; e.g., Thoreau, Fuller, Hawthorne, Dickinson, Whitman).

ENGL 5574. Studies in American Literature to 1914. (4.0 cr.; A-F or Audit; prereq 6 credits literature; fall, spring, every year)

Study of selected North American authors from the Colonial Era to the end of WWI. Literature studied will vary in relation to what kind of literary or cultural study instructor intends or what kind of critical approach to literature is used.

ENGL 5575. Studies in American Literature after 1914. (4.0 cr.; A-F or Audit; prereq 6 credits literature; fall, spring, every year)

Study of selected North American authors after 1914. Literature studied will vary in relation to what kind of literary or cultural study instructor intends or what kind of critical approach to literature is used.

ENGL 5577. Major American Authors. (4.0 cr. [max 8.0 cr.]; A-F or Audit; prereq 6 credits literature; fall, spring, every year)

Concentrated study in one to three authors, who are announced before course is offered.

ENGL 5581. American Novel I. (4.0 cr.; A-F or Audit; prereq 6 credits literature or instructor consent; fall, spring, even years)

The American novel, origins through 1920; cultural, intellectual, and aesthetic contexts. Authors and topics vary.

ENGL 5582. American Novel II. (4.0 cr.; A-F or Audit; prereq 6 credits literature; spring, offered periodically)

The American novel, 1920 to present; cultural, intellectual, and aesthetic contexts. Authors and topics vary.

ENGL 5583. British Novel. (4.0 cr.; A-F or Audit; prereq 6 credits literature; fall, spring, every year)

The British novel in its social, aesthetic, and intellectual contexts.

ENGL 5584. Mapping Postcolonial Literature. (4.0 cr.; A-F or Audit; prereq minimum 6 credits of Literature; spring, even years)

Interdisciplinary study of postcolonial literatures of Africa, Asia, and Latin America in their cultural and historical contexts. Critical examination of the postcolonial condition, including colonial constructions of knowledge and power and anti-colonial struggles against subordination. Exploration of key concepts, geography, history, theory, and future of postcolonial studies.

ENGL 5591. Independent Study. (1.0-5.0 cr. [max 8.0 cr.]; prereq instructor consent, maximum 6 credits may be applied to grad program; fall, spring, summer, every year) Students choose projects in consultation with their instructor.

ENGL 5595. Special Topics: (Various Titles to be Assigned). (1.0-5.0 cr. [max 10.0 cr.]; A-F or Audit; prereq Primarily for majors, minors, grads; fall, spring, summer, offered periodically)

Topics not included in regular English curriculum. Topic and credits announced before course offered.

ENGL 5661. Publishing the Middle Ages.

(4.0 cr.; A-F or Audit; prereq Junior or senior or grad student or instructor consent; fall, offered periodically)

Study of the ways in which the middle ages were defined and canonized in print culture. Instruction on the processes of medieval manuscript production and editing, followed by analysis of rhetorical framework within which "medievalism" was constructed in the 19th century.

ENGL 5662. The Making of a Major Author: The Scholarly Edition in 17th- and 18th-Century England. (4.0 cr.; A-F or Audit; prereq Junior or senior or grad student or instructor consent; fall, spring, offered periodically)

Study of the ways in which writers such as Shakespeare and Milton were transformed into "major authors" and "national poets" through the publication of scholarly editions of their works subsequent to their deaths. Textual analysis of the editions is combined with study of their publication histories, including the roles of editors and publishers who produced them.

ENGL 5663. Readers and the History of Books. (4.0 cr.; A-F or Audit; prereq Junior or senior or grad student or instructor consent; fall, offered periodically)

History of reading, primarily in the United States and England. Study of factors affecting literacy in late 18th through early 20th centuries, including technological advances, educational reform and changes in authorship and literature.

ENGL 5664. Small Presses, Little Magazines, and Modernism. (4.0 cr.; A-F or Audit; prereq Junior or senior or grad student or instructor consent; spring, offered periodically)

The founding and promotion of the modernist movement in little magazines and small presses. Publishing careers of significant modernists (e.g. Ford, Pound, Yeats, H.D. Eliot, Joyce).

ENGL 5665. The American Literary Marketplace. (4.0 cr.; A-F or Audit; prereq Junior, senior or graduate student or instructor consent; spring, even years)

Study of the making, marketing, and selling of American literature. Close attention to history of American publishing industry, emergence of popular genres such as the romance and popular forms such as the dime novel, and material and technological changes in book production.

ENGL 5802. English Language for Educators. (4.0 cr.; A-F or Audit; prereq Graduate student; credit will not be granted if already received for LING 5802; fall, every year)

Application of linguistic and language learning theories to the teaching of communication arts, with emphasis on preparation of secondary school English teachers. Includes a focus on first and second language acquisition, approaches to language and grammar instruction, and the roles of language and dialect in culture and youth development.

ENGL 5821. History of the English Language. (4.0 cr.; A-F or Audit; fall, every year)

History of sounds, word stock, and structures of English language from earliest records to present.

ENGL 5902. Teaching Language, Cognition, and Writing. (4.0 cr.; A-F or Audit; prereq Teaching comm art/lit major or minor or TESOL licensure or elem/middle education comart/lit specialization or instructor consent; fall, every year)

Theory and practice of teaching composition; for prospective teachers grade five to community college level.

ENGL 5922. Teaching Literature and Communication. (5.0 cr.; S-N or Audit; prereq 5902, teach comm art/lit major or minor or TESOL licensure or instructor consent; fall, every year)

Theory and applications in teaching reading, writing, literature, speaking, listening, and non-print media, grades 5-12.

ENGL 8171. Seminar in Pre-1800 British Literature. (4.0 cr.; A-F or Audit; prereq Graduate Student; fall, spring, offered periodically)

Selected topics in the study of British literature written prior to 1800.

ENGL 8181. Seminar in British Literature, Late 18th - 20th Century. (4.0 cr.; A-F or Audit; fall, spring, offered periodically)

Graduate seminar on selected topics in the study of British literature written from the late 18th century through the 20th century.

ENGL 8191. Seminar: American Literature. (4.0 cr.; A-F or Audit; fall, spring, offered periodically)

Intensive study of selected authors and topics announced ahead of time; historical, cultural, and literary contexts; methodology; relevant scholarship and criticism.

ENGL 8333. FTE: Master's. (1.0 cr.; No Grade Associated; prereq Master's student, adviser and DGS consent; fall, spring, every year)

(No description.)

ENGL 8444. FTE: Doctoral. (1.0 cr.; No Grade Associated; prereq doctoral student, adviser and DGS consent; fall, spring, summer, every year)

(No description)

ENGL 8888. Thesis Credits: Doctoral. (1.0-24.0 cr. [max 100.0 cr.]; No Grade

Associated; prereq [max 18 credits per semester or summer]; 24 credits required; fall, spring, summer, every year)

(No description)

ENGL 8906. Introduction to Critical Theory. (4.0 cr.; A-F or Audit; prereq Grad Student; fall, every year)

Core course required for all English M.A. (Plan B) students. Seminar in critical theory and methods of literary research.

ENGL 8931. Practicum in Teaching Literature. (1.0-4.0 cr. ; A-F or Audit; prereq 8 credit grad-level literature or instructor consent; fall, spring, every year)

Teaching in sophomore literature courses; experience preparing supplementary materials, consulting with students, and assisting instructors in grading student work.

Environment and Sustainability (ES)

College of Liberal Arts

ES 1001. Introductory Seminar. (2.0 cr.; A-F only; fall, every year)

Introduction to the complexities of multidisciplinary environmental issues through research and literature review with emphasis on development of critical thinking skills.

ES 2095. Special Topics: (Various Titles to be assigned). (1.0-4.0 cr. [max 8.0 cr.]; fall, spring, summer, offered periodically)

Special topics in environmental science

ES 2803. Issues in Global Ecology. (SUSTAIN; LE CAT5; LEIP CAT05; 3.0 cr.; A-F or Audit; spring, every year)

Holistic approach to current status and future prospects of Earth's life support systems.

ES 3100. Sustainable Food Systems. (SUSTAIN; 3.0 cr.; A-F or Audit; spring, every year)

Historical and contemporary food systems within sustainability framework. Understands food within social, political, economic and environmental contexts. Looks at sustainable production, consumption and processing issues.

ES 3500. Ecological Economics. (3.0 cr.; A-F only; prereq [ES or URS major] and [Econ 1022 or Econ 1023] or instructor consent; fall, offered periodically)

Examine the basic principles and assumptions of Micro and Macro Economics, and their relevance in our modern global economic system. Examine the environmental/social consequences of deviations from these assumptions, and alternative economic models/analyses and policies consistent with sustainable development.

ES 4010. Seminar. (4.0 cr.; A-F only; prereq ES major, 90 credits; credit will not be granted if already received for 5001; spring, every year)

Critical discussion, research, and literature review of multidisciplinary environmental issues.

ES 4090. Internship Preparation. (1.0 cr.; S-N only; prereq ES major, credit will not be

granted if already received for 5040; spring, every year)

Various employers and members of environmental organizations in the Duluth region, and in Minnesota will speak to the class each week to describe what they do in their perspective fields of environment and sustainability. Students will research careers in environmental work, producing reports on prominent fields and directions in environmental work. Students will be placed with perspective internship experiences at the end of the semester.

ES 4091. Independent Study. (1.0-3.0 cr. ; A-F only; prereq 60 credits, instructor consent; no grad credit; credit will not be granted if already received for ES 4001; fall, spring, summer, every year)

Directed readings and projects for students who wish to do independent advanced study or work on topics not normally covered in other courses.

ES 4097. Internship. (3.0 cr.; S-N only; prereq 4090 or 5040, ES major, No grad credit; credit will not be granted if already received for 5050; summer, every year)

Practical experience in some field of environmental work, under direction of a faculty adviser and a work-site adviser.

Environmental Education (ENED)

College of Education and Human Service Professions

ENED 1000. Introduction to Outdoor Recreation. (4.0 cr.; A-F or Audit; prereq Credit will not be granted if already received for REC 1000; fall, spring, every year)

Overview of outdoor education, including outdoor recreation, environmental education and adventure education, will be explored. The structure and role of outdoor education in contemporary society will be considered.

ENED 2000. Technology in Outdoor Education. (3.0 cr.; A-F or Audit; prereq Pre-Recreation or Recreation-Outdoor Education major or instructor consent; fall, every year)

The use of technology to conduct and manage outdoor and environmental education programs. Includes basic computer hardware and software selection related to technology such as gps, interpretation, and trail cameras guiding outdoor education and management

ENED 2300. Teaching and Learning. (4.0 cr.; A-F or Audit; prereq 1000; spring, every year)

Learning in the outdoor context is explored via presentation and active consideration of philosophical and theoretical foundations of environmental and outdoor education. Teaching skills for the environmental and outdoor non-formal educational context are presented and developed; for example, instruction in basic educational methodology and accompanying field-teaching experiences is provided. Outdoor classroom management including basic risk management, student behavior management, lesson planning and use of the outdoor classroom are presented and explored.

ENED 3309. Outdoor Leadership. (1.0 cr.; S-N or Audit; prereq Rec 2300, PETE 3507; spring, every year)

Theories of leadership practices commonly used in outdoor education settings. Includes group development stages and techniques of group management. Concludes with preparation for 9-day field experience (EnEd 3310). This course MUST be taken in conjunction with EnEd 3310.

ENED 3310. Outdoor Leadership Field Experience. (2.0 cr.; A-F or Audit; prereq 3309; summer, every year)

Practice, theory, and methods involved in leadership development including a detailed analysis of the qualities and roles of leaders in outdoor educational settings. recreation settings. This course will occur as a 9-day field experience.

ENED 3331. Organization of Environmental Education Centers. (2.0 cr.; A-F or Audit; prereq 2300 or instructor consent; credit will not be granted if already received for REC 3331; fall, offered periodically)

Philosophy and organization of environmental education centers as non-formal education providers. Both residential and non-residential centers including history, philosophy, management, and educational delivery relative to environmental literacy will be studied. Visits to local environmental learning centers are included.

ENED 3341. Field Interpretive Techniques I. (3.0 cr.; A-F or Audit; prereq Rec 2300 or instructor consent; credit will not be granted if already received for REC 3341; fall, every year)

Techniques and methods used to interpret natural history of autumn and early winter environments. Emphasizes geomorphology, tree identification, and basic raptor ecology. Primarily field based at sites throughout northeastern Minnesota.

ENED 3342. Field Interpretive Techniques II. (3.0 cr.; A-F or Audit; prereq Rec 2300 or instructor consent, credit will not be granted if already received for EnEd 3342; spring, every year)

Techniques and methods used to interpret natural history of winter and spring environments. Ecology of winter, vernal ponds, spring wildflowers, biomes, and migratory birds. Primarily field based at sites throughout northeastern Minnesota.

ENED 4163. Outdoor Education Methods. (3.0 cr.; A-F or Audit; prereq ENED 3342 or instructor consent; credit will not be granted if already received for EDUC 4163; fall, every year)

Methods and theoretical basis for teaching outdoor education. Emphasis on application at outdoor sites. Weekend experience at a regional nature center required.

ENED 4315. Operations and Management. (4.0 cr.; A-F or Audit; =[ENED 5315]; prereq 2300 or instructor consent; fall, every year)

Methods and practice of administrative processes of personnel, fiscal, and facility management. Field study and presentation of a management plan.

ENED 4410. Ropes Course Management. (3.0 cr.; A-F or Audit; prereq Rec 2300 or instructor consent, no Grad credit; credit will not be granted if already received for Rec 4410; fall, every year)

Management of a ropes course as a part of an outdoor education facility. Includes ropes course elements, instructional techniques, group debriefing skills, site inspection, safety, recommend and equipment maintenance. This course will follow industry standards such as Project Adventure.

ENED 4555. Foundations of Environmental Education. (3.0 cr.; A-F or Audit; prereq Rec 2300 or instructor consent; spring, every year)

Provides a background of skills and understanding of environmental education delivery in various educational settings, with emphasis on formal classroom audience.

ENED 4601. Wilderness Philosophy. (2.0 cr.; prereq No grad credit; credit will not be granted if already received for Educ 4601; fall, every year)

People and social forces that have influenced land-use related to designated wilderness; philosophical and historical basis for wilderness management.

ENED 4996. Outdoor Education Internship. (12.0 cr.; S-N or Audit; prereq Recreation-Outdoor education major, instructor consent; no grad credit; credit will not be granted if already received for Rec 4996; fall, spring, summer, every year)

Supervised field experience in outdoor education.

ENED 5100. Research Design and Methods in the Social Sciences. (3.0 cr.; A-F or Audit; prereq graduate student or instructor consent; fall, every year)

An overview of the designs, methods, and processes used in social science research. Course content includes the following topics: Developing a purpose statement and research questions; conceptualization, operationalization, and measurements of variables' choosing and using human research subject; experimental research' survey research

ENED 5163. Outdoor Education Methods. (3.0 cr.; A-F or Audit; prereq MEd candidate or instructor consent; fall, every year)

Methods and theoretical basis for teaching outdoor education. Emphasis on application at outdoor sites. Weekend experience at a regional nature center required

ENED 5164. Environmental Education In-Service Training. (0.5-10.0 cr. ; A-F or Audit; prereq instructor consent; credit will not be granted if already received for Educ 5164; fall, spring, summer, every year)

Environmental education methods, materials, and curricula for educators wishing to enhance their environmental education training.

ENED 5165. Theories and Models in Outdoor Education. (2.0 cr.; A-F or Audit; prereq instructor consent; credit will not be granted if already received for Educ 5165; fall, every year)

Overview of theoretical foundations of outdoor education. Definitions of terms related to outdoor education, historical antecedents, future adventure education, social and psychological benefits of outdoor education.

ENED 5167. Research and Issues in Outdoor Education. (2.0 cr.; A-F or Audit; prereq Credit will not be granted if already received for Educ 5167; spring, every year)

Research literature and related issues pertaining to outdoor education, including research design and methods. Application of research to specific issues.

ENED 5315. Operations and Management. (4.0 cr.; A-F or Audit; =[ENED 4315]; prereq Certificate or Master of Environmental Education student; fall, every year)

Methods and practice of administrative processes of personnel, fiscal, and facility management. Involves annual operations and long-range management with sustainability of agency natural resources. Field study and presentation of a long-range management plan are included requirements.

ENED 5325. Sustainability Issues Investigation. (2.0 cr.; A-F or Audit; prereq instructor consent; spring, every year)

The study of resolving environmental problems that affect sustainability. This includes issue identification; building an effective team of investigators; and, study of the issue to the point of making recommendations to resolve the issue of sustainability management and education.

ENED 5343. Advanced Field Interpretive Techniques. (3.0 cr.; A-F or Audit; prereq 3341 or 3342 or instructor consent; summer, every year)

Techniques and methods used to interpret the natural and cultural history of unique field sites; For example, Isle Royale National Park. Specific, in-depth topics of natural and cultural history will be emphasized. Techniques for field site investigation and field based interpretation as an educational approach will be investigated.

ENED 5495. Special Topics: (Various Titles to be Assigned). (1.0-4.0 cr. ; summer, every year)

Treatment of topics not included in regular curriculum or in-depth treatment of topics associated with normal curricular offering.

ENED 5555. Environmental Education for Practicing Educators. (2.0 cr.; A-F or Audit; prereq Credit will not be granted if already received for Educ 5555; fall, spring, every year)

Provides information base for informed decision making about environmental issues. Develops knowledge, skills, attitudes, motivation, and commitment to work individually and collectively toward sustaining a healthy world environment.

ENED 5560. Current Research and Issues. (3.0 cr.; A-F or Audit; prereq MEd candidate or instructor consent; spring, every year)

Examines research literature and related issues pertaining to outdoor education including disciplines of science, environmental

experiential, and adventure education. Trends in research, teaching, plus research design and methods.

ENED 5625. Program Development and Evaluation. (3.0 cr.; A-F or Audit; spring, every year)

A comprehensive approach to program development will be applied to youth-based environmental education programs. Course is designed for those working in supervisory capacities to gain skills in designing, implementing, and evaluating environmental education programs.

ENED 5800. Sustainability Education: Methods and Strategies. (3.0 cr.; A-F or Audit; prereq Minimum 60 credits or Environmental Education Certificate or Graduate student or instructor consent; summer, every year)

Methods and lesson strategies connected to current definitions, theories, and practices of teaching sustainability practices and management. Sustainability of the natural environment from the effects of outdoor education and nature-based tourism is an underestimated aspect of sustainability practices. Pedagogical approaches to teach sustainable practices for the natural environment will be the primary focus of this course. Students will be able to apply this course to other sustainability practices such as sustainable energy or food practices.

ENED 5850. Classroom Applications. (2.0 cr.; A-F or Audit; prereq MEd candidate or instructor consent; fall, every year)

Understanding the formal classroom environment: scope and sequence, management, assessment, and standards for applications pertinent to audience and setting in environmental education.

ENED 5855. Programming for School Systems. (3.0 cr.; A-F or Audit; prereq 5850, Educ 5850 or instructor consent; spring, every year)

The relationship between environmental education and the formal school system (P-12) will be examined. Instructional approaches that use the environment as a context for helping students develop essential content and skills in the core academic disciplines will be emphasized.

ENED 5990. Research Project. (1.0-6.0 cr. ; S-N only; prereq Instructor consent; fall, spring, summer, every year)
Faculty-supervised research project required for MEd

ENED 5991. Independent Study. (1.0-6.0 cr. ; A-F or Audit; prereq Certificate or Masters Environmental Education student, instructor consent; fall, spring, summer, every year)
Directed independent study or projects in a particular area of interest. Approved degree program plan should be completed before course is taken by graduate students.

ENED 5992. Readings in Environmental Education. (1.0-6.0 cr. ; A-F or Audit; prereq Certificate or Master Environmental Education student or instructor consent; fall, spring, summer, every year)

Special complementary readings and discussion in advanced or graduate student's field of interest in environmental or outdoor education. Readings exceed the scope and/or offering of regular courses.

ENED 5998. Outdoor Education Seminar. (1.0 cr. [max 3.0 cr.]; S-N or Audit; prereq instructor consent, credit will not be granted if already received for Rec 4998; fall, spring, every year)

Facilitated discussions and presentations of contemporary recreation research, curricula, and/or issues.

Environmental Science (ESCI)
Swenson College of Science and Engineering

ESCI 2210. Science and Management of Environmental Systems. (4.0 cr.; A-F or Audit; prereq Biol 1011, (Chem 1151 and 1152 or Chem 1153 and 1154 and 1155 and 1156) Geol 1110 or instructor consent; fall, every year)

Scientific foundations of major environmental issues, water chemistry, atmospheric chemistry, natural resources, global climate, national and international environmental regulation and policy, and environmental economics.

ESCI 3101. Nonrenewable Resources. (3.0 cr.; A-F or Audit; prereq 2210, Chem 1151 or 1161, Phys 2011 or 2013 and 2014, or instructor consent; fall, every year)

Geology of nonrenewable resources and introduction to extractive industry methods and procedures. Formation and occurrence of natural resources, theory and practice of technologies associated with the production, separation, purification, conversion, consumption, and waste disposal of nonrenewable energy and mineral resources.

ESCI 3102. Renewable Resources. (3.0 cr.; A-F or Audit; prereq Phys 2012 or 2015 and 2016; spring, every year)

Principles of renewable energy, energy conversion, irreversible thermodynamics and thermodynamic engines, thermoelectric generators, turbines, photovoltaic conversion, electrochemical conversion, fuel cells, pumping efficiency, wind energy, conversion of wave energy, heat pumps, ecosystems and biomass energy, and energy transmission and storage.

ESCI 3291. Independent Study. (1.0-3.0 cr. ; prereq instructor consent; fall, spring, summer, every year)

Directed, student motivated, study arranged with instructor and ESCI director before registration.

ESCI 3296. Internship in Environmental Science. (1.0-2.0 cr. ; S-N only; prereq Environmental Science major and department consent; fall, spring, summer, every year)

Practical work experience with an employer closely associated with student's academic area. Arranged by mutual agreement between student, department, and employer. Written report and assessment by non-academic supervisor at the end of the work experience.

ESCI 4101. Pollution and Technology. (3.0 cr.; A-F or Audit; prereq 2210, Chem 1151 or 1161, Phys 2011 or 2013 and 2014, or instructor consent, no grad credit; fall, every year)

Sources, distribution, and ultimate fate of air, water and solid/hazardous wastes. Principles of treatment of point and non-point source wastes. Case studies of successful remediation technologies. Models of contaminant movement in the environment. Landfill construction. Application of federal law: National Environmental Policy Act, Clean Air Act, Clean Water Act, Pollution Prevention Act, Resource Conservation and Recovery Act, and Superfund Amendments and Reauthorization Act.

ESCI 4102. Environmental Assessment. (3.0 cr.; A-F or Audit; prereq instructor consent; no grad credit; spring, every year)

Environmental issues identification and investigation. Review of case studies of environmental investigations and the components of environmental impact statements. Selection of local or regional environmental issues and evaluation of the environmental problems from a multidisciplinary perspective. Preparation of draft Environmental Impact Statement (EIS).

Exercise Science Athletic Training (ESAT)

College of Education and Human Service Professions

ESAT 2400. Applied Exercise Science.

(3.0 cr.; A-F or Audit; prereq Pre pe major or coaching minor; credit will not be granted if already received for PEP 3035 or CC 3101; fall, spring, every year)
Anatomical, physiological and biomechanical principles of physical training and conditioning.

ESAT 2610. Introduction to Athletic Training. (4.0 cr.; A-F or Audit; prereq Pre-athletic training or instructor consent; credit will not be granted if already received for PEP 2610; spring, every year)

An overview of the responsibilities of an athletic trainer and the athletic trainer's role as a sports medicine team member; as well as the basic concepts in the prevention, recognition, and care of injuries to the physically active.

ESAT 2620. Prevention and Care of Athletic Injuries. (2.0 cr.; A-F or Audit; prereq Athletic training major; credit will not be granted if already received for PEP 2620; fall, every year)

Principles and techniques of the prevention and care of common athletic injuries. Emphasis is on preparing the student to make appropriate decisions in the prevention, first aid treatments, emergency care, and transportation of the sick and injured in sports.

ESAT 2697. Clinical Experience in Athletic Training I. (2.0 cr.; A-F or Audit; prereq 2610, Athletic Training major; fall, every year)

Athletic training psychomotor skills are enhanced and assessed by an approved clinical instructor during the clinical rotation. Emphasis is on competencies and proficiencies

previously instructed in courses. A minimum of 100 hours of clinical experience are required.

ESAT 2698. Clinical Experience in Athletic Training II. (2.0 cr.; A-F or Audit; prereq 2697, Athletic Training major; spring, every year) Athletic training psychomotor skills are enhanced and assessed by an Approved Clinical Instructor. Emphasis is on competencies and proficiencies previously instructed in courses. A minimum of 100 hours of clinical experience are required.

ESAT 3200. Motor Learning and Development. (5.0 cr.; A-F or Audit; prereq Minimum 60 credits, Athletic training or Exercise Science or Physical Education major or instructor consent; fall, spring, every year) Principles and practices that affect the learning and performing of motor skills; theories of motor learning; professional applications of the motor learning in exercise science, physical therapy, athletic training, and physical education.

ESAT 3210. Exercise Adherence. (3.0 cr.; A-F or Audit; prereq Minimum 60 credits, Exercise Science major or instructor consent; fall, spring, every year) Fundamental concepts of exercise psychology. Physical activity models of involvement; exercise determinates and correlates; exercise interventions.

ESAT 3300. Human Biomechanics. (4.0 cr.; A-F or Audit; prereq HLTH 2030, PHYS 1001, minimum 60 credits, Exercise Science major or instructor consent; fall, spring, every year) Application of physical laws to human movement. Laws of mechanics and tissue biomechanics concepts are applied to human motor function. (3 hr lect, 1 hr lab)

ESAT 3400. Exercise Physiology. (4.0 cr.; A-F or Audit; prereq HLTH 2040 or PHSL 3011, minimum 60 credits, Exercise Science major, or instructor consent; fall, spring, every year) Physiological responses and adaptations to acute and chronic exercise. (3 hrs lect, 1.25 hrs lab)

ESAT 3410. Performance Nutrition and Weight Management. (4.0 cr.; A-F or Audit; prereq Hlth 1470, minimum 60 credits, Athletic Training or Exercise Science major or instructor consent; fall, spring, every year) A study of the principles of sports nutrition with emphasis on the effects of diet on body composition, metabolic processes, physiological function, and physical performance.

ESAT 3420. Exercise Testing and Prescription. (4.0 cr.; A-F or Audit; prereq 3400, Exercise Science major or instructor consent; fall, spring, every year) Physical fitness programming for adults; principles of exercise testing and prescription.

ESAT 3430. Principles of Strength and Conditioning Programs. (4.0 cr.; A-F or Audit; prereq 3400, Exercise Science major or instructor consent; fall, spring, every year) Theory and practice of developing and implementing strength training and conditioning

programs; emphasis on technique analysis and instructional methods.

ESAT 3432. Exercise Leadership. (3.0 cr.; A-F or Audit; prereq Exercise science cand or instructor consent; fall, every year) Principles and practices of group exercise leadership and instruction.

ESAT 3440. Clinical Exercise Physiology. (5.0 cr.; A-F or Audit; prereq 3420, Exercise Science major or instructor consent; fall, spring, every year) Examination of the use of physiological principles and relationships in clinical situations where exercise is used for prevention or alleviation of disease.

ESAT 3600. Clinical Kinesiology. (4.0 cr.; A-F or Audit; prereq 2610, athletic training major; credit will not be granted if already received for PEP 3632; fall, every year) Fundamental concepts of functional anatomy and biomechanics related to athletic performance and injury. An introduction to injury evaluation, palpation, goniometry, and manual muscle testing will also be presented.

ESAT 3610. Mechanics of Musculoskeletal Injury. (3.0 cr.; A-F or Audit; prereq 3600; spring, every year) Fundamental concepts of kinesiology and biomechanics related to human movement and musculoskeletal injury. Emphasis is place on the mechanical properties of bony and soft tissues during movement patterns and how this related to injury.

ESAT 3630. Lower Extremity Injury Evaluation . (4.0 cr.; A-F or Audit; prereq 3600, athletic training major; credit will not be granted if already received for PEP 3620; spring, every year) Pathology, etiology, palpation, special tests, and neurological tests used by athletic trainers in the evaluation of injuries to the lower extremity, lumbar spine and pelvic structure.

ESAT 3632. Upper Extremity Injury Evaluation . (4.0 cr.; A-F or Audit; prereq 3630, athletic training major; fall, every year) Pathology, etiology, palpation, special tests, and neurological tests used by athletic trainers in the evaluation of injuries to the upper extremity, head, neck and torso.

ESAT 3640. Therapeutic Modalities. (3.0 cr.; A-F or Audit; prereq 3600, athletic training major; credit will not be granted if already received for PEP 3640; spring, every year) Theories and concepts in the appropriate application and utilization of therapeutic modalities in the treatment of athletic injuries. A supervised laboratory experience is included within this course to ensure that students develop the appropriate psychomotor skills in applying and using each modality safely.

ESAT 3642. Therapeutic Exercise. (4.0 cr.; A-F or Audit; prereq 3640, athletic training major; credit will not be granted if already received for PEP 3610; fall, every year) Theories and concepts in the appropriate application and utilization of therapeutic exercises in the rehabilitation of athletic

injuries. A supervised laboratory experience is included within this course to ensure that students develop the appropriate psychomotor skills in applying and using rehabilitation techniques.

ESAT 3697. Clinical Experiences in Athletic Training III. (2.0 cr.; A-F or Audit; prereq 2698, Athletic Training major; fall, every year) Athletic training psychomotor skills are enhanced and assessed by an approved clinical instructor during the clinical rotation. Emphasis is on previously learned classroom material. 225 hours of clinical experiences are required.

ESAT 3698. Clinical Experiences in Athletic Training IV. (2.0 cr.; A-F or Audit; prereq 3697, Athletic Training major; spring, every year) Athletic training psychomotor skills are enhanced and assessed by an approved clinical instructor during the clinical rotation. Emphasis is on previously learned classroom material. 225 hours of clinical experiences are required.

ESAT 4001. Pharmacology in Athletic Training. (2.0 cr.; A-F or Audit; prereq 3632, 3642, Athletic Training major, no grad credit; spring, every year) Pharmacological application of therapeutic medications commonly prescribed for acute and chronic health problems and injuries in athletic populations. Also examined is the use and abuse of drugs, ergogenic aids and supplements frequently used by athletes.

ESAT 4590. Research in Athletic Training. (3.0 cr.; A-F or Audit; prereq 3610 and 3698; no grad credit; fall, every year) Interpretation of statistical procedures and research designs commonly used in athletic training research. Prepares students to conduct research projects related to the field of athletic training.

ESAT 4600. Senior Seminar Athletic Training. (2.0 cr.; A-F or Audit; prereq 4001, Athletic Training major, no grad credit; credit will not be granted if already received for PEP 5600; spring, every year) A culminating course that includes a review of current trends in health care, preparation for the BOC examination, and a research project related to athletic training.

ESAT 4610. Orthopedic Seminar. (1.0 cr.; A-F or Audit; prereq 3698; no grad credit; fall, spring, every year) Provides athletic training students the opportunity to work with medical doctors in the evaluation of injuries sustained during physical activity, including an overview of diagnostic imaging techniques and their interpretation.

ESAT 4646. Medical Aspects of Athletic Training. (3.0 cr.; A-F or Audit; prereq 3642, 3698, Athletic Training major, no grad credit; fall, every year) The recognition, evaluation, management, and treatment of non-orthopedic medical conditions that affect the physically active population.

ESAT 4650. Administrative Aspects of Athletic Training. (3.0 cr.; A-F or Audit;

prereq 4001, Athletic Training major, no grad credit; fall, every year)

Managerial and organizational strategies for developing and directing athletic training services at the high school, collegiate, and clinical setting. Practical applications and case studies are emphasized.

ESAT 4697. Clinical Experiences in Athletic Training V. (2.0 cr.; A-F or Audit; prereq 3697, Athletic Training major, no grad credit; fall, every year)

Athletic training psychomotor skills are enhanced and assessed by an approved clinical instructor during the clinical rotation. Emphasis is on previously learned classroom material. 300 hours of clinical experience are required

ESAT 4698. Clinical Experiences in Athletic Training VI. (2.0 cr.; A-F or Audit; prereq 4697, Athletic Training major, no grad credit; spring, every year)

Athletic training psychomotor skills are enhanced and assessed by an approved clinical instructor during the clinical rotation. Emphasis is on previously learned classroom material. 300 hours of clinical experiences are required.

ESAT 4700. Statistics and Research Methods in Exercise Science. (4.0 cr.; A-F or Audit; prereq 12 cr from 3200, 3300, 3400, 3410, Exercise Science major, no grad credit; fall, spring, every year)

Interpretation of statistical procedures and research design in exercise science. Prepares students to conduct research projects in the exercise physiology, biomechanics, motor learning, and the psychological factors that influence exercise.

ESAT 4710. Applied and Experimental Exercise Science. (4.0 cr.; A-F or Audit; prereq 4700, Exercise Science major or instructor consent; no grad credit; fall, spring, every year)

Advanced study and research in exercise science; methods of quantifying exercise responses and adaptations; basic research design.

ESAT 4996. Internship. (3.0-12.0 cr.; S-N or Audit; prereq 3420, Exercise Science major, instructor consent; no grad credit; fall, spring, summer, every year)

Supervised field internship experience in hospital, fitness facility, or agency setting. Six credits required for Health Fitness concentration. Additional credits may be used as electives in this program. Forty clock hours experience are required per credit hour of registration.

Family Medicine (FMED)

Medical School - Duluth Campus

FMED 5591. Independent Study. (1.0-8.0 cr. [max 12.0 cr.]; prereq department consent; fall, spring, summer, every year)

Intensive, independent study project of student's interest in medical research, interdisciplinary fellowship, preceptorship in rural health care delivery, or another medical

area approved by Department of Family Medicine.

FMED 6441. Community Clinical Medicine. (1.0 cr.; P-N Grade Basis; prereq Regis med student; fall, every year)

Clinical practicum, hospital based, covering core material in family practice, internal medicine, obstetrics, pediatrics, surgery. Patient work-ups with discussion by preceptor.

FMED 6442. Community Clinical Medicine. (2.0 cr.; P-N Grade Basis; prereq Regis med student; spring, every year)

Clinical practicum, hospital based, covering core material in family practice, internal medicine, obstetrics, pediatrics, surgery. Patient work-ups with discussion by preceptor.

FMED 6462. Family Medicine Preceptorship . (3.0 cr.; P-N or Audit; prereq Regis med student; summer, every year) Students spend periods of time with a physician in family practice in rural/small communities of Minnesota and Wisconsin observing methods by which health care is delivered.

FMED 6501. Clinical Pathology Conferences I. (1.0 cr.; P-N or Audit; prereq Regis med student; summer, every year)

Applying knowledge gained in pathology and laboratory medicine to an unknown clinical case in order to work through a differential diagnosis.

FMED 6502. Clinical Pathology Conferences II. (1.0 cr.; P-N or Audit; prereq Regis med student; fall, spring, every year)

Applying knowledge gained in pathology and laboratory medicine to an unknown clinical case in order to work through a differential diagnosis.

FMED 6957. Medical Education for Diversity and Service. (1.0 cr.; P-N Grade Basis; prereq UMD Med School student; summer, every year)

Preparation exercises for intercultural medical education experiences, defriending exercises following intercultural medical education experience.

FMED 6967. The Healer's Art. (1.0 cr.; P-N or Audit; prereq Regis med student; fall, every year)

Provides a basis for inquiry and discussion between medical students and clinical faculty on topics that are entwined within the practice of medicine. Due to course content, enrollment is limited.

FMED 6987. Obstetrical Longitudinal Course. (1.0 cr.; P-N or Audit; prereq Preregis med, instructor consent, cannot be concurrently registered for FMed 6977; spring, every year) Introduces the first-year medical student to obstetrical care through small group lectures and discussions while following an obstetrical patient on a longitudinal basis in conjunction with a local family practitioner or OB specialist. Due to course content, enrollment is limited. Discussion.

FMED 6997. Rural Academy of Leadership. (1.0 cr.; P-N Grade Basis; prereq Preregis

med, instructor consent; spring, offered periodically)

Learn how to use interests and talents in the community through volunteer service and leadership. Consists of lecture/discussion sessions and training/orientation retreat to prepare for volunteer activities at a local free clinic. Includes a community service project that will culminate in a presentation to others at the end of the course.

FMED 7100. Clinical Family Medicine. (13.0 cr. [max 117.0 cr.]; P-N or Audit; prereq department consent; fall, spring, summer, every year)

Supervised care of patients of all ages emphasizing continuous, primary, preventive, acute, and chronic care in all general diagnostic categories.

Finance & Management Information (FMIS)

Labovitz School of Business and Economics

FMIS 2201. Information Technology in Business. (3.0 cr.; A-F or Audit; =[FMIS 1201, FMIS 3201, CS 1011]; prereq LSBE student or Computer Information Systems majors or minors, minimum 15 credits or college consent; fall, spring, every year)

Introduction to information technology (IT) concepts: computer hardware and software; use of personal productivity tools (spreadsheet, database, and presentation software); system development processes; Web technologies; applications of IT in business processes.

FMIS 3141. Business Communications. (3.0 cr.; A-F or Audit; prereq LSBE candidate or Economics major or college consent; fall, spring, summer, every year)

Principles of business communication and their application to oral, written, and nonverbal communication.

FMIS 3220. Database Management and Design. (3.0 cr.; A-F only; prereq 2201 or CS 1121 or CS 1511, LSBE candidate or college consent; fall, spring, every year)

Concepts and structures relating to design, implementation, and administration of database management systems. Emphasis on relational databases and development of integrated applications.

FMIS 3222. Systems Analysis and Design. (3.0 cr.; A-F or Audit; prereq 2201, LSBE candidate or college consent; fall, spring, every year)

Analysis phase of systems development life cycle. Emphasizes feasibility study, requirements analysis, and system specification. Detailed study of current physical and logical systems models and specification.

FMIS 3224. Data Communications and Computer Networks. (3.0 cr.; A-F or Audit; prereq 3201 or 2201 or CS 1121 or CS 1511, LSBE candidate or college consent; fall, spring, every year)

Management of telecommunications networks from a business problem solving perspective. Survey of telecommunications technologies,

network architectures, management issues, and evolving business environments.

FMIS 3232. Visual Web Programming. (3.0 cr.; A-F or Audit; prereq 2201 or 3201, 3220 or concurrently, LSBE candidate or college consent; fall, spring, every year)
Introduces Microsoft .Net technology, which consists of the .Net Platform and the .Net Framework. Focuses on the ASP .Net with VB .Net, which is part of .Net Framework designed for developing Web applications and Web services.

FMIS 3240. Enterprise System Architectures. (3.0 cr.; A-F or Audit; prereq 2201 or CS 1121, LSBE candidate or college consent; fall, spring, every year)
Combines an accelerated introduction to an object-oriented programming language with an appreciation for developing scalable, flexible and interoperable enterprise-wide application. Focus is on how to select appropriate technologies and combine them in the design of effective enterprise architectures.

FMIS 3291. Independent Study MIS. (1.0-3.0 cr. [max 9.0 cr.]; A-F only; =[FMIS 3691]; prereq department consent; fall, spring, summer, every year)
Special work in information sciences that extends beyond, or in greater depth than, regular course offerings.

FMIS 3295. Special Topics: (Various Titles to be Assigned). (1.0-4.0 cr. [max 24.0 cr.]; A-F or Audit; prereq LSBE candidate or department approval; fall, spring, offered periodically)
Exploration of specific MIS problems, issues, and approaches.

FMIS 3397. LSBE Internship. (3.0 cr.; A-F or Audit; prereq Admitted to LSBE candidacy, consent of internship director; fall, spring, summer, every year)
Work-integrated learning program providing practical experiences within students' majors. Students participate in an approved program within cooperating businesses, government agencies, or civic organizations. Requires minimum 200 hours work experience, assigned written reports, and performance evaluations.

FMIS 3601. Corporate Finance. (3.0 cr.; A-F or Audit; prereq LSBE candidate or approved non-LSBE business administration minor or college consent; fall, spring, summer, every year)
Fundamental concepts of managerial financial decision making. Time value of money, valuation, risk and return, financial statement analysis, short-run financial management, capital budgeting, cost of capital, long-term financing, and corporate taxation.

FMIS 3612. Managerial Finance. (3.0 cr.; A-F or Audit; prereq 3601, LSBE candidate or college consent; fall, spring, every year)
Intermediate conceptual and analytical applications in capital budgeting, funds flow, cost of capital, debt management, equity financing, mergers and acquisitions, business reorganizations, international financial management.

FMIS 3619. Analysis of Financial Statements. (3.0 cr.; A-F or Audit; prereq 3601, LSBE candidate or instructor consent; an Accounting/Finance double major cannot take FMIS 3619 to count as a Group B finance elective. See your finance adviser for details.; spring, every year)
Analysis and interpretation of financial statements, presentation of analytical techniques, including trend, comparative, and ratio analysis. Use of computer assisted analysis

FMIS 3644. Investment Fundamentals. (3.0 cr.; A-F or Audit; prereq 3601, LSBE candidate or college consent; fall, spring, every year)
Comprehensive introduction to nature, problems, and process of evaluating particular securities and portfolio construction. Survey of basic principles of security analysis, analytical techniques, and investment policy for individual and institutional investors. Introduction to computer-assisted investment analysis.

FMIS 3647. Financial Markets and Institutions. (3.0 cr.; A-F or Audit; prereq 3601, LSBE candidate or college consent; fall, spring, every year)
Analysis of money and capital markets, savings-investment process, and financial institutions. Role of Federal Reserve and Treasury in finance market development; supply and demand for loanable funds; level and structure of interest rates. Asset/liability management.

FMIS 3649. International Finance. (3.0 cr.; A-F or Audit; prereq 3601, LSBE candidate or college consent; fall, summer, every year)
Comprehensive framework and analysis for financial management of international firm. International financial markets, exchange rates and international firms, elements of international investments, financing decisions, and strategy formulation.

FMIS 3655. Risk Management and Insurance. (3.0 cr.; A-F or Audit; prereq 3601, LSBE candidate or instructor consent; fall, every year)
Foundations as well as the economic, financial and legal issues surrounding risk management and insurance. Students will discuss and analyze risk management techniques currently used in business and examine different types of insurance policies.

FMIS 3691. Independent Study Finance. (1.0-3.0 cr. ; A-F only; =[FMIS 3291]; prereq department consent; fall, spring, summer, every year)
For students wishing to do special work in finance that extends beyond, or in greater depth than, regular course offerings.

FMIS 3695. Special Topics: (Various Titles to be Assigned). (1.0-3.0 cr. [max 6.0 cr.]; A-F or Audit; prereq 3601, LSBE candidate or college consent; fall, spring, offered periodically)
Exploration of specific finance problems, issues, and approaches.

FMIS 4220. Medical Informatics. (3.0 cr.; A-F or Audit; prereq 2201 or 3201, LSBE candidate

or college consent, no grad credit; fall, every year)
Introduction to the convergence of computing, information systems, and healthcare with a focus on managing information and developing systems that leads to more effective decisions and actions in healthcare. Covers the standards, ethics and security of the electronic health record.

FMIS 4221. XML and Information Management. (3.0 cr.; A-F or Audit; prereq 2201 or 3201, 3220, 3232; credit will not be granted if already received for 3230; fall, spring, every year)
Intermediate courses that focuses on the fundamentals of the XML specification of the W3C and its related technologies, including XML Schema, XPath, XQuery, and XSLT. Writing well-formed and valid XML documents, defining DTDs and schemas, exchanging and manipulating XML data via an RDBMS, and integrating XML technologies into Web applications will be covered.

FMIS 4225. Advanced Applications Development. (3.0 cr.; A-F only; prereq 3220, 3232; fall, spring, every year)
Development of advanced microcomputer-based applications using modern development environments (languages). Emphasis on systems development and integration, interface design, and data access strategies.

FMIS 4615. Derivative Securities. (3.0 cr.; A-F or Audit; prereq 3644, LSBE candidate with 60 credits or grad student or college consent; fall, spring, every year)
Nature and functions of derivative security markets such as options, futures, options on futures, swaps, and financial engineering. Emphasizes their use as tools for risk reduction, portfolio management, and speculative medium for aggressive investor.

FMIS 4616. Security Analysis. (3.0 cr.; A-F or Audit; prereq 3644, Acct 3101 or FMIS 3619, Financial Markets major or minor; no grad credit; fall, every year)
Introduction to theory, concepts, and practices of security analysis and investment practices. Common stock, fixed income securities, derivative securities, and mutual funds will be analyzed. Other topics include sector analysis, financial statement analysis, ratio analysis, diversification, and hedging.

FMIS 4617. Management of Financial Institutions. (3.0 cr.; A-F or Audit; prereq 3647, LSBE candidate with 60 credits or grad student or college consent; fall, spring, offered periodically)
Techniques for managing commercial banks and other financial institutions through asset/liability management.

FMIS 4620. Portfolio Theory and Analysis. (3.0 cr.; A-F or Audit; =[FMIS 4611]; prereq Financial Markets major or minor; no grad credit; fall, spring, every year)
Portfolio management in a modern portfolio theory (MPT) framework. Risk measurements, risk-return relationships, and portfolio models are developed. Topics include Markowitz

portfolio theory, risk-return models, bond portfolio management, evaluating portfolio performance, and outperforming the market.

FMS 4624. Applied Portfolio Management. (3.0 cr.; A-F or Audit; prereq 4616, 4620, Financial Markets major or minor; no grad credit; fall, spring, offered periodically) Gives students in the financial markets program "hands on" learning experience by analyzing and managing a real-money investment fund. Students will be responsible for managing all aspects of the investment fund.

FMS 4644. Portfolio Management. (3.0 cr.; A-F or Audit; prereq 3644, LSBE candidate; spring, every year) Portfolio analysis in the mean-variance framework of Markowitz. Portfolio management strategies. The CAPM, APT, and other capital market theory implications. Portfolio performance evaluation.

FMS 4646. Financial Plan Development. (3.0 cr.; A-F or Audit; prereq 3601, 3644, 3655, ACCT 2001 3401 and 4600, BLAW 3301 (can be taken concurrently); no grad credit; spring, every year) Financial planning is the process of managing resources to achieve personal financial goals. It involves the steps of determining current financial situations, developing financial goals, identifying alternative courses of actions, evaluation alternatives, creating financial action plans, and finally evaluating and revising plans. This course provides the systematic framework for implementing these activities.

Fine Arts (FA)

School of Fine Arts

FA 1102. Creating Art. (FINE ARTS; LE CAT9; 3.0 cr.; A-F or Audit; prereq Credit will not be granted if already received for 1101; fall, odd years) Discussion/direct experience of settings/ways in which art (including aesthetic philosophy and other creative work) arises.

FA 2595. Special Topics: (Various Titles to be Assigned). (1.0-3.0 cr. [max 9.0 cr.]; fall, spring, summer, offered periodically) Selected studies with interdisciplinary or multidisciplinary focus.

Foreign Studies (FORS)

Academic Affairs

FORS 1110. RUSS 1110 Beginning Russian Language and Culture (Abroad). (COMM & LAN; 8.0 cr.; A-F or Audit; prereq Admission to an approved study abroad program requires consent from the International Education Office.; summer, odd years) This five week program/course, allows students to develop basic proficiency in Russian, while providing cultural and historical understanding of Russian society. There are no prerequisites for this course, and no previous knowledge of Russian is required. All language skills are practiced and improved. This course takes place in St. Petersburg, Russia, where students

apply their language skills by learning about the history of the city as well as aspects of contemporary Russian culture and politics. This course is composed of in-class instruction, seminars, discussions, field trips, and small group projects.

FORS 1210. RUSS 1210 Intermediate Russian Language and Culture (Abroad). (COMM & LAN; 8.0 cr.; A-F or Audit; prereq Admission to an approved study abroad program requires consent from the International Education Office.; spring, summer, offered periodically)

This five week summer program/course improves students' proficiency in Russian, while providing cultural and historical understanding of Russian society. All language skills are practiced and improved, beginning at the intermediate level. This course takes place in the summer in St. Petersburg, Russia, where students apply their language skills by learning about the history of the city, as well as aspects of contemporary Russian culture and politics. This course is composed of in-class instruction, seminars, discussions, field trips, and small group project. Taught in Russian.

FORS 2025. HIST 2025 History in Greece. (3.0 cr.; A-F or Audit; prereq Admission to an approved study abroad program requires consent from the International Education Office.; summer, odd years) Taught on site in Greece. Examine the history of ancient Greece and how the image of Greece affected Western Europe through the Renaissance and Enlightenment.

FORS 2030. HIST 2030: China An Ancient Civilization. (3.0 cr.; =[HIST 2030]; prereq Admission to an approved study abroad program requires consent from the International Education Office.; summer, offered periodically) Study abroad course

FORS 3000. AAAS 3000 Kenyan Experience. (6.0 cr.; A-F or Audit; prereq Admission to an approved study abroad program requires consent from the International Education Office.; summer, every year) This course provides a critical study of Kenyan cultures and education. Taught on site in Kenyan, the course will richly enhance students' understanding of the social, economic, and political challenges influencing contemporary Kenya, from colonization to globalization. It will draw on education, folklores, women's lives, literature, ecoactivism, and ecocriticism in its attempt to promote diversity, global perspectives, and sustainability.

FORS 3006. Hist 3235, History and Soccer. (3.0 cr.; A-F or Audit; =[HIST 3235]; prereq Admission to an approved study abroad program. Required consent from the International Education Office.; fall, spring, offered periodically) Taught on site in England. Over the past two centuries "soccer" has developed from an informal and regionally variable pastime into the single most popular sport on earth. This phenomenon is incomprehensible without

the specific social, cultural, and geographic considerations of nineteenth and twentieth century Britain and its colonies. The sport will be used as a lens through which to examine the social and cultural aspects of the Industrial Revolution and the British Empire, focusing on the central question: "How did historical forces facilitate the rise and spread of the "World's Game?" Covers the techniques of historical methodology and source analysis, and the general narrative of the Industrial Revolution and British Empire (including colonial perspectives), as well as the internal history of the game itself.

FORS 3131. International Student Teaching. (1.0-20.0 cr. ; prereq Admission to an approved study abroad program requires consent from the International Education Office.; fall, spring, offered periodically) Study Abroad Course

FORS 3178. FR 3040 Language and Culture in France. (6.0 cr.; A-F or Audit; prereq Admitted to an approved study abroad program, required consent from the International Education Office.; summer, offered periodically) Taught on site in France. Explore the rich heritage of Montpellier while studying French language, culture, gastronomy, history and politics. Live with a host family to bolster language skills and internalize daily life. Study current issues within France, such as immigration, globalization and identity politics taught by French faculty.

FORS 3200. ANTH 3200 Exploring Sustainability in Costa Rica. (4.0 cr.; =[ANTH 3200]; prereq Admission to an approved study abroad program requires consent from the International Education Office.; spring, summer, offered periodically) Taught on site in Costa Rica. Introduces students to fieldwork based experiences in sustainability and community engaged scholarship. Course generally involves travel, extensive outside of the classroom work, and a service learning component with post project reflection.

FORS 3205. GEOG 3205 Mapping in Belize. (3.0 cr.; A-F or Audit; =[GEOG 3205]; prereq Admission to an approved study abroad program requires consent from the International Education Office.; summer, offered periodically) Study abroad course; taught on site in Belize. Novice mappers to the geospatially proficient students will be exposed to a meaningful field experience and lab practicum where field data and satellite imagery will be combined to render valuable information about the Maya Gold landscape. Students will utilize Global Positioning System (GPS) and remote sensing techniques to create informative and cartographically derived outputs; a map. Through this international experience, students will be exposed to a unique cultural experience where they will learn what is important to Mayan culture by observing the dynamics of this landscape. Time spent in Belize will expose each student to the eclectic mingling of Mestizo, Mopan and Kekchi Maya, Garifuna,

Creoles, Lebanese, East Indian and Chinese peoples.

FORS 4100. HLTH 4100 History of Health in Italy. (3.0 cr.; A-F or Audit; prereq Minimum 30 credits, no grad credit; admitted to an approved study abroad program, required consent from the International Education Office.; summer, every year)

Taught on site in Italy. Investigating the foundations of public and community health using primary historical sites in the area now unified as Italy. Analyze the impact of social and cultural factors on community health from early civilizations through the Renaissance, with emphasis of effects of the Black Death. Examine the role of arts used to convey health information for non-literate populations. Relate to aspects of preventative health care and promoting healthy communities in the present. Study Abroad

Foreign Studies (FST)

Academic Affairs

FST 1399. Chinese Language in China. (6.0 cr. [max 12.0 cr.]; prereq Required consent from the International Education Office.; fall, spring, summer, offered periodically) Study Chinese language and culture in a classroom setting and on field trips. The program will be held in Beijing, Shanghai, and at the Ocean University of China in Qingdao, China. Emphasis will be on language, culture and history.

FST 3040. Ger 3040, Culture of Germany. (4.0 cr.; A-F or Audit; prereq GER 1202 or equivalent, admitted to an approved study abroad program, required consent from the International Education Office.; spring, summer, every year) Taught on site in Germany. Study of German culture, both contemporary and past as it informs the present, on site in Germany. Conducted entirely in German, and all language skills will be inculcated and improved. Format will include seminar, discussions, field trips, and small group projects.

FST 3894. Study Abroad in Spain: Language and Culture. (6.0 cr.; prereq Admission to an approved study abroad program by the International Education Office. Student must have completed SPAN 1202 or higher or received instructor consent.; summer, offered periodically) This month long summer study abroad experience is in Salamanca, Spain. Study Spanish language, literature and culture at the University of Salamanca. Live with a Salamantine family to further cement language skills and internalize daily life. Practice language skills with Spaniards and international students alike in this diverse and multicultural city.

FST 4006. Comm 4949, Intercultural Hawaiian Experience. (4.0 cr. [max 12.0 cr.]; S-N or Audit; =[COMM 4949]; prereq Admitted to an approved Study Abroad Program, required consent from the International Education Office; no grad credit; spring, every year)

Taught on site in Hawaii. Practice of intercultural communication at culturally diverse sites. Students will immerse themselves in Non-European/American cultures and participate in intercultural communication with members of those cultures. Offered at various sites within the U.S. and internationally.

FST 4225. INTB 4201, Chinese Business and Economics. (3.0 cr.; A-F or Audit; prereq Admission to an approved study abroad program. Required consent from the International Education Office.; summer, every year)

Taught on site in China. Introduction to Chinese business and economy. Provides fundamental knowledge of Chinese business and economy, provides students with understanding of social, cultural, economic and political environments of doing business in China through lectures, readings, hand-on project and travel to China.

FST 4295. INTB 4211 Innovation in Ireland (GLOBAL PER). (3.0 cr.; A-F only; prereq Minimum 2.8 GPA, minimum 60 credits, admission to an approved study abroad program by the International Education Office.; summer, every year)

Taught on site in Ireland. Explore Irish innovation on multiple levels (individual, organizational, and regional) concentrating on how Ireland has created a culture of innovation and the consequences of this innovation on its people from its earliest history to today.

French (FR)

College of Liberal Arts

FR 1101. Beginning French I. (COMM & LAN; LE CAT3; 4.0 cr.; A-F or Audit; prereq Little or no prior formal study of this language, or instructor consent; fall, summer, every year) Conversation and communicative course for students with little or no previous study of French. Emphasis on oral and aural skills; some grammar. Taught in French and English.

FR 1102. Beginning French II. (COMM & LAN; LE CAT3; 4.0 cr.; A-F or Audit; prereq 1-2 yrs high school French or 1101 or instructor consent; spring, summer, every year) Conversation and communicative course for students with limited previous study of French. Emphasis on oral and aural skills; some grammar. Taught in French and English.

FR 1201. Intermediate French I. (COMM & LAN; LE CAT3; 4.0 cr.; A-F or Audit; prereq 3-4 yrs high school French or 1102 or instructor consent; fall, every year) Consolidation and enrichment of previously acquired abilities speaking and understanding French, set within introduction to written French and survey of contemporary culture of French-speaking societies. Emphasis on oral, aural, and reading skills; vocabulary building; some writing. Taught in French.

FR 1202. Intermediate French II. (COMM & LAN; LE CAT3; LEIP CAT03; 4.0 cr.; A-F or Audit; prereq 4 years high school french or 1201 or instructor consent; spring, every year)

Consolidation and enrichment of previously acquired abilities speaking and understanding French, set within introduction to written French and survey of contemporary culture of French-speaking societies. Emphasis on oral, aural, and reading skills; vocabulary building; some writing. Taught in French.

FR 2301. Advanced French. (COMM & LAN; LE CAT3; LEIP CAT03; 4.0 cr.; A-F or Audit; prereq 5 years high school french or 1202 or instructor consent; fall, every year) Development of French literacy within a culturally authentic contemporary context. Emphasis on practical writing and formal oral and aural communication skills; vocabulary building; enhancement of reading skills; review of key grammar. Taught in French.

FR 2315. French Cinema. (HUMANITIES; LE CAT9; LEIP CAT09; 4.0 cr.; A-F or Audit; spring, offered periodically) Images of human diversity in French cinema. Films with English subtitles; class discussion in English.

FR 3031. French Language Study Abroad I. (1.0-5.0 cr. [max 10.0 cr.]; prereq department consent; fall, spring, summer, offered periodically) For students pursuing formal study of French, beyond the beginning and intermediate levels, in a French-speaking country, under the auspices of another college or university or by individual agreement.

FR 3032. French Language Study Abroad II. (1.0-5.0 cr. [max 10.0 cr.]; prereq department consent; fall, spring, summer, offered periodically) For students pursuing formal study of French, beyond the beginning and intermediate levels, in a French-speaking country, under the auspices of another college or university or by individual agreement.

FR 3040. Language and Culture in France. (6.0 cr.; A-F or Audit; prereq Department consent; summer, every year) Taught on site in France. Study of French culture, both contemporary and past as it informs the present. Conducted entirely in French, and all language skills will be included and improved. Format will include seminars, discussions, field trips, and small group projects.

FR 3045. French Culture and Civilization Study Abroad I. (1.0-5.0 cr. [max 10.0 cr.]; prereq department consent; fall, spring, summer, offered periodically) For students pursuing formal study of French culture and civilization, beyond the beginning and intermediate levels, in a French-speaking country, under the auspices of another college or university or by individual agreement.

FR 3046. French Culture and Civilization Study Abroad II. (1.0-5.0 cr. [max 10.0 cr.]; prereq department consent; fall, spring, summer, offered periodically) For students pursuing formal study of French culture and civilization, beyond the beginning and intermediate levels, in a French-speaking country, under the auspices of another college or university or by individual agreement.

FR 3047. French Culture and Civilization Abroad III. (1.0-5.0 cr. [max 10.0 cr.]; prereq department consent; fall, spring, summer, offered periodically)

For students pursuing formal study of French culture and civilization, beyond the beginning and intermediate levels, in a French-speaking country, under the auspices of another college or university or by individual agreement.

FR 3048. French Culture and Civilization Study Abroad IV. (1.0-5.0 cr. [max 10.0 cr.]; prereq department consent; fall, spring, summer, offered periodically)

For students pursuing formal study of French culture and civilization, beyond the beginning and intermediate levels, in a French-speaking country, under the auspices of another college or university or by individual agreement.

FR 3302. Advanced French Composition and Conversation. (COMM & LAN; 4.0 cr.; A-F or Audit; prereq 2301 with grade of C or higher; spring, every year)

Refines students' skills in oral and written expression after they have completed the French language sequence. Individualized work on points of syntax and semantics, set in a contemporary context, using a variety of texts and resources.

FR 3310. Survey: Essays, Short Stories, Poetry in the French Language.

(HUMANITIES; 4.0 cr.; A-F or Audit; prereq 2301 with C or higher or instructor consent; spring, odd years)

Selected works in three genres, written in the French language from the 15th Century to the present: essays, short stories, poetry.

FR 3591. Independent Study. (1.0-4.0 cr. [max 8.0 cr.]; A-F or Audit; prereq 2301 with C or better, instructor consent; fall, spring, every year)

Students develop and carry out reading and research programs in consultation with the instructor.

FR 3905. Autobiography in French Literature and Cinema. (HUMANITIES; 4.0 cr.; A-F or Audit; prereq 2301 or instructor consent; spring, even years)

Selected autobiographical works in French and Francophone literature and cinema from the 16th Century to the present.

FR 4018. Studies in Francophone Cultures and Literature (LE CAT9, LEIP CAT09).

(HUMANITIES; GLOBAL PER; 4.0 cr.; A-F or Audit; prereq 2301 with grade of C or better or instructor consent; no grad credit; spring, odd years)

Studies literature and film from francophone (i.e. the French-speaking world) such as Maghreb, Sub-Saharan Africa, French Indochina, Canada, and the French West Indies. Focuses on politics and aesthetics in relation to colonization, diaspora, cultural identities and *mÃ©tissage* (cultural, linguistic and ethnic blending or hybridity) as well as the creation of new existential and political spaces. The course is taught in French.

FR 4095. Special Topics (Various Titles to be Assigned). (4.0 cr.; A-F or Audit;

prereq FR 2301 with a C or better or instructor consent, no grad credit; fall, spring, offered periodically)

Various topics in the language, history, literature, and culture of France and/or Francophone countries.

FR 4412. Contemporary French Culture and Society. (HUMANITIES; GLOBAL PER; 4.0 cr.; A-F or Audit; prereq 2301 with grade of C or higher or instructor consent; no Grad credit;

fall, spring, offered periodically) Study of contemporary social, cultural, and political issues in France and other Francophone regions. Conducted in French.

FR 4422. 20th-Century Novel.

(HUMANITIES; 4.0 cr.; A-F or Audit; prereq 2301 or equivalent with C or better or instructor consent; no grad credit; fall, spring, offered periodically)

Study of representative novels. Taught in French.

FR 4472. French Classical Literature.

(HUMANITIES; 4.0 cr.; A-F or Audit; prereq 2301 or equivalent with C or better or instructor consent; no grad credit; fall, spring, offered periodically)

Representative works of 17th-century French prose, poetry, and theatre. Taught in French.

FR 4492. 19th-Century Novel.

(HUMANITIES; 4.0 cr.; A-F or Audit; prereq 2301 with C or better or instructor consent; no grad credit; fall, spring, offered periodically)

Study of several novels by major 19th-century writers: Hugo, Balzac, Stendhal, Flaubert, Zola, Maupassant). Taught in French.

Geographic Information Science (GIS)

College of Liberal Arts

GIS 3533. Multimedia, Animated and Internet Mapping. (4.0 cr.; A-F only; prereq GEOG 3532; credit will not be granted if already received for GEOG 3533; fall, every year)

In an age where the user has increasingly become their own mapmaker (e.g., Mapquest, online GIS) this course examines recent issues in cartography related to map animation, the Internet, geovisualization, and on-demand cartographic systems-focusing on the new cartographic challenges and opportunities associated with interactive, digital mapping systems. This class will examine both theoretical and practical issues in the design of effective digital maps and mapping systems.

GIS 3563. Geographic Information Science I: Theory and Analysis. (4.0 cr.; A-F

only; prereq GEOG 2552 or GIS major or minor or certificate student or Environment Sustainability; credit will not be granted if already received for GEOG 3564 or 4563 and 4564.; fall, spring, every year) Emphasizes the concepts needed to use GIS effectively for manipulating, querying, analyzing and visualizing spatial data. This course will provide an introduction to and basic skills with industry standard GIS software in a wide variety of applications in both the

natural and social sciences. The course will cover basic data modeling, data manipulation, and analytical methods and implications of geospatial technologies on society.

GIS 3564. Geographic Information Science II: Applied GIS. (4.0 cr.; A-F or Audit; prereq

3563; credit will not be granted if already received for GEOG 3564 or 4563 and 4564.; fall, spring, every year)

This course provides more hands-on skills with industry standard GIS software in a wide variety of applications in both the natural and social sciences. The course will cover the design aspects of application, as well as organizational and institutional aspects of applied GIScience. Lastly, the courses will consider ethics and geospatial information and a code of ethics for geospatial professionals.

GIS 3580. Earth Imagery. (4.0 cr.; A-F only; prereq 2552; credit will not be granted if already received for GEOG 3580; fall, every year)

This course is a selective overview of the methods used for imaging the Earth, it's atmosphere, and it's subsurface. The main objective is to expose students to some of the common methods of Earth Imaging and provide them with a hands on experience. This course introduces airphotos, satellite imaging, and Digital Elevation Models (DEMs). By the end of the course students will be able to comfortably analyse airphotos, Landsat and other satellite data, and create and analyse DEMs.

GIS 3591. Independent Study in GIS.

(1.0-3.0 cr. [max 6.0 cr.]; A-F only; prereq instructor consent; fall, spring, summer, every year)

For students interested in doing advanced work in selected fields of GIS.

GIS 3595. GIS Special Topics: (Various Titles to be Assigned). (1.0-4.0 cr. [max 8.0 cr.]; A-F only; fall, spring, summer, offered periodically)

Topics in GIS of current and special interest to students that are not offered in regular department curriculum. Topics may involve specialties of staff or visiting faculty.

GIS 3597. Internship in GIS. (3.0-4.0 cr.

[max 8.0 cr.]; A-F only; prereq GIS major with minimum 60 credits and instructor consent; fall, spring, summer, every year)

Scheduled assignments with direct supervision in public agencies or relevant private firms.

GIS 4585. Applied Statistics in GIS. (4.0 cr.; A-F only; prereq 3563 and STAT 1411; credit will not be granted if already received for GEOG 3585 or GIS 3585; no grad credit.; spring, every year)

The aim of this course is to provide GIS students or students in related fields or interested in spatial data analysis, with little to no previous statistical knowledge, with the basic skills needed to question and analyze data and reach valuable conclusions. Many of the methods covered in this course are commonly used in various fields of social or environmental studies, in economy and management, in sciences and engineering: statistics are a lingua franca that is often a key

element of interdisciplinary work. however, there will be an emphasis on the specificity of date that varies in space, and methods specific to spatial analysis will be introduced. Through the theoretical background will be discussed, the class will focus more on application that on theory, through a problem solving approach. We will use a variety of software, mostly ArcGIS, QGIS and MS Excel.

GIS 5571. Geographic Information Science in Urban Analysis. (4.0 cr. [max 8.0 cr.]; A-F or Audit; prereq 3563 or 4563, instructor consent; credit will not be granted if already received for GEOG 5571; fall, odd years) This advanced course serves to provide students with an opportunity to explore the many applications of geographic information systems in local government, transportation development, and community planning. Students will learn how GIS can be used to effectively carry out urban and regional planning tasks. Several lab projects will be focused around advanced tasks in GIS analysis using land-use planning subject areas and will use Duluth area data. Several guest lectures will focus on current GIS projects and "real-world" experience. Students will gain a basic understanding of GIS project planning and data management. Software used will be ESRI ArcGIS.

GIS 5572. Environmental Application of GIS. (4.0 cr.; A-F only; prereq 3563 or 4563 or instructor consent; credit will not be granted if already received for GEOG 5572; spring, every year) Introduction to ArcView GIS and its applications to the environmental issues such as natural hazards, forest management, contaminated sites, soil erosion, habitat assessment, and regional planning.

GIS 5573. GIScience in Regional Sustainability Applications. (4.0 cr. [max 8.0 cr.]; A-F or Audit; prereq 3563 or 4563 or instructor consent; credit will not be granted if already received for GEOG 5573; fall, even years) This course serves to provide students with an opportunity to explore the many applications of geographic information systems in environmental sustainability, renewable energy, and community planning for the future. Students will learn how GIS can be used to effectively carry out short term GIS projects. Focus will be on current topics such as energy use calculations, sustainable community development, watershed planning and transit planning in the regional area. Several guest lectures will focus on current GIS applications. Software used will be ESRI ArcGIS.

GIS 5581. Digital Image Processing and Analysis. (4.0 cr.; A-F only; prereq 3580 or instructor consent; credit will not be granted if already received for GEOG 4580 or GEOG 5581; spring, every year) This advanced remote sensing course focuses on theories and applications of digital image processing and provides students with knowledge and skills of advance digital image processing and analysis techniques. Topics include image display and disualization,

methods for geometric and radiometric corrections, image enhancement, image classification and change detection, digital image processing, analysis of hyperspectral and active microwave images.

GIS 5591. Independent Study in GIS. (1.0-3.0 cr. [max 6.0 cr.]; A-F only; prereq instructor consent; fall, spring, summer, every year) Independent problems for postbaccalaureate students interested in doing additional work in selected fields in GIS.

GIS 5595. GIS Special Topics: (Various Titles to be Assigned). (1.0-4.0 cr. [max 8.0 cr.]; A-F or Audit; prereq minimum 90 credits or #; maximum 6 credits to grad program; fall, spring, summer, offered periodically) Topics in GIS of current and special interest to students that are not offered in regular department curriculum. Topics may involve specialties of staff or visiting faculty.

Geography (GEOG)

College of Liberal Arts

GEOG 1202. World Regional Geography. (GLOBAL PER; LE CAT8; LEIP CAT08; 3.0 cr.; A-F only; fall, spring, every year) Geography of human groups in diverse settings. Emphasis on cultural diversity, regional development, and human and environmental forces shaping regional patterns and processes. Geographic analysis of selected regions and countries.

GEOG 1304. Human Geography. (SOC SCI; LE CAT6; LECD CAT06; 3.0 cr.; A-F only; fall, spring, summer, every year) Ecological basis of human existence. Human population patterns and cultural diffusion. Agricultural geography. Political geography. Geography of language, religion, and ethnic groups. Effects of urbanization; economic geography.

GEOG 1414. Physical Geography. (NAT SCI; LE CAT4; 4.0 cr.; A-F only; fall, spring, every year) Earth-sun relations, maps and globes, and major factors of the natural environment, including water resources, landforms, weather and climate, natural vegetation, and soils. (3 hrs lect, 2 hrs lab)

GEOG 2305. Geography of Cultural Diversity. (CDIVERSITY; 3.0 cr.; A-F only; prereq credit will not be granted if already received for GEOG 2405; spring, offered periodically) Culture is ubiquitous as it is ambiguous in social science research. Cultural geography overlaps into all other sub disciplines, along with current approaches, issues and debates in contemporary research. It defies any clear, satisfying definition. Consequently, the numerous philosophical, theoretical, methodological and ethical issues pertaining to the investigation and representation of culture in academia will be the focus.

GEOG 2306. Environmental Conservation. (SUSTAIN; LE CAT8; 3.0 cr.; A-F only; fall, spring, summer, every year)

Integrated study of physical, economic, social, and political aspects of natural resource management. Emphasis on identifying environmental problems and evaluating alternatives for resolution, including planning, regulation, market incentives, and mitigation activities.

GEOG 2313. Economic Geography. (SOC SCI; LE CAT6; 3.0 cr.; A-F only; fall, every year) Contemporary geographic pattern analysis of production, distribution, and consumption of goods and services. Development of geographic theories and models that attempt to explain spatial variations of economic activities such as agriculture, manufacturing, and trades and services.

GEOG 2360. Geography of Religion. (GLOBAL PER; LE CAT7; LEIP CAT07; 4.0 cr.; A-F only; spring, offered periodically) This course is an introduction to the geography of religion. Topics covered include the origins and distribution of sacred places in all major world religions, the geography of holy men and women, religious pilgrimages, and contested religious spaces.

GEOG 2552. Introduction to Maps and Geospatial Information. (LOGIC & QR; LE CAT2; 3.0 cr.; A-F only; fall, spring, summer, every year) This course will define a map and consider maps as tools for communication. Students will explore the effects of scale, projection, cartographic symbolization and generalization on the mapping process and resulting digital databases. Students will be introduced to spatial data models, types of spatial data and representation, and will study alternative or non-tradition map representations provided by GIS and Remote Sensing.

GEOG 3205. Conservation and Cultural Preservation: Mapping in Belize. (3.0 cr.; A-F only; =[FORS 3205]; prereq Admission to an approved study abroad program. Required consent from the International Education Office.; summer, every year) Taught on site in Belize. Novice mappers to the geospatially proficient students will be exposed to a meaningful field experience and lab practicum where field data and satellite imagery will be combined to render valuable information about the Maya Gold landscape. Students will utilize Global Positioning System (GPS) and remote sensing techniques to create informative and cartographically derived outputs; a map. Through this international experience, students will be exposed to a unique cultural experience where they will learn what is important to Mayan culture by observing the dynamics of this landscape. Time spent in Belize will expose each student to the eclectic mingling of Mestizo, Mopan and Kekchi Maya, Garifuna, Creoles, Lebanese, East Indian and Chinese peoples.

GEOG 3334. Urban Geography . (3.0 cr.; A-F only; prereq Minimum 30 credits or instructor consent; fall, every year) As the world becomes more urbanized there seems to be less distinction between global

problems and urban problems. Analysis of the relationship between urbanization and other aspects of our modern world such as economic globalization, increased levels of international migration, and warfare. Examine how global dilemmas can be seen in the national and international issues. Pay particular attention to the everyday struggles that occur in the households and neighborhoods of cities as people attempt to care for themselves and their families in this rapidly changing world.

GEOG 3335. Urban Planning. (3.0 cr.; A-F only; prereq Minimum 30 credits; spring, every year)

Urban planning explores the purpose, practice, and theories of modern community planning for the promotion of social and economic well-being. The causes of urban problems, and the tools planners can use to solve them will be investigated. Special focus will be paid to citizen participation and how the voices of community members can be heard in the planning process.

GEOG 3370. Geographies of Development. (3.0 cr.; A-F only; prereq Minimum 30 credits; fall, offered periodically)

Focuses on the theories of development, development in practice, and the spaces of development. Specifically considers theories of development and their interpretations, strategies of development and developing nations, and interconnections and globalization and development.

GEOG 3401. Weather and Climate. (3.0 cr.; A-F only; prereq 1414, minimum 30 credits or instructor consent; spring, every year)

Atmospheric composition, structure, and motion; precipitation processes, air masses, fronts, cyclonic storms, and general weather patterns. Global distribution and classification of climates.

GEOG 3422. Natural Hazards. (3.0 cr.; A-F only; prereq 1414, minimum 30 credits or instructor consent; spring, every year)

Geography of natural hazards. Human-physical environment interrelationships under extreme geophysical conditions; causes, characteristics, and consequences of natural hazards such as earthquakes, tornadoes, hurricanes, floods, and drought; human adjustment to these events.

GEOG 3461. Geography of Global Resources. (SUSTAIN; 3.0 cr.; A-F only; prereq Minimum 30 credits or instructor consent; spring, every year)

Spatial distribution and uses of global natural resources addressed through models of resource management, focusing on energy, non-fuel minerals, population, food, and technology. Theoretical approach and political perspective applied to trade, international economic development, and environmental issues.

GEOG 3481. Urban Ecology. (3.0 cr.; A-F only; prereq Minimum 30 credits or instructor consent; spring, every year)

Introduction to theoretical, practical and policy aspects of urban ecology. Discusses methods of sustainable cities and ecologically

responsible planning. Includes study of relevant field techniques and policy issues, including public participation in planning process and development of sustainable growth strategies.

GEOG 3532. Map Design and Geographic Visualization. (4.0 cr.; A-F only; prereq 2552 or instructor consent; Stat 1411 recommended; fall, spring, every year)

Thematic mapping of qualitative and quantitative data. Data measurement levels and their relationships to geographic phenomena and map symbols. Appropriate treatment (both statistical and representational) of map data. Designing and creating maps using computers. (2 hrs lect, 4 hrs lab)

GEOG 3712. Geography of Latin America.

(3.0 cr.; A-F only; prereq Minimum 30 credits or instructor consent; spring, every year)

Considers the social, physical and political landscapes of Latin America and the Caribbean before, during and after the European invasion and colonial times. Examines contemporary dynamics in the region from a political ecology perspective.

GEOG 3991. Independent Study in

Geography. (1.0-4.0 cr. [max 6.0 cr.]; A-F only; prereq instructor consent; fall, spring, summer, every year)

For students interested in doing advanced work in selected fields of geography.

GEOG 3995. Special Topics: (Various Titles to be Assigned). (1.0-4.0 cr. [max 8.0 cr.]; A-F only; prereq instructor consent; fall, spring, offered periodically)

Topics in geography of current and special interest to students that are not offered in regular department curriculum. Topics may involve specialties of staff or visiting faculty.

GEOG 3997. Internship in Geography.

(1.0-6.0 cr. [max 8.0 cr.]; prereq Geography major, 60 credits or instructor consent; fall, spring, summer, every year)

Scheduled assignments with direct supervision in public agencies or relevant private firms.

GEOG 4393. Political Geography. (4.0 cr.;

A-F only; prereq Minimum 75 credits including 6 credits Geography or instructor consent; fall, spring, offered periodically)

Survey of political geography past and present. Environmental-political theories, German geopolitics, territoriality, nation-states and nationalism, boundaries and frontiers, jurisdictional organization and reorganization, locational conflicts, electoral geography, locality studies, and urban politics.

GEOG 4446. Water Processes and

Management. (3.0 cr.; A-F only; prereq 1414, no grad credit; spring, every year)

Introduction to the components of surface water processes and water resources management, including precipitation, runoff generation, channel processes, spatial and temporal variations in water distribution, aspects of water quantity and quality, and basin management problems.

GEOG 4451. The Geography of Soils. (4.0 cr.; A-F only; prereq 1414 or Geol 1110 or grad student or instructor consent; fall, every year)

Examines soil formation and processes in varied environments, with emphasis on soil as a dynamic system, integral to all terrestrial ecosystems. Human impact and use of soils is examined with regard to land degradation and soil erosion.

GEOG 4612. Field Techniques. (4.0 cr.; A-F only; prereq Minimum 60 credits or grad student or instructor consent; spring, every year)

Geographic survey of physical and cultural aspects of selected urban and rural landscapes, including basic methods of observation, measurement, recording, analysis, and presentation of field data. Chiefly field training.

GEOG 4803. Geographic Thought. (3.0 cr.; A-F only; prereq 60 credits or grad student or instructor consent; fall, every year)

Development and significance of geographic concepts and thought. History and intellectual roots of contemporary geography, geographers, and geographic institutions.

GEOG 4990. Geography Seminar. (1.0 cr.; A-F only; prereq Geography major and minimum 90 credits; no grad credit, credit will not be granted if already received for Geog 5999.; fall, spring, every year)

Presentation and discussion of current geographic research, including but not limited to human/physical geography, environments and sustainability, urban geography and planning, and GIS applications.

GEOG 4999. Honors Project Geography.

(3.0 cr.; A-F only; prereq minimum 90 credits, approval by department honors program director; no grad credit; fall, spring, every year)

Advanced individual project in any area of Geography, GIScience, Urban and Regional Studies, or Environment and Sustainability demonstrating sound theoretical and research foundations and resulting in a written report.

GEOG 5543. Advanced Cartographic

Methods. (4.0 cr.; A-F only; prereq 3532, Stat 1411, 60 cr incl 12 cr geog or grad student or instructor consent; spring, even years)

Alternative map representations, such as multimedia representations, map animations, and maps for physically challenged individuals. Focuses on cognitive issues concerning map design, such as color perception and symbolization, that enhance map reading and understanding. (2 hrs lect, 4hrs lab)

GEOG 5991. Independent Study in

Geography. (1.0-4.0 cr. [max 6.0 cr.]; A-F only; prereq Maximum 4 credits can be applied to graduate program; instructor consent; fall, spring, summer, every year)

Independent problems for postbaccalaureate students interested in doing additional work in selected fields in geography.

GEOG 5995. Special Topics: (Various Titles to be Assigned). (1.0-4.0 cr. [max 6.0 cr.];

A-F only; prereq Grad student or instructor consent; maximum 8 credits to grad program; fall, spring, summer, offered periodically)

Topics of current and special interest to students that are not offered in regular

curriculum. Topics may involve specialties of staff or visiting faculty.

GEOG 5999. Senior Project in Geography. (3.0-4.0 cr.; A-F only; prereq instructor consent; Maximum 3 credits can be applied to grad program; fall, spring, every year) Student-initiated field, lab, and/or library research topic. Formal written and oral presentation.

Geology (GEOL)

Swenson College of Science and Engineering

GEOL 1040. Freshman Seminar: Topics: (Various Titles to be Assigned). (LE CAT5; 3.0 cr.; A-F or Audit; prereq Freshman, fewer than 30 cr.; fall, spring, offered periodically) Topics of general interest in the geosciences. Topic announced before course is offered.

GEOL 1110. Geology and Earth Systems. (NAT SCI; LE CAT4; SUSTAIN; 4.0 cr.; A-F or Audit; fall, spring, every year) Comprehensive survey of Earth's composition, structure, and dynamics to develop an understanding of internal processes, plate tectonics, and surface processes as a framework for geological history and development of life.

GEOL 1120. Life and Death of the Dinosaurs. (NAT SCI; LE CAT5; 3.0 cr.; A-F or Audit; spring, offered periodically) Survey of dinosaurs, who dominated large-animal life on Earth for 150 million years; theories of dinosaur origins and extinction; habitat of dinosaurs on worldwide Mesozoic coastal plains; dinosaur fossilization and modern excavation.

GEOL 1130. Introduction to Environmental Science. (NAT SCI; LE CAT4; SUSTAIN; LEIP CAT04; 4.0 cr.; A-F or Audit; spring, every year) Earth's physical and biological systems and human interaction with the environment. Climate, rocks, soils, ecosystems, human population, land use, energy use and its consequences, environmental policy, air and water pollution, and conservation issues.

GEOL 1610. Oceanography. (NAT SCI; LE CAT5; SUSTAIN; 3.0 cr.; A-F or Audit; prereq Credit will not be granted if already received for 2610.; fall, every year) Origin and history of ocean basins, sea floor morphology, chemistry of sea water, currents, waves, tides, life in the sea, primary productivity, nutrient dynamics, human impact.

GEOL 2110. Earth History. (4.0 cr.; A-F or Audit; prereq 1110 or 1130 or 2610 or Ast 1040 or Geog 1414 or instructor consent; spring, every year) The historical development of the science of geology, nature of the geologic record, fossils, the geologic time scale, and tectonic evolution of continents and ocean basins. Concepts presented are developed within the framework of the theory of plate tectonics.

GEOL 2120. The Earth's Dynamic Interior. (3.0 cr.; A-F or Audit; prereq 1110 or 1130 or 2110 or 1610 or Geog 1414; fall, every year)

Treatment of the origin, structure and internal composition of the Earth, synthesizing geological, chemical and physical knowledge bearing on the Earth's inaccessible interior. Emphasis is placed on dynamic processes at all depths in the Earth.

GEOL 2311. Mineralogy. (4.0 cr.; A-F or Audit; =[GEOG 2300]; prereq 1110 or 2110, 1 semester college chemistry or instructor consent; fall, every year)

Systematic study of minerals and their relationship to rocks. Emphasis will be placed on introductory crystal chemistry, crystallography and physical properties; optical mineralogy, and identification of minerals in hand specimen, thin section, and by x-ray diffraction. (Course fee assessed.)

GEOL 2312. Petrology. (5.0 cr.; A-F or Audit; prereq 2311; spring, every year)

Petrology of igneous, sedimentary and metamorphic rocks, including their occurrence, petrogenesis and tectonic setting. Emphasis on the relationships between mineral assemblages, rock textures, geochemistry, origins, and rock-forming processes. Course fees assessed.

GEOL 2350. Earth's Resources. (NAT SCI; LE CAT5; LEIP CAT05; 3.0 cr.; A-F or Audit; prereq Minimum 25 credits or instructor consent; fall, every year)

Distribution of Earth's resources through space and time, including metals, minerals, fossil fuels, building materials, water, and soil. Relationships between population growth and Earth's finite resources. (field trip)

GEOL 3000. Geologic Maps. (3.0 cr.; A-F or Audit; prereq 2312; spring, every year)

Principles of reading and interpreting geological maps. Emphasis will be placed on interpreting and visualizing published geologic maps, constructing geologic histories, and an introduction to the basic methods of making geologic maps in the field.

GEOL 3091. Independent Study. (1.0-2.0 cr. [max 4.0 cr.]; prereq instructor consent; fall, spring, summer, every year)

Directed readings and projects on topics not normally covered in other courses.

GEOL 3100. Earth's Climate and Environment: Past and Future. (3.0 cr.; A-F or Audit; prereq 1110 or 1130 or 1610, Chem 1151 or 1153/1154; spring, odd years)

Exploration of the processes that control Earth's climate and affect the environment on timescales of 100's of millions to 10's of years. Discussions will include how and why the dinosaurs environment was different from today's and concerns about future global warming.

GEOL 3180. Teaching Assistant Experience I. (1.0-2.0 cr. [max 6.0 cr.]; S-N only; prereq 2110, 2120, 2311, 2312, geological sciences major, instructor consent (Maximum 2 credits can be applied toward geological sciences major.); fall, spring, every year)

Participation in teaching Geological Sciences lecture and lab courses, including preparation of material, instruction, and student interaction.

GEOL 3210. Geomorphology. (4.0 cr.; A-F or Audit; =[GEOG 2210]; prereq 1110 or 2110, Math 1250 or 1290 or 1296 or 1596 or instructor consent; fall, every year)

Study of Earth surface processes emphasizing the origin and evolution of landforms; response of the physical environment to climatic change and tectonic events, and application of physical, chemical, and mathematical principles to the study and interpretation of landforms.

GEOL 3420. Sedimentology and Stratigraphy. (4.0 cr.; A-F or Audit; prereq 2110, 2311 or instructor consent; fall, every year)

Introduction to the concepts, methods, and application of sedimentology and stratigraphy, including the description and interpretation of sediments and sedimentary rocks, their provenance, stratal packaging, and tectonostratigraphic setting. (Course fee assessed.)

GEOL 3710. Introduction to Geochemistry. (3.0 cr.; A-F or Audit; prereq Math 1296 or equiv, Chem 1152 or instructor consent; spring, offered periodically)

Understanding chemical reactions occurring in geological processes on scales ranging from atomic to global. Geochemistry of the Earth; chemical reactions and stability of minerals; applications of geochemistry to understanding global processes and environmental problems. (3 hrs lect)

GEOL 3800. Principles of Geophysics. (4.0 cr.; A-F or Audit; prereq 2120, MATH 1297, PHYS 1002; fall, every year)

An introduction to the geophysical concepts and techniques used by practicing geoscientists.

GEOL 3996. Field Internship in Geological Sciences. (1.0-2.0 cr. [max 4.0 cr.]; S-N or Audit; prereq 2312; fall, spring, summer, every year)

Credit given for professional field work experience outside an academic department. Requires prior departmental approval and coordination with faculty sponsor.

GEOL 3997. Industrial Internship in Geological Sciences. (1.0-2.0 cr. [max 4.0 cr.]; S-N or Audit; prereq 2312; fall, spring, summer, every year)

Credit given for professional work experience outside an academic department. Requires prior departmental approval and coordination with faculty sponsor.

GEOL 4091. Geologic Problems and Research. (1.0-2.0 cr. [max 4.0 cr.]; A-F or Audit; prereq instructor consent, no grad credit; fall, spring, summer, every year)

Individual research in lab or field problems.

GEOL 4180. Teaching Assistant Experience II. (1.0-2.0 cr. [max 4.0 cr.]; S-N only; prereq Geol core, geological sciences major, instructor consent; max 2 cr can be applied toward geological sciences major; no grad credit; fall, spring, every year)

Participation in teaching Geological Sciences lecture and lab courses, including preparation of material, instruction, and student interaction.

GEOL 4210. Glacial and Quaternary

Geology. (4.0 cr.; A-F or Audit; prereq 3210 or grad student or instructor consent; credit will not be granted if already received for 5210; spring, odd years)

Physics of glacier flow, processes of erosion and deposition, survey of glacial landforms, history and chronology of glaciation. Survey of geological and biological responses to changing environment resulting from climatic fluctuations during last three million years of Earth history. Field studies on the glacial deposits of Minnesota. (2 hrs lect, 2 hrs field lab)

GEOL 4240. Physical Hydrogeology.

(4.0 cr.; A-F or Audit; prereq 2110, Phys 2011 or 2013 and 2014, Math 1296 or Math 1290 or grad student or instructor consent; credit will not be granted if already received for 5240; spring, odd years)

Introduction to concepts of fluid movement in Earth's crust and the interaction of rocks and water. Introduction to the hydrologic cycle, theory of flow through porous media, crustal-scale flow systems, role of fluids in the plate tectonic cycle.

GEOL 4250. Environmental Hydrogeology.

(4.0 cr.; A-F or Audit; prereq Math 1296 or Math 1290 and (Phys 2011 or 2013 and 2014) or grad student or instructor consent; credit will not be granted if already received for 5250; fall, odd years)

A quantitative introduction to hydrogeology and aquifer mechanics with emphasis on environmental applications, including, unsaturated flow, interaction between surface water and groundwater, wellhead protection, well hydraulics, inverse methods, and solute transport. Offered alternate years.

GEOL 4320. Precambrian Geology.

(3.0 cr.; A-F or Audit; prereq 4450 or grad student or instructor consent; credit will not be granted if already received for 5320; fall, odd years) Nature, distribution, origin, correlation, and special problems of the Precambrian, emphasizing Lake Superior region. Term paper. 3 hrs. lect, field trips; offered alternate years.

GEOL 4335. Physical Volcanology.

(3.0 cr.; A-F or Audit; prereq 2312 or grad student or instructor consent; credit will not be granted if already received for 5335; fall, even years) Morphology and development of volcanic formations and deposits, and criteria for their recognition in ancient rock terranes. Types of eruptions and deposits, tectonic environments of volcanism, evolution of volcanoes, physical processes and controls of volcanism, and volcanic hazards. Offered alternate years.

GEOL 4350. Economic Geology.

(4.0 cr.; A-F or Audit; prereq 2312 or grad student or instructor consent; credit will not be granted if already received for 5350; fall, odd years) Geologic description, distribution, and genesis of economic mineral deposits; processes leading to their formation; relationship to plate tectonics; exploration techniques and criteria for finding new deposits. Course fees assessed.

GEOL 4360. Geologic, Geophysical, and Geochemical Methods of Exploration.

(4.0 cr.; A-F or Audit; prereq 4350, Math 1290 or 1296 or instructor consent; spring, even years) Team-taught course will introduce various geologic, geophysical, and geochemical exploration methods used to locate and evaluate the economic viability of metallic ore bodies in a variety of geologic settings. In labs, students will develop skills in ore microscopy, drill core logging, and geophysical field methods. Case studies will be used to highlight various exploration methods and ore deposit types.

GEOL 4450. Structural Geology.

(5.0 cr.; A-F or Audit; prereq 2312 or instructor consent; credit will not be granted if already received for 3520; spring, every year) Introduction to brittle and ductile deformation, including joints, faults, shear zones, and folds; deformation mechanisms; elementary stress and strain theory. Labs include geometric, structural, and kinematic analysis, and a group project. Course fee assessed.

GEOL 4480. Tectonics.

(3.0 cr.; A-F or Audit; prereq 2120, 4450, or grad student or instructor consent; credit will not be granted if already received for 5500; spring, odd years) Ancient and active plate-tectonic processes. Topics include tectonic theory, plate motions, evolution of divergent, convergent and transform margins, anatomy of orogenic belts, and neotectonics. Examines tectonic phenomena in the context of geological, geophysical and surficial processes. Offered alternate years.

GEOL 4500. Field Geology.

(6.0 cr.; A-F or Audit; prereq 4450, department consent; no grad credit; summer, every year) Geological mapping of sedimentary, igneous, and metamorphic terranes and of Quaternary deposits and landforms; topographic maps and aerial photographs, including preparation of geologic maps and cross sections, and map unit descriptions.

GEOL 4550. Tectonic Geomorphology.

(3.0 cr.; A-F or Audit; prereq 3210 or 3420 or Grad student or instructor consent; spring, even years) Consideration of how tectonics interacts with climate to sculpt the landscapes of mountain belts. Conceptual and quantitative modeling of landscape evolution to gain insights into the controls on elevation and relief of orogens. Analysis of topographic data sets to identify the statistical properties of landscapes and identify the signatures of feedback between surface processes and tectonics.

GEOL 4710. Aqueous Geochemistry/ Chemical Hydrogeology.

(4.0 cr.; A-F or Audit; prereq Math 1290 or Math 1297 and Chem 1152 or grad student or instructor consent; credit will not be granted if already received for 5710; fall, even years) Principles of solution chemistry, with application to chemical weathering, acid deposition, rivers, lakes, and oceans. Use of chemical equilibrium software to examine complex real world problems.

GEOL 4815. Exploration Geophysics.

(4.0 cr.; A-F or Audit; prereq 1110, Math 1297 or grad student or instructor consent; credit will not be granted if already received for 4805 or 5810.; fall, odd years) Review of principle geophysical techniques used in the exploration industries. Emphasizes the application of these techniques for solving near-surface problems. Includes review of case histories and group projects.

GEOL 4820. Global Geophysics.

(3.0 cr.; A-F or Audit; prereq 2120, Math 1290 or 1296 or grad student, instructor consent; credit will not be granted if already received for 5820; fall, even years) Build upon material presented in 2120, exploring the contribution of geophysics to our understanding of the Earth and the processes that control its appearance and behavior. Offered alternate years.

GEOL 5091. Geologic Problems.

(1.0-2.0 cr. [max 4.0 cr.]; prereq Graduate Student or instructor consent; fall, spring, summer, every year)

Individual research in lab or field problems.

GEOL 5095. Special Topics: (Various Titles to be Assigned).

(1.0-3.0 cr. [max 12.0 cr.]; A-F or Audit; prereq instructor consent; fall, spring, every year)

Topics not covered in regular curriculum. Topic announced before course offered.

GEOL 5100. Seminar.

(1.0-2.0 cr. [max 4.0 cr.]; prereq instructor consent; fall, spring, offered periodically) Oral and written presentation on topics of current significance to geoscientists. Participation by department staff.

GEOL 5215. Glaciology.

(3.0 cr.; A-F or Audit; prereq 8 credits geology, Math 1290 or Math 1296, (Phys 2011 or 2013 and 2014) or grad student or instructor consent; fall, spring, offered periodically) Theory of glacier flow. Anatomy of glaciers and ice sheets, mechanics and thermodynamics of glacier flow. Reconstruction of physical characteristics of past ice sheets from glacial sediments and landforms. Glacier response to climate change. Offered alternate years

GEOL 5220. Advances in Paleoclimatology.

(3.0 cr.; A-F or Audit; prereq instructor consent; spring, even years) Analysis of past global change from climate proxy records in glacial ice, tree rings, ocean and lake sediments, ocean corals. Impact of ocean and atmospheric circulation on global climate; climate cycles; El Nino; human impact on global climate. Offered alternate years.

GEOL 5251. Well Hydraulics.

(3.0 cr.; A-F or Audit; prereq 2312, (Phys 2011 or 2013 and 2014), (Math 1296 or Math 1290), or grad student or instructor consent; spring, even years) Hydraulics of groundwater flow to wells: equations of flow; analysis of steady and non-steady radial flow; aquifer response to stress; analysis of monitoring well networks, pumping tests, and single-point aquifer performance tests.

GEOL 5260. Fluvial Geomorphology. (4.0 cr.; A-F or Audit; prereq 3210 or 3420, Math 1296, (Phys 2011 or 2013 and 2014) or Grad student status or instructor consent; fall, even years)

Focuses on the physical processes operating in stream channels and watersheds including watershed-scale hydrology and topography in GIS; reach-scale fluid mechanics and sediment transport; and channel patterns, forms, and classification systems. Other topics included will be river history, human alterations to rivers, and river restoration efforts.

GEOL 5310. Advanced Petrology. (3.0 cr.; A-F or Audit; prereq 2312 or grad student; fall, odd years)

Physico-chemical principles applied to origin of igneous and metamorphic rocks. Phase equilibria in important mineral systems. Lab study and interpretation of igneous and metamorphic rocks using petrographic microscope. (2 hrs lect, 2 hrs lab)

GEOL 5321. Theory, Practice of Scanning Electron Microscopy and X-Ray Microanalysis in Lectures. (3.0 cr.; A-F or Audit; prereq Minimum 75 credits, Chem 1152 or 1156, Phys 2012 or 2015 and 2016, or Grad student or instructor consent; spring, every year)

Presents the basic physics of scanning electron microscopy, including electron beam generation, image formation, signal detection, and beam-sample interactions. Basic sample preparation methods for scanning electron microscopy will be presented and demonstrated in laboratory sessions. How characteristic x-rays are produced in a sample and how they are measured and quantified will also be presented. Use of the SEM to collect data and instruction on how to organize collected data in a logical manner.

GEOL 5450. Advanced Structure. (3.0 cr.; A-F or Audit; prereq 2120, 4450, or grad student or instructor consent; fall, even years)

Modern structural analysis: strain (paths, partitioning, history), theology, displacement, deformation processes, (mesoscopic, grainscale, microstructures), and fabric evolution. Application of structural techniques to integrative problems (e.g., tectonics, hydrogeology, and planetary, sedimentary and economic geology). Offered alternate years. Course fee assessed.

GEOL 5730. Geochronology. (3.0 cr.; A-F or Audit; prereq 2311, one year of college chemistry or grad student; spring, even years)

Covers both radiometric and non-radiometric methods of dating primarily Earth but also solar-system materials (meteorites). The chronometers discussed will cover a range of timescales, from early solar-system history to recent human-influenced history. Offered alternate years.

GEOL 5839. Coral Reef Geology. (3.0 cr.; A-F or Audit; =[BIOL 5839]; prereq Junior or senior or grad student in Geology or related field; spring, even years)

Physical, chemical and sedimentary processes in coral reef environments, reef morphology,

stratigraphic framework of modern and ancient reefs, reef type and dependence on basin morphology and tectonic setting, coral reefs and Quaternary sea-level change. Includes field study of reef systems.

GEOL 8094. Geologic Research. (1.0-6.0 cr. ; A-F or Audit; prereq instructor consent; fall, spring, every year)
Individual research.

GEOL 8100. Seminar. (1.0-2.0 cr. [max 6.0 cr.]; S-N or Audit; prereq Graduate geology major or instructor consent; fall, spring, every year)

Oral and written presentations on topics of current significance to geoscientists.

GEOL 8200. Professional Issues in Earth and Environmental Science. (1.0 cr.; S-N or Audit; prereq Graduate student or instructor consent; fall, every year)

Introduces the incoming graduate student in geological sciences to professional practice, standards and ethics, including peer review, proposal writing, ethical problems, the purpose of a university.

GEOL 8333. FTE: Master's. (1.0 cr.; No Grade Associated; prereq Master's student, adviser and DGS consent; fall, spring, summer, every year)
(No description)

GEOL 8444. FTE: Doctoral. (1.0 cr.; No Grade Associated; prereq prereq doctoral student, adviser and DGS consent; fall, spring, summer, every year)
(No description)

GEOL 8666. Doctoral Pre-Thesis Credits. (1.0-6.0 cr. [max 12.0 cr.]; No Grade Associated; prereq Max 6 cr per semester or summer; doctoral student who has not passed prelim oral; no required consent for the first two registrations up to 12 cr; departmental consent for the third and fourth registrations up to an additional 12 cr, or 24 cr total (for doctoral students admitted summer 2007 and beyond; doctoral students admitted prior to summer 2007 may register up to 4 times totaling 60 cr); fall, spring, summer, every year)
(No description)

GEOL 8777. Thesis Credit: Master's. (1.0-18.0 cr. [max 50.0 cr.]; No Grade Associated; prereq Max 18 cr per semester or summer; 10 cr total required (Plan A only); fall, spring, summer, every year)
(No description)

GEOL 8888. Thesis Credits: Doctoral. (1.0-24.0 cr. [max 100.0 cr.]; No Grade Associated; prereq [max 18 cr per semester or summer]; 24 cr required; fall, spring, summer, every year)
(No description)

German (GER)

College of Liberal Arts

GER 1101. Beginning German I. (COMM & LAN; LE CAT3; 4.0 cr.; A-F or Audit; prereq Little or no prior formal study of this language, or instructor consent; fall, every year)

Conversation and communicative course for students with little or no previous study of German. Emphasis on oral and aural skills; some grammar. Taught in German and English.

GER 1102. Beginning German II. (COMM & LAN; LE CAT3; 4.0 cr.; A-F or Audit; prereq 1-2 years high school german or 1101 or instructor consent; spring, every year)

Conversation and communicative course for students with limited previous study of German. Emphasis on oral and aural skills; some grammar. Taught in German and English.

GER 1201. Intermediate German I. (COMM & LAN; LE CAT3; 4.0 cr.; A-F or Audit; prereq 3-4 years high school german or 1102 or instructor consent; fall, every year)

Consolidation and enrichment of previously acquired abilities speaking and understanding German, set within introduction to written German and survey of contemporary culture of German-speaking societies. Emphasis on oral, aural, and reading skills; vocabulary building; some writing. Taught in German.

GER 1202. Intermediate German II. (COMM & LAN; LE CAT3; LEIP CAT03; 4.0 cr.; A-F or Audit; prereq 4 years high school german or 1201 or instructor consent; spring, every year)
Consolidation and enrichment of previously acquired abilities speaking and understanding German, set within introduction to written German and survey of contemporary culture of German-speaking societies. Emphasis on oral, aural, and reading skills; vocabulary building; some writing. Taught in German.

GER 2040. Berlin: Myth, Legend and Reality. (HUMANITIES; LE CAT8; LEIP CAT08; 3.0 cr.; A-F or Audit; summer, even years)
Analysis of Berlin the metropolis from the turn of the 20th century to today, through films, music, texts and essays, to determine where myth, legend, and reality merge and separate, and to comprehend the importance of Berlin in German and European historical, political and social developments. Taught in English.

GER 2301. Advanced German. (COMM & LAN; LE CAT3; LEIP CAT03; 4.0 cr.; A-F or Audit; prereq 5 years high school german or 1202 or instructor consent; fall, every year)
Development of German literacy within a culturally authentic contemporary context. Emphasis on practical writing and formal oral and aural communication skills; vocabulary building; enhancement of reading skills; review of key grammar. Taught in German.

GER 2315. German Film: History and Analysis. (FINE ARTS; LE CAT9; INTL PERSP; 4.0 cr.; A-F or Audit; summer, every year)
Introduction to important films produced by German, Austrian and Swiss filmmakers and the art of film analysis, and to the relationship between film, society and culture. Taught in English.

GER 2402. Germany Today. (HUMANITIES; LE CAT8; LEIP CAT08; 3.0 cr.; A-F or Audit; fall, spring, offered periodically)
Survey of culture, politics, and society of Germany and German-speaking countries,

beginning with post World War II era and emphasizing the European Union's emergence and Germany's role in contemporary Eastern Europe. Taught in English.

GER 2500. German Business Culture. (COMM & LAN; 4.0 cr.; A-F or Audit; prereq 1102 or an equivalent level of competency; fall, even years)

In this course we will develop a wide set of skills related to doing business in German and in German speaking-countries. At the beginning of the course, students can expect to learn a set of basis skills necessary for everyday business communication, such as business letter composition and writing a German resume. By the end of the course, we will have dealt with a broad set of larger topics that require both an understanding of the language and an understanding of the cultural conditions that influence the way business is conducted in Germany, Switzerland and Austria. Taught in German.

GER 3031. German Language Study Abroad I. (1.0-5.0 cr. [max 10.0 cr.]; prereq department consent; fall, spring, summer, offered periodically)

For students pursuing formal study of German, beyond the beginning and intermediate levels, in a German-speaking country, under the auspices of another college or university or by individual agreement.

GER 3032. German Language Study Abroad II. (1.0-5.0 cr. [max 10.0 cr.]; prereq department consent; fall, spring, summer, offered periodically)

For students pursuing formal study of German, beyond the beginning and intermediate levels, in a German-speaking country, under the auspices of another college or university or by individual agreement.

GER 3040. Culture of Germany Studied in Germany. (4.0 cr.; A-F or Audit; prereq 1202 or instructor consent; summer, every year) Study of German culture, both contemporary and past as it informs the present, on site in Germany. Conducted entirely in German, and all language skills will be inculcated and improved. Format will include seminar, discussions, field trips, and small group projects

GER 3045. German Culture and Civilization Study Abroad I. (1.0-5.0 cr. [max 10.0 cr.]; prereq department consent; fall, spring, summer, offered periodically)

For students pursuing formal study of German culture and civilization, beyond the beginning and intermediate levels, in a German-speaking country, under the auspices of another college or university or by individual agreement.

GER 3046. German Culture and Civilization Study Abroad II. (1.0-5.0 cr. [max 10.0 cr.]; prereq department consent; fall, spring, summer, offered periodically)

For students pursuing formal study of German culture and civilization, beyond the beginning and intermediate levels, in a German-speaking country, under the auspices of another college or university or by individual agreement.

GER 3047. German Culture and Civilization Study Abroad III. (1.0-5.0 cr. [max 10.0 cr.]; prereq department consent; fall, spring, summer, offered periodically)

For students pursuing formal study of German culture and civilization, beyond the beginning and intermediate levels, in a German-speaking country, under the auspices of another college or university or by individual agreement.

GER 3048. German Culture and Civilization Study Abroad IV. (1.0-5.0 cr. [max 10.0 cr.]; prereq department approval; fall, spring, summer, offered periodically)

For students pursuing formal study of German culture and civilization, beyond the beginning and intermediate levels, in a German-speaking country, under the auspices of another college or university or by individual agreement.

GER 3302. Advanced Composition and Conversation. (COMM & LAN; 4.0 cr.; A-F or Audit; prereq 2301; spring, every year)

Refines students' skills in oral and written expression after they have completed the German language sequence. Individualized work on points of syntax and semantics, set in a contemporary context, using a variety of texts and resources.

GER 3401. Introduction to Literary Studies. (HUMANITIES; 4.0 cr.; A-F or Audit; prereq 2301 or instructor consent; fall, spring, offered periodically)

Techniques and tools for understanding and writing about German poetry, fiction, and drama both as literary texts and as cultural testimony. Emphasis on class discussion and writing critical essays in German. Taught in German.

GER 3403. Page and Stage: German Theater and Performance. (FINE ARTS; 4.0 cr.; A-F or Audit; prereq 2301 with a grade of C or higher or instructor consent; fall, spring, every year)

Introduction to basic theories of drama and performance, survey of major German dramatists and current stage practices in Germany. Emphasis on class discussion and interpretive reading in German, with critical essays in German. Taught in German.

GER 3591. Independent Study. (1.0-4.0 cr. [max 8.0 cr.]; A-F or Audit; prereq 2301 with a grade of C or higher or equivalent or instructor consent; fall, spring, summer, every year) Students develop and carry out reading and research programs in consultation with the instructor.

GER 3601. German Studies I: Migration and Mythology: Revolt and Revolution. (HUMANITIES; 4.0 cr.; A-F or Audit; prereq 2301 with a grade of C or instructor consent; fall, odd years)

Introduces students to Germanic history, culture and literature from 3rd century until 1848. Taught in German.

GER 3602. German Studies II: Revolution, Fascism, New World Order: Germany 19th, 20th, and 21st Centuries. (HUMANITIES; 4.0 cr.; A-F or Audit; prereq 2301 with a grade of C or higher or instructor consent; spring, even years)

Introduces students to Germanic history, culture, and literature from the mid-19th to the mid 20th century. It is taught in German. Topics may include: Germany as a nation state; Adolf Hitler's rise to power; the Weimar Republic; Body culture; exile(s) and exile literature during and after the Third Reich; the city as metropolis; women's movements and women's rights; socialist movements and the beginning of the welfare state; mass culture; the industrial revolution and its influence on humankind; Education and education reforms; (N)Ostalgia, Wendeliteratur; terrorism; the establishment and influence of green party politics.

GER 4095. Special Topics: (Various Titles to be Assigned). (1.0-4.0 cr. [max 8.0 cr.]; A-F or Audit; prereq 2301 with a grade of C or higher or instructor consent; fall, spring, summer, offered periodically)

Various topics in the language history and structure, literature, and culture of the German-speaking countries.

GER 4302. German Women Writers and Filmmakers. (HUMANITIES; 4.0 cr.; A-F or Audit; prereq 2301 or instructor consent; no grad credit; fall, spring, offered periodically) Analysis of German written and visual texts and exploration of women's oppression within repressive political systems as well as Western democracies; women's exploration of their selves; and the question of whether there is a "female writing". Conducted in German.

GER 4305. German Cinema. (HUMANITIES; 4.0 cr.; A-F or Audit; prereq 2301 with a grade of C or higher or instructor consent; no grad credit; fall, spring, every year)

An introduction to the history of German cinema and to film analysis with a focus on the relationship among German film, history, literature, culture, and politics. The course will examine representative works from various cinematic periods. Taught in German.

GER 4404. Contemporary Germany. (HUMANITIES; GLOBAL PER; 4.0 cr.; A-F or Audit; prereq 2301 with a grade of C or higher or equivalent or instructor consent; no grad credit; fall, spring, every year) Civilization, culture, and politics of Germany and German-speaking countries since 1945. Research term paper in German.

GER 4502. German Modernisms: From Vienna to Berlin. (HUMANITIES; 4.0 cr.; A-F only; prereq 2301 with a grade of C or higher or instructor consent, no grad credit; fall, even years)

Focuses on the literature and culture of the two major centers in German modernisms: fin de siècle Vienna and Weimar Berlin. Both cities were the site of intellectual and aesthetic upheavals that challenged traditional notions of the subject, representation, class, gender, and technology. Examines major thinkers, writers, artists, and movements in German speaking areas between 1890 and 1933. Taught in German.

GER 4591. Independent Study. (1.0-4.0 cr. [max 8.0 cr.]; A-F or Audit; prereq 2301 with a grade of C or better and instructor consent; fall, offered periodically)

Students develop and carry out reading and research programs in consultation with the instructor.

Graduate School (GRAD)

Academic Administration

GRAD 999. Graduate School Active Status.

(0.0 cr.; No Grade Associated; prereq Grad Students Only; fall, spring, summer, every year)

A zero-credit registration mechanism for Grad School students who must register solely to meet the Grad School's registration requirement. Registration requirements established by departments and agencies within or outside the University (which include, but are not restricted to registration required to hold an assistantship, athletic eligibility, maintain legal visa status or defer loans) are NOT met by Grad 0999.

Health (HLTH)

College of Education and Human Service Professions

HLTH 1100. Health and Wellness Strategies for Life.

(LE CAT8; 3.0 cr.; A-F or Audit; =[HLTH 1000]; fall, spring, summer, every year)

A lecture series introducing students to health and wellness encompassing nutritional, physical, emotional and spiritual aspects of health and well-being with emphasis on behavioral, environmental and social influences on developing a satisfying and productive lifestyle in our society.

HLTH 1104. Health Science Terminology.

(1.0-3.0 cr. ; A-F or Audit; fall, spring, summer, every year)

Terms commonly used in health sciences and medical professions; emphasis on word structure.

HLTH 1470. Human Nutrition.

(NAT SCI; LE CAT5; 3.0 cr.; A-F or Audit; fall, spring, summer, every year)

Emphasis on chemical nature of dietary nutrients, physiological and metabolic aspects of human nutrition, effects of diet on human health, and global issues in health and nutrition.

HLTH 1600. Basic First Aid and CPR.

(2.0 cr.; A-F or Audit; fall, spring, every year) Basic skills and knowledge to respond correctly in first aid emergencies. Leads to American Red Cross Certification basic first aid and CPR certification.

HLTH 1650. CPR/AED for the Professional Rescuer.

(1.0 cr.; A-F or Audit; fall, spring, every year)

Techniques of cardiopulmonary resuscitation involving one and two rescuers. Leads to American Red Cross certification for infant/child/adult CPR and AED.

HLTH 1700. First Responder.

(3.0 cr.; A-F or Audit; fall, spring, every year) Principles of emergency response and accident prevention in the home and community. Leads to Red Cross first emergency responder certification.

HLTH 2030. Applied Human Anatomy. (4.0 cr.; A-F or Audit; prereq Athletic training, health education or physical education or exercise science or recreation major or candidate, [Biol 1001 or Biol 1011] and [Chem 1102 or Chem 1113]; credit will not be granted if already received for Biol 1761; fall, spring, summer, every year)

Study of the structure and function of the human body covering the cells and tissues of the integumentary, skeletal, muscular, nervous, circulatory, respiratory, digestive, urinary, and reproductive systems. Laboratory experiences employ videos, models, skeletons, and pre-dissected human prosections. Intended for athletic training, exercise science, health education and physical education majors as well as other health related professions.

HLTH 2040. Human Physiology.

(4.0 cr.; A-F or Audit; prereq Minimum 30 credits, BIOL 1001 or 1011; one semester college chemistry or instructor consent; fall, spring, summer, every year)

Physiological mechanisms of cells, organs, and organ systems; function, control, and coordination of body systems.

HLTH 3101. Community Health.

(3.0 cr.; A-F or Audit; prereq Minimum 30 credits; fall, spring, summer, every year)

Health promotion and disease prevention at local, state, and national levels. Comparison between health problems of individuals and those of groups. Analysis of functions and roles of voluntary and official agencies. Exploration of community-based programs.

HLTH 3115. Consumer Health Education.

(3.0 cr.; A-F or Audit; prereq Minimum 30 credits; fall, spring, every year) Overview of concepts of marketing, analysis, selection, and decision making regarding health care, products, services, and providers.

HLTH 3116. Principles of Epidemiology and Human Disease.

(3.0 cr.; A-F or Audit; prereq Minimum 45 credits; spring, offered periodically) Discussion of diseases and distribution among people. Topics include epidemiological concepts of how diseases are transmitted, surveillance and outbreak investigations, and prevention to eliminate diseases in the community. Vital statistics and methods of tabular-graphical data will be explored.

HLTH 3117. Principles of Sex Education.

(3.0 cr.; A-F or Audit; prereq Health Education major, minimum 45 credits or instructor consent; spring, every year) Planning and implementing comprehensive sex education programs in various settings. Sexual physiology, sociocultural aspects of sexuality, birth control, prevention of STDs/HIV, teen pregnancy, and other current topics. How community and family values affect sex education.

HLTH 3118. Women's Health Issues.

(3.0 cr.; A-F or Audit; prereq Minimum 30 credits; fall, spring, every year) Survey of American women's health issues. Role of women as patients and as health care

providers. Language, politics, and economics of women's health care. Comparison of American women's health status to that of women around the world.

HLTH 3161. School Health Programs Early Childhood Education.

(2.0 cr.; A-F or Audit; prereq EIED 1010, minimum of 45 credits, ECh cand major; fall, spring, summer, every year) Survey of school health programs with in-depth study of selected health education curricula and topic areas, including alcohol, tobacco, drugs, communicable disease, and nutrition. Development of strategies and methods for teaching controversial areas.

HLTH 3202. Drug Education.

(2.0 cr.; A-F or Audit; prereq 45 credits, for students seeking and admitted to the STEP (Secondary Teaching Education program), major in health education, physical education, exercise science and communication sciences and disorders or instructor consent.; fall, spring, summer, every year)

Physiological and psychological effects of alcohol, tobacco, and other drugs. Survey of societal causes and effects of drug use and abuse. Reasons and pressures for drug use by students. Appraisal and assessment of teacher's role in education, intervention, and treatment of drug abuse.

HLTH 3300. Technology, Design and Communication Applications in Health Education and Promotion.

(4.0 cr.; A-F or Audit; prereq minimum 30 credits; Health Ed major, pre or concurrent registration in 3301 or instructor consent; fall, every year) Technology applications for health educators in community settings. Develops basic, intermediate, and advanced skills in software, web, and other current technologies used in developing effective health education interventions.

HLTH 3301. Foundations of Health Education and Promotion.

(3.0 cr.; A-F or Audit; prereq 1100 and [(pre-or concurrent registration in 3300 and Health Education Community concentration majors) or Health Education School concentration major or Health Education minor]or instructor consent; fall, spring, every year) Health, philosophy, and theories of health education and promotion; introduction to the profession, professional organizations and literature. Responsibilities and competencies of health educators in various settings. Ethical issues, current and future trends in health education and promotion.

HLTH 3302. School Health Education Methods and Materials.

(3.0 cr.; A-F or Audit; prereq 3301, Health Education major with school concentration or instructor consent; spring, every year) Coordinated school health programming with a focus on comprehensive school health education for grades 5-12. Methods, strategies, and materials for effective teaching. Determining students needs and interest, selecting content, planning curriculum, stating objective, developing learning opportunities, and evaluating student learning.

HLTH 3303. Health Education and

Promotion Program. (3.0 cr.; A-F or Audit; =[HLTH 3450]; prereq Concurrent registration is required (or allowed) in 3301, Health Educ major or minor or instructor consent; fall, spring, every year)

Introduction to planning models used in health education/promotion programming. Provides knowledge and skills necessary to assess, plan, and implement health education/promotion programs for multi-age populations. Includes needs assessment, community analysis and organization, program design, and implementation.

HLTH 3305. Community Health Methods and Strategies.

(4.0 cr.; A-F or Audit; prereq 3300, 3303, Health Ed major with Community concentration or instructor consent; spring, every year)
Theory, methods and practice of community health education. Includes identification and prioritization of community health problems with emphasis on development and implementation of strategies to address these problems. Students will test these strategies within community and school settings.

HLTH 3307. Conducting and Managing Worksite Health Promotion Programs.

(3.0 cr.; A-F or Audit; prereq 3303, Health Education major or minor or Exercise Science major or instructor consent; spring, every year)
How to design, implement, and evaluate worksite and employee health promotion programs. Exploration of current theories and practical application. Focus on employee needs assessment and risk appraisal, worksite health culture development, effective intervention planning, program evaluation and financial cost and benefits.

HLTH 3341. Encountering Death and Grief: A Cross-Cultural Journey.

(CDIVERSITY; 3.0 cr.; A-F or Audit; prereq credit will not be granted if already received for 5341; spring, offered periodically)
Grief, loss, death, dying, and bereavement in our society as understood by children, adolescents, and adults. Review of research and current literature; education program planning strategies for individuals associated with schools, agencies, organizations, or worksites.

HLTH 3400. Facilitating Healthy Lifestyle Change.

(3.0 cr.; A-F or Audit; prereq 3301, Health Education major or minor or instructor consent; fall, every year)
Facilitate health behavior change for individuals and small groups. Emphasis on theories and principles of behavior change, health counseling ethics, interpersonal skills, and records management. Includes assessing, planning, implementing, and evaluating behavior change processes.

HLTH 3500. Environmental Health. (3.0 cr.; A-F or Audit; prereq Health Education major, minimum 60 credits or instructor consent; fall, every year)

Biological, ecological, and physiological aspects of the environment; concurrent effects on health of the community; and possible solutions to environmental problems.

HLTH 3991. Independent Study. (1.0-6.0 cr. ; A-F or Audit; prereq instructor consent; fall, spring, every year)

Opportunity for upper-division students to undertake an independent project that would serve to further their knowledge base and/or professional competencies.

HLTH 3992. Readings in Health. (1.0-4.0 cr. ; A-F or Audit; prereq instructor consent; fall, spring, every year)

Special complementary work and investigation in undergraduate student's field of interest; survey of literature and resources available to health educators.

HLTH 4000. Professional Issues for Health Educators. (4.0 cr.; A-F or Audit; prereq 3305, Health Education major or instructor consent, no grad credit; fall, every year)

Application of advanced skills/competencies. Identifying controversial issues, developing life/work balance and job seeking skills with electronic portfolio, professional networking, beginning grant writing, and preparing for Certified Health Education Specialist (CHES) exam. Students will spend 40 hour minimum in community.

HLTH 4100. Historical Perspectives of Community Health Through Culture & Art in Italy.

(GLOBAL PER; 3.0 cr.; A-F or Audit; prereq minimum 30 credits and instruction consent; no grad credit; summer, every year)
Investigating the foundations of public and community health using primary historical sites in the area now unified as Italy. Analyze the impact of social and cultural factors on community health from early civilizations through the Renaissance, with emphasis of effects of the Black Death. Examine the role of arts used to convey health information for non-literate populations. Relate to aspects of preventative health care and promoting healthy communities in the present.

HLTH 4105. Obesity: Causes and Intervention.

(3.0 cr.; A-F or Audit; prereq 1470, minimum 60 credits or instructor consent; no grad credit; spring, every year)
Obesity is a common, serious and costly health risk in the US, making it the focus of many public health programs. This course reviews the etiology of obesity and explores the behavioral, social and political aspects of obesity interventions. The associated health risks of obesity will be examined especially the impacts of these on children and youth. Special emphasis is placed on community, school and work place interventions.

HLTH 4996. Internship in Health Education.

(1.0-15.0 cr. ; S-N or Audit; prereq health education major, instructor consent; no grad credit; fall, spring, summer, every year)
Supervised entry-level health education practical experience in hospital, worksite, voluntary, or official agencies. Number of settings is limited to two.

HLTH 5100. Historical Perspectives of Community Health Through Culture & Art in Italy.

(3.0 cr.; A-F or Audit; prereq minimum 30 credits and instructor consent; summer, every year)

Investigating the foundations of public and community health using primary historical sites in the area now unified as Italy. Analyze the impact of social and cultural factors on community health from early civilizations through the Renaissance, with emphasis of effects of the Black Death. Examine the role of arts used to convey health information for non-literate populations. Relate to aspects of preventative health care and promoting healthy communities in the present.

HLTH 5990. Special Topics: (Various Titles to be Assigned).

(1.0-3.0 cr. [max 6.0 cr.]; A-F or Audit; prereq instructor consent; fall, spring, summer, offered periodically)

Opportunity for upper-division and graduate students to explore current issues. Various health-related problem areas; emphasis on facilitating positive attitudinal and behavioral changes within students/clients.

HLTH 5991. Independent Study. (1.0-6.0 cr. ; A-F or Audit; prereq instructor consent, non-degree seeking or grad student; maximum of 6 credits can be applied toward degree; fall, spring, every year)

Directed independent study, readings, research, or projects in a particular area of interest. Degree program plan and project proposal should be approved before course is taken by graduate students.

HLTH 5992. Readings in Health. (1.0-4.0 cr. ; A-F or Audit; prereq instructor consent; fall, spring, every year)

Special complementary readings and discussion in advanced or graduate student's field of interest in health and health education.

Health Care Management (HCM)

Labovitz School of Business and Economics

HCM 4510. Medical Sociology. (3.0 cr.;

A-F only; prereq LSBE candidate or college consent, no grad credit; spring, odd years)
Introduction to common theoretical and empirical approaches used by sociologists to study health and illness. Social inequalities in health and illness and the social processes that shape these experiences are the themes of the course.

HCM 4520. Health Care Organization and Management. (3.0 cr.; A-F only; prereq LSBE candidate or college consent, MgtS 3401 preferred but not required, no grad credit; fall, spring, every year)

Studies the organizational structures, types of governance and management issues of the American health care system.

HCM 4530. Legal Aspects of and Ethics in Health Care. (3.0 cr.; A-F only; prereq LSBE candidate or college consent, no grad credit; fall, every year)

Introduction to the legal and ethical environment of health services administration and offers a current and historical overview of legal regulation of the health care industry.

HCM 4550. Health Care Finance. (3.0 cr.; A-F only; prereq 4520, FMIS 3601, LSBE candidate or college consent, no grad credit; spring, even years)

Covers finance issues related to healthcare organizations. Topics include: reimbursement analysis, understanding the nature of costs, uncertainty, forecasting, service line profitability analysis, and preparation of operating and capital budgets.

HCM 4560. International Comparisons of Health Care Systems. (3.0 cr.; A-F only; prereq LSBE candidate or college consent, no grad credit; spring, even years)

Explores various health care systems offered around the world by evaluating their characteristics, issues and reforms.

HCM 4570. Health Care Quality

Management. (3.0 cr.; A-F only; prereq 4520, LSBE candidate or college consent; no grad credit; fall, spring, every year)

Covers basic principles of quality and patient safety measurement and improvement in health care. Methods for measuring health outcomes and satisfaction as well as regulatory and accreditation requirements affecting quality of care in hospitals, nursing homes, and other areas of healthcare will be discussed.

HCM 4580. Health Services Research

Methods. (3.0 cr.; A-F or Audit; prereq 4520 or instructor consent, no grad credit; fall, every year)

Introduction to the methods used in health services research. Topics include: types of research, conceptualizing research, foundations of health services research, research ethics, study design, validity, qualitative and quantitative methodologies, major data sets in health services research, data analysis, applying research finds, and presenting findings.

HCM 4591. Independent Study. (1.0-3.0 cr. ; A-F only; prereq LSBE candidate, instructor consent, no grad credit; fall, spring, summer, every year)

Special work in health care management that extends beyond or in greater depth than regular course offerings.

HCM 4595. Special Topics: (Various Titles to be Assigned). (1.0-3.0 cr. [max 9.0 cr.]; A-F only; prereq LSBE candidate or department consent, 4520 or instructor consent, no grad credit; spring, every year)

Specific health care management problems, issues, and approaches.

HCM 4597. Internship. (3.0 cr.; A-F only; prereq LSBE candidate, consent of program director or internship director, no grad credit; fall, spring, summer, every year)

Work-integrated learning program providing practical experiences within the health services industry. Students participate in approved program within cooperating businesses, governmental agencies, or civic organizations. Requires a minimum of 200 hours of work experience, assigned written reports, and performance evaluations.

Health, Physical Education and Recreation (HPER)

College of Education and Human Service Professions

HPER 3000. Organization and Administration of Health, Physical Education, and Recreation. (3.0 cr.; A-F or Audit; prereq Major in Health Education or Exercise Science or Physical Education or Recreation or instructor consent; spring, every year)

Theoretical and practical basis of administrative process and organizational structure of HPER programs.

HPER 3100. Risk Management. (2.0 cr.; A-F or Audit; prereq Major in Exercise Science or Recreation or instructor consent; fall, spring, every year)

Proactive approach to managing risks associated with conducting health, physical education, and recreation programs. Emphasis on planning for a safe environment.

HPER 3200. Research and Evaluation in Health Science. (3.0 cr.; A-F or Audit; prereq Minimum 60 credits, Health education major or minor or recreation/outdoor education major or minor or instructor consent; fall, spring, every year)

Exploration of the principles of investigation and evaluation in the health and human service professions with emphasis on methods, data analysis and presentation, and evaluation reports. Basic background information for scientific inquiry and use of evaluative data in health and human service programs.

HPER 3300. Health and Physical Education in the Elementary School. (3.0 cr.; A-F or Audit; prereq EIED Major; fall, spring, summer, every year)

Developing health and physical education programs for the elementary school classroom teacher. Emphasis on planning appropriate health and physical education lessons and teaching developmental movement experiences.

HPER 4999. Senior Project. (3.0-12.0 cr. ; S-N or Audit; prereq Hlth Educ or PE or REC or Ex Science candidate, minimum 90 credits, instructor consent; fall, spring, every year)

Selection and completion of a project approved and supervised by faculty.

History (HIST)

College of Liberal Arts

HIST 1027. Introduction to Islam.

(HUMANITIES; LE CAT7; LEIP CAT07; 3.0 cr.; A-F or Audit; summer, every year)

This course is an introduction to Islam delivered fully online through MOODLE. It starts with the history of the pre-Islamic Middle East, the life of the Prophet Muhammad; and the emergence of Islam. It follows the survey of the Qur'an and Traditions; the tenets of the faith, sectarian differences; gender and the family, and Islam's encounter with the Occident.

HIST 1207. Dawn of Modern Europe.

(HUMANITIES; LE CAT7; 3.0 cr.; A-F or Audit; fall, spring, every year)

Early history of the modern era: Renaissance, Reformation, Age of Reason, French Revolution and its impact, Napoleonic era.

HIST 1208. Europe in the Modern Age.

(HUMANITIES; LE CAT7; 3.0 cr.; A-F or Audit; fall, spring, every year)

Making of modern Europe; analysis of economic and technological revolution, collision of ideologies, imperialist expansion, revolutions, and wars.

HIST 1304. US History Part I: 1607-1877.

(HUMANITIES; LE CAT7; 3.0 cr.; A-F or Audit; fall, spring, every year)

Evolution of the United States from colonial origins into a modern nation. Frontier and agrarian heritage, constitutional development, emergence of modern U.S. political system, expansion of democracy, and cultural diversity. Colonial period to 1877.

HIST 1305. US History Part II: 1865-Present.

(HUMANITIES; LE CAT7; 3.0 cr.; A-F or Audit; fall, spring, every year)

Historical roots of major challenges facing Americans today: global responsibility as a world power; the quest for political, economic, and social justice; and community and family changes in modern society; 1877 to present.

HIST 1400. Modern World History from 1500 to present. (HUMANITIES; LE CAT7; LEIP CAT07; 3.0 cr.; A-F or Audit; fall, summer, odd years)

This course surveys the evolution of the world from relatively isolated regions around 1500 to the global interdependence whose trends continues to the present day. This course will examine the emergence of the interdependence among major civilizations, especially between the West and the East. This latest interaction was initiated by the European colonizations and sustained by the contributions of other civilizations. Major themes of the course include the social, cultural, political, economic, demographic, and environmental ramifications of the global interaction.

HIST 2025. Greece in History and Memory: The Mystery of the East and the Making of the West - Abroad. (3.0 cr.; A-F or Audit; prereq Consent from the UMD International Education Office.; summer, odd years)

Taught on site in Greece. Examine the history of ancient Greece and how the image of Greece affected Western Europe through the Renaissance and Enlightenment.

HIST 2030. China: An Ancient Civilization.

(3.0 cr.; A-F or Audit; =[FORS 2030]; prereq Admission to an approved study abroad program requires consent from the International Education Office.; summer, every year)

Taught on site in China. This course is an introduction to Chinese culture for students who are interested in but have little knowledge of ancient Chinese history. It will introduce Confucianism, Buddhism, Daoism, and other schools of thought. It will also introduce topics such as gender relations, Chinese medicine, food, and the martial arts. It will prepare students for other courses in Chinese history.

HIST 2095. Special Topics in History

(Various Titles to be Assigned). (1.0-4.0 cr.

[max 8.0 cr.]; A-F or Audit; fall, spring, summer, offered periodically)

Special Topics in History to be assigned.

HIST 2325. Muslim Societies. (LE CAT7; LEIP CAT07; 4.0 cr.; A-F or Audit; prereq credit will not be granted if already received for HIST 2525; fall, every year)

This course will be delivered partially online through MOODLE. Muslim Societies is an introduction to the cultural and religious bases of the societies in which Islam is the predominant faith. It covers Islamic origins; the career of Muhammad; beliefs; observances; and religious and socio-political issues of the present day.

HIST 2345. Science and Society: 1500 to Present. (HUMANITIES; LE CAT7; 3.0 cr.; A-F or Audit; prereq credit will not be granted if already received for HIST 2245; spring, offered periodically)

Explores a series of creative moments in development of science and scientific methods within their broader social and cultural contexts.

HIST 2355. United States Military History. (LE CAT7; 3.0 cr.; A-F or Audit; fall, spring, offered periodically)

Explore the history of the United States military from the colonial era to the present in the context of broader patterns of American history.

HIST 2357. Women in American History. (LE CAT7; LECD CAT07; 3.0 cr.; A-F or Audit; fall, spring, every year)

Roles and contributions of women in American life from colonial period to present.

HIST 2365. Russia in the 20th Century. (GLOBAL PER; LE CAT7; LEIP CAT07; 3.0 cr.; A-F or Audit; prereq credit will not be granted if already received for HIST 2265; fall, every year)

Revolutions of 1917, the Soviet period, collapse of the Soviet Union and evolution of Soviet successor states; 1900 to present.

HIST 2405. History of Chinese Culture. (3.0 cr.; A-F or Audit; fall, summer, offered periodically)

This course examines the history of Chinese culture from the beginning of Chinese civilization, ca. 16th century BCE to the Republican period (1912 - 1949). Through a perspective of history, the course seeks to provide students with some basic knowledge of major Chinese cultures in a variety of fields, from philosophy, law, calligraphy, civil examination to gender, architect, art, medicine, and marital arts. It also intends to teach students the origin, development, and end of certain cultures or practices in the course of China's long history and their impacts on neighboring countries such as Korea, Japan, and Vietnam.

HIST 2410. Modern China, Japan, Koreas, Vietnam and East Asia. (3.0 cr.; A-F or Audit; fall, summer, offered periodically)

This course is an introductory study to the history of major East Asian countries such as China, Japan, and Korea. It intends to examine the political, cultural, legal, diplomatic, religious, military history in this region and

the interactions among themselves. But, in the modern period, with the heavy influence of the West, the history of East Asia is not longer restricted in East Asia, it has become an integral part of the world history. Therefore, the course seeks to explore the western influence on East Asia and East Asian countries; responses to the West.

HIST 2515. Precolonial Africa. (HUMANITIES; LE CAT7; LECD CAT07; 3.0 cr.; A-F or Audit; fall, summer, every year)

Political, cultural, and socioeconomic developments in precolonial Africa to 1800. Emphasis on slave trade, Islamic revolution, and European commercial penetration.

HIST 3035. From Alexander to Mohammad. (3.0 cr.; A-F or Audit; prereq Credit will not be granted if already received for HIST 3335 or HmCI 3335; fall, spring, offered periodically) Social and cultural analysis of the impact Alexander the Great had on eastern Mediterranean development between 323 B.C. and 631 A.D. Alexander and his world, the formation of its three great religions, and the Alexandrian legacy of his achievement.

HIST 3038. History of Christianity: Origins to 1054. (3.0 cr.; A-F or Audit; prereq credit will not be granted if already received for HIST 3238; spring, every year)

Examination of the historical (social, cultural, intellectual, and political) development of the Christian religion from the first century to the schism of 1054, with particular consideration of Eastern Christianity.

HIST 3055. The Ancient Near East. (3.0 cr.; A-F or Audit; prereq Minimum 30 credits; credit will not be granted if already received for HmCI 3055 or CSt 3055; fall, spring, offered periodically)

History of Ancient Near East from birth of civilization in Egypt and Mesopotamia (c. 3100 B.C.) to arrival of Alexander (330 B.C.). Review of the ancient cultures of Egypt, Babylonia, Assyria, the Hittites, Persia, Syria, and Palestine.

HIST 3091. Directed Readings in History. (1.0-4.0 cr. [max 16.0 cr.]; A-F or Audit; prereq instructor consent; fall, spring, summer, every year)

By arrangement in the department: individual study of material below the research level or formal study of history at an accredited institution abroad.

HIST 3095. Special Topics: (Various Titles to be Assigned). (3.0 cr. [max 15.0 cr.]; A-F or Audit; fall, spring, summer, offered periodically) Special topics in history.

HIST 3097. Internship in History. (1.0-3.0 cr. [max 6.0 cr.]; A-F or Audit; prereq 60 credits, instructor consent; fall, spring, summer, every year)

Supervised opportunity to pursue local or regional history under auspices of local museums, historical societies, commemorative commissions. Written and oral presentation of completed project.

HIST 3099. Practicum in Teaching History. (3.0 cr. [max 6.0 cr.]; A-F or Audit; prereq

History major, completion of 20 credits of 2xxx and above history courses with GPS of 3.3, completion of 90 credits, instructor consent; fall, spring, offered periodically)

Assisting in teaching a 1xxx- or 2xxx-level history course; experience preparing course materials, advising students in learning about the grading process; experience in lecturing and leading discussions, conferences with professor about teaching issues.

HIST 3107. The World of Late Antiquity: From Constantine to Justinian. (3.0 cr.; A-F or Audit; prereq Credit will not be granted if already received for HIST 3007 or HmCI 3007.; fall, spring, offered periodically)

The world of late antiquity, 234 to 565 A.D. produced a number historic changes marked by a radical departure from the classical world of Greece and Rome. The most apparent is the rise of Christianity and its acceptance as a legitimate religion by Constantine the Great. His world was marked by a movement toward feudalism, an entrenched political order, and state controlled economic institutions. The last person who visually connected himself to ancient Rome was Justinian. For many his reign marks the end of the ancient world.

HIST 3121. The Age of the Heroes: Homer and his World. (3.0 cr.; A-F or Audit; prereq Minimum 30 credits; Credit will not be granted if already received for HmCI 3021 or CSt 3021 or HIST 3021; fall, spring, offered periodically) Organization and development of the Greek world from the fourth millennium B.C. to 700 B.C. Descriptive study of Minoan and Mycenaean worlds emphasizing critical evaluation of archaeological, mythological, and artistic significance of Homer.

HIST 3131. The Roman Republic. (3.0 cr.; A-F or Audit; prereq Credit will not be granted if already received for HmCI 3031 or HIST 3031; fall, spring, offered periodically) Republican Rome from origins through collapse in 44 B.C., with emphasis on cultural and political attributes, leading figures, and causes of its demise.

HIST 3133. From Homer to Alexander: Archaic and Classical Greece. (3.0 cr.; A-F or Audit; prereq Credit will not be granted if already received for HIST 3333 or HmCI 3333; fall, spring, every year) Early history of Greek world from Heroic Age to death of Alexander the Great, 850-323 B.C.

HIST 3141. The Roman Empire: The Imperial Republic and Imperial Age to Marcus Aurelius. (3.0 cr.; A-F or Audit; prereq Credit will not be granted if already received for HmCI 3041 or HIST 3041; fall, spring, offered periodically)

Outlines a four century period in which ancient Rome was an empire beginning after the Second Punic War of 201 B.C. Republican Rome struggled with external possessions and the wealth this provided for the ruling elite in their effort to dominate the state. The failed reform movement of the Gracchi brothers guaranteed that a polarized society would continue. This led to the Roman Revolution and the establishment of the imperial dynasties, the

first of which was created by Julius Caesar and his successors and Julio-Claudians. The Pax Romana was a direct outcome of the seizure of power by Julius Caesar and for the next two full centuries Rome governed a world that was larger than the continental United States. The signs of mismanagement, social stagnation, and military pressure at the end of the 2nd century A.D. in the reign of the philosopher-king Marcus Aurelius eventually led to a crisis that was both political as well as economic.

HIST 3235. History and Soccer: The Rise of the World's Game. (HUMANITIES; LE CAT7; LEIP CAT07; 3.0 cr.; S-N only; =[FORS 3006]; prereq course offered while abroad in England, instructor consent; fall, spring, offered periodically)

Taught on site in England. Over the past two centuries "soccer" has developed from an informal and regionally variable pastime into the single most popular sport on earth. This phenomenon is incomprehensible without the specific social, cultural, and geographic considerations of nineteenth and twentieth century Britain and its colonies. The sport will be used as a lens through which to examine the social and cultural aspects of the Industrial Revolution and the British Empire, focusing on the central question: "How did historical forces facilitate the rise and spread of the "World's Game?" Covers the techniques of historical methodology and source analysis, and the general narrative of the Industrial Revolution and British Empire (including colonial perspectives), as well as the internal history of the game itself.

HIST 3243. Europe in Crisis in the 20th Century. (3.0 cr.; A-F or Audit; fall, spring, summer, every year)
Causes, conduct, and consequences of World Wars I and II from European perspective. Offered during day school and in Individualized Learning Program.

HIST 3244. History of Holocaust. (3.0 cr.; A-F or Audit; fall, spring, summer, every year)
Anti-Semitic and extermination policies of the Hitler regime. Origins of that regime and its policies. European anti-Semitism and the Jewish experience in Europe. Conduct of perpetrators, victims, onlookers, resisters. Theological responses and Holocaust representations. Historiographic controversies.

HIST 3257. Modern France. (3.0 cr.; A-F or Audit; fall, spring, every year)
History of France from 1789 to present.

HIST 3264. Imperial Russia. (3.0 cr.; A-F or Audit; fall, spring, offered periodically)
Peter I to end of reign of Alexander III.

HIST 3310. Colonial America: The American Revolution. (3.0 cr.; A-F or Audit; fall, every year)
This course studies the social and political values, ideas, and experiences of colonial and revolutionary America that underlay the eventual formation of the US Constitution. Particular attention is given to the different ways in which American settlers from varying social and ideological contexts reconceived their own past history/histories,

HIST 3315. Religion in Colonial America. (3.0 cr.; A-F or Audit; spring, every year)
Examines the history of religion, in all its forms, during the period of Colonial America and the American Revolution. Special attention is given to the role of religion in the social and political changes of the colonies.

HIST 3318. Slavery, Lincoln and the Civil War. (3.0 cr.; A-F or Audit; fall, spring, every year)
Examines the Civil War and its causes, slavery, and the career of Abraham Lincoln.

HIST 3320. American Popular Culture, 1929 to the Present. (3.0 cr.; A-F or Audit; fall, every year)
Examines the intersection of the American popular arts--especially film, music, the visual arts, and literature--with national and international politics and American public life from the Great Depression to the present.

HIST 3346. History of Hollywood. (3.0 cr.; A-F or Audit; prereq credit will not be granted if already received for HIST 3246; fall, every year)
Study of American cinema in terms of how Hollywood functioned, what kind of films it produced, and why. Through the lens of Hollywood, the core issues of American life in the twentieth century will be examined.

HIST 3361. The American City. (3.0 cr.; A-F or Audit; fall, spring, every year)
American urbanization from colonial town to modern metropolis, emphasizing social and cultural problems peculiar to cities and impact of the city on American civilization.

HIST 3365. American Culture and Globalization. (3.0 cr.; A-F or Audit; fall, spring, every year)
The U.S. as an importer and exporter of cultural and social trends from the colonial period to the present. Global relationships among reform movements, migration, business and labor, intellectual ideas, and popular culture. Analysis of the American character.

HIST 3386. The United States and the World since 1898. (3.0 cr.; A-F or Audit; prereq students will receive credit if 3384 (only) or 3385 (only) were taken; credit will not be granted if already received for 3384 and 3385.; fall, every year)
Examines United States foreign relations--political, economic, social, and cultural--since 1898.

HIST 3396. The Vietnam War. (3.0 cr.; A-F only; spring, every year)
Examines the Vietnam war as a transformative event in both the United States and Vietnam. It will cover the decades-long history of the conflict, and will address its legacies in U.S. foreign relations, domestic politics and culture, and Vietnamese life.

HIST 3462. History of Modern Japan. (3.0 cr.; A-F or Audit; fall, spring, offered periodically)
History of Japan since 1800: Commodore Perry's mission to Japan, Meiji Revolution, Japan's expansion in Asia, World War II, developments in the postwar era.

HIST 3463. History of Modern China. (3.0 cr.; A-F or Audit; fall, spring, offered periodically)
China's history from the Opium War to the Great Proletarian Cultural Revolution and Deng Xiaoping's capitalist reform.

HIST 3465. Twentieth Century China Politics. (3.0 cr.; A-F or Audit; spring, every year)
Examines Chinese history from the late Qing to the present with a particular attention on the Chinese political, legal, social, and diplomatic history. Teaches the various factors that gradually influenced the historical course of China, the important roles that the West and Japan played in shaping modern China, the causes and consequences of the numerous political movements in the early stage of the People's Republic of China, and China's recent massive reform efforts to prosperity.

HIST 3505. Colloquium for Majors. (1.0 cr.; S-N only; prereq History or teaching social studies major/minor; fall, spring, every year)
Lecture and discussion groups on a variety of topics.

HIST 3615. Modern Africa. (3.0 cr.; A-F or Audit; prereq credit will not be granted if already received for HIST 3515; fall, spring, summer, every year)
Africa, 1800 to present. Colonial conquest and domination, African resistance, nationalism, and problems of independence.

HIST 3616. Society and Culture in 20th-Century Africa. (3.0 cr.; A-F or Audit; prereq credit will not be granted if already received for HIST 3516; spring, offered periodically)
Generational, class, and gender conflicts in the wake of European occupation, impact of colonial and neocolonial domination, and African responses to that occupation and to the world economy in the 20th century; selected films and literary sources.

HIST 3726. Modern Middle East: 18th Century-Present. (4.0 cr.; A-F or Audit; spring, every year)
This course delivered partially online through MOODLE focuses on Middle Eastern history from the eighteenth century to the present. Nineteenth-century reform informs the course's major theme; the rise of the nation state in the Modern Middle East. Geographically, the course covers the Arabic-speaking regions, Turkey, Iran, and Israel.

HIST 3728. Her Story: Women, History and Islam. (3.0 cr.; A-F or Audit; summer, every year)
This course focuses on women in the pre-Islamic and Islamic Middle East. It takes us swiftly through 1,500 years of history by emphasizing certain themes such as patriarchy and pre-Islamic women; Islam and the founding discourses on women and the family; high Islamic culture and women; and, finally, colonial and post-colonial discourse on and by women. The aim of this course is to trace both her story and the emergence of her voice in the historiography of the Middle East. At the conclusion of this course student should understand and be able to characterize

the historical developments that influenced women's roles in society and in the historical record, past and present.

HIST 3825. Islamic History from Muhammad to the Ottomans. (4.0 cr.; A-F or Audit; prereq minimum 30 credits; credit will not be granted if already received for HIST 3725; fall, every year)

This intermediate level class on Islamic history is offered partially online. It covers the periods from ca. 570 to 1600 C.E. It includes an examination of the political leadership of the Prophet; the development of the caliphate and Community; sectarian differences; the rise of the independent states; military and land tenure practices; social history; the influx of Turks, Mongol and Timurid invasions; and ends with the Ottoman and Safavid dynasties.

HIST 3939. Europe in the Age of Renaissance and Reformation: 1348-1648. (3.0 cr.; A-F or Audit; prereq credit will not be granted if already received for HIST 3239; fall, every year)

Social, economic, political, and cultural development of Europe from the Black Death to the Thirty Years' War. Central themes include Renaissance humanism and art, Columbus and European expansion, the Protestant and Catholic Reformations, and the era of religious wars.

HIST 3940. Early Modern England: 1485-1689. (3.0 cr.; A-F or Audit; =[HIST 3245]; prereq credit will not be granted if already received for HIST 3240; spring, offered periodically)

Early Modern English society and culture from the 15th to the 17th centuries.

HIST 4727. Middle Eastern History Through Film. (LEIP CAT07; 4.0 cr.; A-F only; prereq 30 credits, no grad credit; credit will not be granted if already received for HIST 4527; spring, every year)

Explores topics in Middle Eastern history-religious, political, social, and cultural-from the rise of Islam to the present through film.

HIST 5094. Directed Research. (4.0 cr. [max 12.0 cr.]; A-F or Audit; prereq instructor consent, maximum 4 credits may be applied to grad program; fall, spring, summer, every year) Directed Research

HIST 5905. History Seminar. (4.0 cr. [max 8.0 cr.]; A-F or Audit; prereq instructor consent; fall, spring, offered periodically) Advanced study and individual research on a selected historical topic or theme; senior capstone course for history majors. (2.5 hrs lect, 1 hr student/faculty consultation)

Honors (HON)

Academic Affairs

HON 3095. University Honors Special Topics: (Various Titles to be Assigned). (1.0-4.0 cr. [max 12.0 cr.]; A-F or Audit; prereq Honors Student, 30 credits or instructor consent; spring, every year) Special topics in support of the UMD Honors Program. Topic will be announced before course is offered.

HON 4095. University Honors Special Topics: (Various Titles to be Assigned). (1.0-4.0 cr. [max 12.0 cr.]; A-F or Audit; prereq Honors students, 60 credits and instructor consent; no grad credit; spring, every year) Special topics in support of the UMD Honors Program. Topic will be announced before course is offered.

Industrial Engineering (IE)

Swenson College of Science and Engineering

IE 1225. Introduction to Design and Manufacturing Engineering. (4.0 cr.; A-F or Audit; =[ENGR 1222, IE 2222]; prereq Mechanical engineering student or industrial engineering student and Math 1296 or 1596 or instructor consent; fall, spring, every year) Introduction to methods used to design and manufacture high quality products. Through the use of a CAD system the student will learn design techniques relative to a product. Students, working in teams, will produce their design using appropriate manufacturing methods.

IE 3115. Operations Research. (4.0 cr.; A-F or Audit; prereq Math 3280, Stat 3411, BSIE candidate or instructor consent; spring, every year) Optimization. Linear programming, network analysis, Markov chains, and queuing theory.

IE 3122. Materials Engineering Laboratory. (2.0 cr.; A-F only; prereq 1225, BSIE or BSME candidate, concurrent registration in 3130; fall, spring, every year) ASTM standards for testing metals, polymer, ceramic, and composite materials. Measurement of material properties including: yield strength, tensile strength, stiffness, hardness, toughness, and hardenability. Traditional methods of processing materials including: punching, plastic injection molding, thermoforming, sand casting, sheet metal forming, extrusion, welding, polymer matrix composites vacuum bagging. Heat treatment and metallographic study of metals. Estimation of the effects processing techniques have on material properties using both analytical and empirical techniques. Use of Design of Experiments approach for estimation of process control factor effects and modeling of process quality characteristics. Detailed lab report writing and oral presentation of results.

IE 3125. Engineering Economic Analysis. (SOC SCI; 3.0 cr.; A-F or Audit; prereq Statistics 3411 or 3611, engineering candidate or instructor consent; fall, spring, every year) Data analysis and methods for engineering decision making under risk; using time and value of money concepts; using expectation principles for project selection; and using forecasts.

IE 3130. Materials Processing Engineering. (3.0 cr.; A-F only; prereq Engr 2110 or ME 2105, Engr 2016 or CE 2017, Stat 3411 (concurrent registration is allowed) and BSIE or BSME candidate; fall, spring, every year) An introduction to common materials processes and material responses, including thermal and

mechanical processing of metals, polymers and composite materials.

IE 3140. Human Factors and Ergonomic Design. (3.0 cr.; A-F only; =[IE 3105]; prereq B.S.I.E. candidate or instructor consent; fall, every year)

Through the study of perception, cognition, and motor performance, explores human abilities and limitations as well as the external factors impacting them. To improve performance of a human-machine system, learn about tools for analyzing products, identifying design elements to augment abilities, and recognizing limitations.

IE 3222. Occupational Systems Laboratory. (2.0 cr.; A-F only; prereq 3140, must be taken after or concurrently with IE 4020 or instructor consent; credit will not be granted if already received for 3105, 3265; spring, every year) Using principles of human factors and production management, introduces methods for assessing and optimizing performance of occupational systems (i.e., workers, workplaces and tasks, and tools and equipment). These methods are applied in laboratory exercises to evaluate effects of workplace factors on various performance measures.

IE 4010. Six Sigma Quality Control. (3.0 cr.; A-F only; =[IE 3255]; prereq Che 2011 or Stat 3411 or 3611, engineering candidate, no grad credit; spring, offered periodically) Statistical quality control in manufacturing; modeling, process quality, control charts, process capability, acceptance sampling methods, Six Sigma, Design of Experiments, and Lean Enterprise.

IE 4020. Lean Production Management. (3.0 cr.; A-F only; =[IE 3265]; prereq 3125 or Che 4501 or instructor consent, no grad credit; spring, every year) Develops management systems using lean methods: JIT, CMS, ERP, SCM, TQM, SMED, and Kaizen Techniques. Forecasting, aggregate planning, inventory management, and other facilities improvement techniques, including efficient scheduling of manufacturing and service systems.

IE 4115. Facility Planning and Simulation. (4.0 cr.; A-F or Audit; prereq 4010, 4020, BSIE candidate; fall, every year) Facility and process design and analysis using flow rates, design relationships, graphical aids, and computer simulation.

IE 4196. Cooperative Education. (1.0 cr. [max 2.0 cr.]; A-F or Audit; =[ME 4196]; prereq BSIE candidate, no grad credit; fall, spring, every year) Practical work experience with employer closely associated with student's academic area; arranged by mutual agreement among student, department, and employer. Biweekly status reports and final written report must be submitted to department.

IE 4222. Systems Integration Laboratory. (2.0 cr.; A-F only; =[IE 4235]; prereq must be taken after or concurrently with IE 4230 or department consent, no grad credit; fall, every year)

Design, programming, and implementation of part or all of an automated and integrated manufacturing, testing, packaging, or distribution system.

IE 4230. Systems Integration. (3.0 cr.; A-F only; prereq 4020 or ME 3140, ECE 2006, CS 1121 or CS 1131 or CS 1511 or CS 2121, BSIE candidate or instructor consent; fall, every year) Study of the hardware and software aspects of many devices, subsystems, and computers used in modern automation, and their integration into automated manufacturing, packaging, and distribution systems.

IE 4255. Multidisciplinary Senior Design. (4.0 cr.; A-F or Audit; =[ME 4255]; prereq 4115, EMgt 4110, BSIE candidate, or instructor consent, no grad credit; fall, spring, every year) Capstone design course in industrial engineering. Project Management, problem definition, root cause analysis, baseline analysis, alternative solutions, analysis, reporting. Societal, economic, ethical, environmental, political considerations. Oral and written reports. Work is in teams focused on industrial or competition-based projects.

IE 4296. Cooperative Education II. (2.0 cr.; A-F or Audit; prereq 4196 or ME 4196; no grad credit; fall, spring, summer, every year) Advanced practical work experience with employer closely associated with student's academic area; arranged by mutual agreement among student, department, and employer. Biweekly status reports and final written report must be submitted to department.

IE 4491. Independent Study. (1.0-4.0 cr. ; A-F or Audit; prereq BSIE or BSME candidate, department consent; fall, spring, summer, every year) Directed individual study arranged with instructor and department head before registration.

IE 4495. Special Topics: (Various Titles to be Assigned). (1.0-4.0 cr. [max 8.0 cr.]; prereq BSIE candidate or instructor consent; fall, odd years) Topics not available in regular department curriculum. May involve specialties of department or visiting faculty.

IE 4801. International Engineering Report. (1.0 cr. [max 2.0 cr.]; S-N or Audit; prereq BSIE or BSME candidate, department consent, no grad credit; fall, every year) Directed self-examination of engineering study abroad in Sweden. Required for each semester abroad

IE 4993. Industrial Engineering Seminar. (1.0 cr. [max 2.0 cr.]; S-N or Audit; prereq BSIE or BSChE or BSECE or BSME or MEHS candidate or instructor consent; no Grad credit; fall, spring, every year) Reports on recent developments in engineering and on research projects in the department.

IE 5305. Supply Chain Management. (3.0 cr.; A-F or Audit; prereq 4020, BSIE candidate or MSEM student or instructor consent; fall, even years) Concepts essential to understanding supply chain management, including strategy and

design, as well as operational, managerial, technological, and implementation issues. It provides an integrated perspective of the supply chain, including purchasing, production, transportation, distribution and information systems.

IE 5315. Organizational Control Methods. (3.0 cr.; A-F or Audit; prereq BSIE or MSEM candidate or department consent; spring, even years) Roles of the engineer in managing organizational resources. Budgeting, cost-volume relationships, product costing, annual reports, audits. Project estimating and reporting.

IE 5325. Advanced Engineering Economics. (3.0 cr.; A-F or Audit; prereq 3125, BSIE or MSEM candidate or department consent; spring, odd years) Fundamentals of engineering economics: decision trees, time value of money, analysis of alternatives for project investments, taxes, inflation. Applications to engineering services and manufacturing.

IE 5335. Engineered Products and Services. (3.0 cr.; prereq BSIE or MSEM candidate, instructor consent; fall, odd years) Development, production, and distribution of engineered products and services. Strategies for positioning engineered products and services to successfully compete in a global market. Sales, purchasing, qualification, and service. Standards, regulations.

IE 5991. Independent Study in Industrial Engineering. (1.0-4.0 cr. [max 6.0 cr.]; prereq MSEM candidate, department consent; fall, spring, summer, every year) Directed study of special interest topics not available in standard curriculum. Must be arranged with instructor before registration. May include readings, research and/or special projects.

Integrated Biosciences (IBS)

Swenson College of Science and Engineering

IBS 5101. Biochemistry and Molecular Biology. (3.0 cr.; A-F only; prereq Chem 4341 or equivalent; spring, every year) A thorough review of the structure and properties of biomolecules including a complete understanding of the components and macromolecules that comprise nucleic acids, proteins, carbohydrates, and lipids.

IBS 8011. Integrated Biological Systems I. (2.0 cr.; A-F only; prereq open to first year IBS Graduate Students only, calculus; fall, every year) This course introduces the student to integrating principles in biology to develop the type of integrated thinking expected in their thesis. Integrating principles to be covered include energy flow, information, stoichiometry, and feedbacks. This course will be delivered largely in lecture format. It will prepare the student for IBS 8013, an extension of this course in spring semester. In IBS 8013, the class will involve applications of these principles to problems and themes that cut

across biological sciences and the applications of these principles to their thesis problem.

IBS 8012. Integrated Evolutionary Processes. (2.0 cr.; A-F or Audit; prereq 8011, IBS Grad student; spring, every year) Review of advanced topics in evolutionary biology, including coevolution, evolution of disease organisms, ecosystem consequences of evolution, evolutionary stable strategies, and game theory. Required for all IBS students.

IBS 8013. Integrated Biological Systems II. (2.0 cr.; A-F or Audit; prereq 8011, calculus; spring, every year) This course follows IBS 8011. In IBS 8011, the students were introduced to four principles of integrative thinking in biology (energy, information, stoichiometry, feedbacks) that apply to all levels of biological organization. IBS 8013 will apply all four principles to various themes and problems in biology which cut across all levels of biological organization. Such themes include but are not limited to metabolism, disease, and movement of materials across membranes and boundaries. The course will emphasize readings and discussion of the primary literature, student led discussions, student presentations of how the integrating principles apply to their thesis research, and the preparation of a paper demonstrating this application. The papers will be handled in a mock peer-review as if they were submitted to one of the Trends journals (Trends in Ecology and Evolution, Trends in Biochemistry, etc.)

IBS 8020. Integrated Biosciences Colloquia. (1.0 cr. [max 4.0 cr.]; S-N only; prereq IBS Graduate Student; fall, spring, every year) Presentations by Integrated Biosciences Graduate Faculty on their research and how it is integrated with various other research programs in Duluth and worldwide.

IBS 8030. IBS Research Club. (1.0 cr. [max 5.0 cr.]; S-N or Audit; prereq IBS Graduate Student; fall, spring, every year) Readings and discussion of current literature integrating the areas of Cell, Molecular and Physiological Biology with Ecology, Organismal, and Population Biology. Current literature emphasizing the application of novel techniques to biological problems at several levels of organization will be presented. Students will lead a discussion on at least one paper. Required for IBS students both semesters of their first two years.

IBS 8094. Rotations. (1.0 cr.; S-N only; prereq IBS Graduate Student; fall, spring, every year) Rotations through laboratories of faculty members of the Integrated Biosciences Program. During the rotations students will be exposed to molecular, cellular, physiological, and ecological problems and techniques.

IBS 8099. The Biological Practitioner. (1.0 cr.; S-N or Audit; prereq IBS Graduate Student; fall, every year) A course designed to introduce the incoming graduate student in biological sciences to professional practice, standards and ethics,

including peer review, proposal writing, ethical problems, the purpose of a university, and other problems. Required for all IBS students.

IBS 8101. Cellular Biochemistry. (3.0 cr.; A-F or Audit; prereq Organic Chemistry, Biochemistry, Cell Biology or Molecular Biology, Calculus or instructor consent.; fall, every year)

This course will introduce students to the physical and molecular basis of cellular function. Students will learn the physical characteristics of macromolecular structures comprising a cell, including polysaccharide, lipid, protein and nucleic acid structure. Students will also learn where these macromolecules occur in the cell, how they are regulated and how they facilitate the cells interaction/communication with its environment, with a focus on small molecule/drug distribution.

IBS 8102. Cell, Molecular and Developmental Biology. (3.0 cr.; A-F only; prereq 5101, Chem 4342 or equivalent, IBS grad student; spring, even years)

Comprehensive review of contemporary topics in modern molecular biology. This will include systemic examples from cell and developmental systems. Required for CMP emphasis.

IBS 8103. Comparative Animal Physiology. (3.0 cr.; A-F only; prereq One year of college biology, two years of college chemistry; 8011, IBS Grad student; spring, odd years)

In depth review of selected topics in animal physiology. Lecture presentation of fundamental concepts of cardiovascular, neural, respiratory, renal, and endocrine physiology. In-depth discussion and student presentation of selected topics with particular emphasis on current advances.

IBS 8201. Ecological Processes. (2.0 cr.; A-F or Audit; prereq 8011, IBS Grad student; fall, every year)

In depth survey of advanced topics in ecological processes, including allometry and scaling, animal behavior, food webs, and energy and material flows through organisms and ecosystems. Required for EOP Track.

IBS 8202. Chemical Biology. (3.0 cr.; A-F or Audit; prereq Organic Chemistry, Biochemistry or Cellular Biochemistry, Cell Biology or Molecular Biology, Calculus or instructor consent.; spring, every year)

This course will introduce students to the common chemical underpinnings of biochemical and biological processes. Students will learn the chemical fundamentals of biological transformations including the synthesis of lipids, carbohydrates, amino acids, nucleotides as well as natural products. In addition, students will gain insight into the roles of metals in biology, medicine, bio-inorganic transformations, as well as energy - and electron-transfer processes associated with living organisms.

IBS 8203. Methods in Molecular Biosciences. (2.0 cr.; A-F or Audit; prereq Organic Chemistry, Physical Chemistry, Biochemistry or Cellular Biochemistry, Cell

Biology or Molecular Biology.; spring, every year)

This course will focus on the fundamental and technical background of methods used in chemical biology toward quantitative assay/interpretation of biological structures/events/Importantly, case studies will be chosen from current literature to highlight applications of a given technique to address biological questions. For each major technique expected experimental information and subsequent interpretation will be discussed.

IBS 8333. FTE: Master's. (1.0 cr.; No Grade Associated; prereq Master's student, adviser and DGS consent; fall, spring, summer, every year)
(No description)

IBS 8444. FTE: Doctoral. (1.0 cr.; No Grade Associated; prereq Doctoral student, adviser and DGS consent; fall, spring, summer, every year)
(No description)

IBS 8666. Doctoral Pre-Thesis Credits. (1.0-6.0 cr. [max 12.0 cr.]; No Grade Associated; prereq Doctoral student who has not passed preliminary oral; no required consent for 1st/2nd registrations, up to 12 combined credits; department consent for 3rd/4th registrations, up to 24 combined credits; doctoral student admitted before summer 2007 may register up to four times, up to 60 combined credits; fall, spring, summer, every year)
(no description)

IBS 8777. Thesis Credits: Master's. (1.0-18.0 cr. [max 50.0 cr.]; No Grade Associated; prereq Maximum 18 credits per semester or summer; 10 credits total required (Plan A only); fall, spring, summer, every year)
(No description)

IBS 8888. Thesis Credit: Doctoral. (1.0-24.0 cr. [max 100.0 cr.]; No Grade Associated; prereq Maximum 18 credits per semester or summer; 24 credits required; fall, spring, summer, every year)
(no description)

IBS 8980. Special Topics: (Various Titles to be Assigned). (2.0 cr.; A-F or Audit; prereq 8011, 8012, 8103; spring, every year)
Explores topics relevant to both EPO and CMP students within the IBS Program.

IBS 8993. Integrated Biosciences Graduate Seminar. (2.0 cr. [max 4.0 cr.]; A-F only; prereq 8012, 8103; spring, every year)

The IBS Seminar course will emphasize topics that cross multiple disciplines in both Ecology, Organismal and Population (EOP), Cell, Molecular and Physiology (CMP) emphases, and Chemical Biology (CB). Example of topics include the following: human health implications of ecological change; cell and molecular techniques in ecology; impact of infectious disease on populations; community ecology, and host defense against disease.

Integrated Elementary Special Education (IESE)

College of Education and Human Service Professions

IESE 1010. Introduction to Elementary Education. (3.0 cr.; A-F or Audit; prereq Pre elementary education student; credit will not be granted if already received for ELED 1010; fall, spring, every year)

The elementary and special education teaching profession: developing personal goals; interaction with faculty and staff at school sites, along with a full-morning teaching experience; simulation of teaching strategies and methods related to hands on learning; overview of special education and associated processes; behavior management techniques; handwriting skills; emergent reading strategies; and ePortfolio training. Weekly 2-hour field practicum.

IESE 2001. Diversity and Education Implications. (3.0 cr.; A-F or Audit; prereq Pre-IESE Candidate, 1010; credit will not be granted if already received for ELED 2001; fall, spring, every year)

Examines issues of diversity related to planning instruction, classroom management, integrated and exploratory curriculum, utilization of technology, community resources, structured service learning and humanizing classroom environments.

IESE 3325. Foundations of Literacy and Language. (3.0 cr.; A-F or Audit; prereq Admission to the elementary education program, 3331; credit will not be granted if already received for ELED 3325; fall, spring, every year)

In the first of three required literacy courses, the teach candidates are introduced to the principles of comprehensive, scientifically-based literacy (reading, writing, speaking, and listening) instruction that includes phonemic awareness, phonics, fluency, vocabulary development, and comprehension.

IESE 3326. Advanced Literacy & Language: Designing & Implementing a Comprehensive Literacy Program. (2.0 cr.; A-F or Audit; prereq IESE candidate, 3325; credit will not be granted if already received for ELED 3326; fall, spring, every year)

Second in a sequence of three literacy courses, this course is designed to prepare teacher candidates to create and implement comprehensive and scientifically based literacy instruction in elementary school classrooms.

IESE 3331. Children's Literature in the Elementary School. (3.0 cr.; A-F or Audit; prereq Pre-IESE, Sophomore standing, 1010 and ECH 2025; credit will not be granted if already received for ELED 3331.; fall, spring, every year)

The focus of this course is on literature for children, the criteria for selecting books and non-book materials for use in the elementary school, and the integration of children's trade books across the curriculum.

IESE 3355. Elementary Mathematics Methods I. (2.0 cr.; A-F or Audit; prereq IESE Candidate, 4366; credit will not be granted if already received for ELED 3355; fall, spring, every year)

First in a two-semester component required of all students planning to teach elementary education in the area of mathematics. Through discussion, projects, and reflection on readings we will study the nature of mathematics, how children learn mathematics, and how to most effectively teach and assess mathematics.

IESE 3356. Elementary Mathematics

Methods II. (3.0 cr.; A-F or Audit; prereq IESE candidate, 3355; credit will not be granted if already received for ELED 3356; fall, spring, every year)

Second in a two-semester component required of all students planning to obtain certification to teach mathematics at the elementary level. Through discussion, projects, and reflections on readings we will study the nature of mathematics as it related to social justice, how to most effectively teach and assess mathematics, and the different ways to grade mathematics.

IESE 4344. Teaching Science and Environmental Education I.

(3.0 cr.; A-F or Audit; prereq IESE candidate, 3325, no grad credit; credit will not be granted if already received for ELED 4344; fall, spring, every year)

This course is the first method course of elementary science teacher preparation. The emphasis of ELED 4344 is on enriching content knowledge, increasing confidence, as well as developing appropriate instructional skills, strategies, and attitudes for being a science teacher. Students will participate in extensive field experiences, learn and apply recommended methods for science instruction based on research and theory, and reflect upon their personal development and ability.

IESE 4346. Teaching Science & Environmental Education II.

(2.0 cr.; A-F or Audit; prereq IESE candidate, 4344; no grad credit; credit will not be granted if already received for ELED 4346; fall, spring, every year)

Advanced methods course of elementary science teacher preparation. Emphasis on designing curriculum, using appropriate teaching methodologies and assessments to measure student learning, as well as developing attitudes for being a science teacher. Presentation of contemporary perspectives in science education and finding solutions to problems in the classroom from the reform initiatives.

IESE 4366. Teaching Elementary Social Studies I.

(3.0 cr.; A-F or Audit; prereq IESE Candidate; no grad credit; credit will not be granted if already received for ELED 4366; fall, spring, every year)

Study of the content and organization of social studies in elementary schools; planning instruction for diverse students; understanding and improving the learning situation and effective use of materials emphasizing historical and civil discourses.

IESE 4367. Teaching Elementary Social Studies II.

(2.0 cr.; A-F or Audit; prereq IESE candidate, 4366; no grad credit; credit will not be granted if already received for ELED 4367; fall, spring, every year)

Exploring inquiry-based models of instruction in social studies planning instruction for diverse students; conceptualizing and planning instructional units; and effective use of an array of instructional materials.

Inter-Institutional Cross-Registration (IICR)

Academic Affairs

IICR 1001. Inter-Institutional Cross Registration.

(1.0-9.0 cr. [max 36.0 cr.]; prereq instructor consent; fall, spring, every year)

Inter-institutional cross registration reflecting the credit hour load of University of Minnesota Duluth students enrolling under the inter-institutional cross registration agreement with the College of Saint Scholastica and the University of Wisconsin Superior and any other institution with whom such an agreement exists.

IICR 1002. Inter-Institutional Cross Registration.

(1.0-9.0 cr. [max 36.0 cr.]; fall, spring, every year)

Inter-institutional cross-registration reflecting the credit hour load of University of Minnesota Duluth students enrolling under the inter-institutional cross registration agreement with the College of St. Scholastica and the University of Wisconsin Superior and any other institution with whom such an agreement exists.

IICR 1003. Inter-Institutional Cross Registration.

(1.0-9.0 cr. ; fall, spring, every year)

Inter-institutional cross-registration reflecting the credit hour load of University of Minnesota Duluth students enrolling under the inter-institutional cross registration agreement with the College of St. Scholastica and the University of Wisconsin Superior and any other institution with whom such an agreement exists.

IICR 1004. Inter-Institutional Cross Registration.

(1.0-9.0 cr. ; fall, spring, every year)

Inter-institutional cross-registration reflecting the credit hour load of University of Minnesota Duluth students enrolling under the inter-institutional cross-registration agreement with the College of St. Scholastica and the University of Wisconsin Superior and any other institution with whom such an agreement exists.

IICR 2002. Inter-Institutional Cross Registration.

(1.0-9.0 cr. [max 36.0 cr.]; fall, spring, every year)

Inter-institutional cross-registration reflecting the credit hour load of University of Minnesota Duluth students enrolling under the inter-institutional cross registration agreement with the College of St. Scholastica and the University of Wisconsin Superior and any other institution with whom such an agreement exists.

IICR 2003. Inter-Institutional Cross Registration.

(1.0-9.0 cr. ; fall, spring, offered periodically)

Inter-institutional cross-registration reflecting the credit hour load of University of Minnesota Duluth students enrolling under the inter-institutional cross registration agreement with the College of St. Scholastica and the University of Wisconsin Superior and any other institution with whom such an agreement exists.

IICR 2004. Inter-Institutional Cross Registration.

(1.0-9.0 cr. ; fall, spring, summer, offered periodically)

Inter-institutional cross-registration reflecting the credit hour load of University of Minnesota Duluth students enrolling under the inter-institutional cross registration agreement with the College of St. Scholastica and the University of Wisconsin Superior and any other institution with whom such an agreement exists.

IICR 3001. Inter-Institutional Cross Registration.

(1.0-9.0 cr. [max 36.0 cr.]; prereq instructor consent; fall, spring, every year)

Inter-institutional cross registration reflecting the credit hour load of University of Minnesota Duluth, students enrolling under the inter-institutional cross registration agreement with the College of Saint Scholastica and the University of Wisconsin Superior and any other institution with whom such an agreement exists.

IICR 3002. Inter-Institutional Cross Registration.

(1.0-9.0 cr. [max 36.0 cr.]; fall, spring, every year)

Inter-institutional cross-registration reflecting the credit hour load of University of Minnesota Duluth students enrolling under the inter-institutional cross registration agreement with the College of St. Scholastica and the University of Wisconsin Superior and any other institution with whom such an agreement exists.

IICR 3003. Inter-Institutional Cross Registration.

(1.0-9.0 cr. ; fall, spring, offered periodically)

Inter-institutional cross-registration reflecting the credit hour load of University of Minnesota Duluth students enrolling under the inter-institutional cross registration agreement with the College of St. Scholastica and the University of Wisconsin Superior and any other institution with whom such an agreement exists.

IICR 4001. Inter-Institutional Cross Registration.

(1.0-9.0 cr. [max 36.0 cr.]; prereq No grad credit; instructor consent; fall, spring, every year)

Inter-institutional cross registration reflecting the credit hour load of University of Minnesota Duluth, students enrolling under the inter-institutional cross registration agreement with the College of Saint Scholastica and the University of Wisconsin Superior and any other institution with whom such an agreement exists.

IICR 4002. Inter-Institutional Cross Registration.

(1.0-9.0 cr. [max 36.0 cr.]; fall, spring, every year)

Inter-institutional cross-registration reflecting the credit hour load of University of Minnesota

Duluth students enrolling under the inter-institutional cross registration agreement with the College of St. Scholastica and the University of Wisconsin Superior and any other institution with whom such an agreement exists.

IICR 4003. Inter-Institutional Cross

Registration. (1.0-9.0 cr. ; prereq No grad credit; fall, spring, offered periodically) Inter-institutional cross-registration reflecting the credit hour load of University of Minnesota Duluth students enrolling under the inter-institutional cross registration agreement with the College of St. Scholastica and the University of Wisconsin Superior and any other institution with whom such an agreement exists.

IICR 5001. Inter-Institutional Cross

Registration. (1.0-9.0 cr. [max 36.0 cr.]; prereq instructor consent; fall, spring, every year) Inter-institutional cross registration reflecting the credit hour load of University of Minnesota Duluth students enrolling under the inter-institutional cross registration agreement with the College of Saint Scholastica and the University of Wisconsin Superior and any other institution with whom such an agreement exists

IICR 5002. Inter-Institutional Cross

Registration. (1.0-9.0 cr. [max 36.0 cr.]; fall, spring, every year) Inter-institutional cross-registration reflecting the credit hour load of University of Minnesota Duluth students enrolling under the inter-institutional cross registration agreement with the College of St. Scholastica and the University of Wisconsin Superior and any other institution with whom such an agreement exists.

IICR 5003. Inter-Institutional Cross

Registration. (1.0-9.0 cr. ; fall, spring, offered periodically) Inter-institutional cross-registration reflecting the credit hour load of University of Minnesota Duluth students enrolling under the inter-institutional cross registration agreement with the College of St. Scholastica and the University of Wisconsin Superior and any other institution with whom such an agreement exists.

Interdisciplinary Studies (IS)

College of Liberal Arts

IS 3093. Senior Project. (1.0-10.0 cr. ; A-F or Audit; prereq instructor consent; credit will not be granted if already received for IS 3099; fall, spring, summer, offered periodically) An agreement that specifies nature of the project, amount of work, and number of credits must be approved by two advisers and filed with director of interdisciplinary studies.

IS 5001. Construction and Deconstruction of Nation: Reflections of 20th Century Hispanic History.

(2.0 cr.; A-F only; prereq Minimum 90 credits; summer, odd years) Introduction to 20th Spanish cinema, literature, and culture: the historical, social aesthetic, and theoretical factors that brought about Spain's

Civil War, Francoism, exile and deportation to Nazi camps, Basque separatism, ETA terrorism, and Spain's membership in the European Union. Spain, along with so many other countries in our increasingly "globalized world," is currently undergoing an "identity crisis." The concept of "Spanishness" will be addressed.

IS 5002. Exodus and Exile in Contemporary Cinema.

(4.0 cr.; A-F only; prereq Minimum 90 credits; summer, odd years) Cross-border and internal population movements have assumed dimensions beyond the response capacity of any single governmental and international body. A socio-historical understanding of uprooted social groups and individuals who voluntarily or involuntarily leave their country and culture. Effects and implications of displacement and examines how European exilic and diasporic filmmakers signify exile and diaspora by expressing, allegorizing, commenting upon and critiquing home, host societies and cultures. Analyses of film texts whose narrative strategies undermine conventional cinema, in particular cinematic realism.

International Business (INTB)

Labovitz School of Business and Economics

INTB 4201. Chinese Business and

Economy. (3.0 cr.; A-F or Audit; prereq LSBE candidate, consent of instructor; summer, every year) Introduction to Chinese business and economy. Provides fundamental knowledge of Chinese business and economy; provides students with understanding of social, cultural, economic and political environments of doing business in China through lectures, readings, hand-on project and travel to China.

INTB 4211. Innovation in Ireland. (GLOBAL PER; 3.0 cr.; A-F only; prereq minimum 2.8 GPA, junior status, instructor consent; summer, every year)

Explore Irish innovation on multiple levels (individual, organizational, and regional) concentrating on how Ireland has created a culture of innovation and the consequences of this innovation on its people from its earliest history to today.

INTB 4221. Health Care and Families in

Thailand. (3.0 cr.; A-F or Audit; prereq minimum GPA of 2.6, minimum 75 credits, instructor consent; spring, summer, offered periodically) Learn about the health care system in Thailand in comparison to the U.S. health care system. Topics to be examined include health policy, health care reform and international exchange of healthcare providers, health care training and patients. Students will be expected to juxtapose the management of healthcare, cultural influences, and family resources and needs.

INTB 4495. Special Topics: (Various Titles to be Assigned). (1.0-3.0 cr. [max 9.0 cr.]; A-F only; prereq instructor consent; fall, spring, summer, offered periodically)

Special, focused, and timely topics in globalization and international business.

International Studies (INTS)

College of Liberal Arts

INTS 1010. Introduction to International Studies. (3.0 cr.; A-F or Audit; fall, spring, every year)

Introduction to the field of International Studies, examination of the implications of our global world, and analysis of a selection of issues in contemporary international affairs.

INTS 1095. Special Topics: (Various Titles to be Assigned).. (1.0-4.0 cr. [max 8.0 cr.]; A-F or Audit; fall, spring, offered periodically) Special topic identified at time course offered.

INTS 1191. International Study. (1.0-5.0 cr. [max 15.0 cr.]; A-F or Audit; prereq department consent; fall, spring, summer, every year) For students who want to take an independent study course while traveling or living in a foreign country. Course must be approved by supervising faculty member and director of international studies.

INTS 4100. Seminar in International Studies.

(4.0 cr.; A-F or Audit; prereq Pol 1050, 60 credits including 8 upper division credits approved IntS courses and instructor consent; fall, spring, every year) Analysis of and supervised research and writing on selected topics.

Journalism (JOUR)

College of Liberal Arts

JOUR 2001. Reporting and Writing I. (3.0 cr.; A-F or Audit; prereq WRIT 1120; fall, spring, every year)

Skill-based course in reporting and writing that introduces the fundamentals used by all journalists; information gathering; writing basic news stories; professional news style; structure and readability; and interviewing techniques. Examples of professional journalism will be read and discussed.

JOUR 2101. Editing I: Copy Editing and Layout. (3.0 cr.; A-F or Audit; prereq 2001, WRIT 1120; credit will not be granted if already received for 3101; fall, spring, offered periodically)

Develops the essential skills for editing print and online publications, including copy and picture editing, selecting stories, exercising sound news judgment, developing the writer-reporter relationship, writing headlines, designing and laying out basic pages, using graphics, and understanding fundamental legal and ethical issues that affect publications.

JOUR 2300. News Photography. (3.0 cr.; A-F or Audit; prereq Credit will not be granted if already received for 3300.; fall, spring, offered periodically)

How to take the types of photographs commonly used by professional news operations, ranging from features and photo essays to spot news and sports. Work produced may be used in the student

newspaper if the student editor accepts it. Develops an understanding of the ethical and theoretical aspects of news photography, and learn a vocabulary for discussing and critiquing visual images.

JOUR 2400. Community and Journalism. (GLOBAL PER; 3.0 cr.; A-F or Audit; prereq Credit will not be granted if already received for 3400.; fall, spring, offered periodically) Examines the role of journalism in defining communities. Exposure to various concepts of community and the role journalism has in defining these communities on both a local and global scale. Analyze a specific case study of one community journalism entity, and explore the ramifications of technology on the transformation of community.

JOUR 2501. History of American Journalism. (3.0 cr.; A-F or Audit; fall, spring, offered periodically) Explores the social and cultural history of journalism in the United States. Read pieces of journalism and critiques of journalism from various time periods and study key moments in journalism history. Examines the practice of journalism, its core values, and how these have changed over time. Explores how technological, social and economic change shape journalism.

JOUR 3001. Reporting and Writing II. (3.0 cr.; A-F or Audit; prereq 2001; fall, spring, offered periodically) Skills-based that builds on JOUR 2001. Write publishable news stories based on field work and interviews. Emphasis on fully-developed, multi-source news stories that are fair and complete. Expand interview and research skills, and become familiar with the wide range of information available in public documents.

JOUR 3401. Digital Storytelling. (3.0 cr.; A-F or Audit; prereq 2001; fall, spring, offered periodically) Report and write various forms of electronic news stories commonly produced for television, radio and the Internet. Learn the stylistic differences between writing electronic news scripts and writing for print. Learn basic field recording techniques and production skills for audio and video.

JOUR 3700. Media Law and Ethics. (3.0 cr.; A-F or Audit; prereq Writ 1120; fall, spring, summer, offered periodically) Examines laws, regulations and major court decisions that affect journalists and news organizations. Topics include First Amendment principles of press freedom, libel, invasion of privacy, prior restraint, access to information, and the regulation of electronic media content.

JOUR 3991. Independent Study in Journalism. (1.0-5.0 cr.; A-F or Audit; prereq 2001, instructor consent; fall, spring, summer, every year) Directed reading and research in journalism.

JOUR 4001. Specialized Reporting and Writing. (3.0 cr.; A-F or Audit; prereq 2001; no grad credit; fall, spring, offered periodically) Delves into a specific area of journalism such as science reporting, outdoor writing,

investigative reporting or writing about government. Read and critique examples and produce work in the given area of specialization.

JOUR 4102. Editing II: Newsroom Practicum. (3.0 cr.; A-F or Audit; =[JOUR 5102]; prereq 2001, 2101, 3001; no grad credit; fall, spring, offered periodically) Experience in a working newsroom. Apply skills from other journalism classes to plan, produce and manage an online news publication. Basic principles as well as practical skills with advanced computer programs. Includes editing, managing and reporting, as well as the discussion of both journalism and leadership issues. Advance theory and practice in news selection, preparation, and display for newspaper, magazine, broadcast and photojournalism media. Emphasis on the ethical and professional responsibility of the journalist.

JOUR 4197. Journalism Internship. (1.0-3.0 cr. [max 6.0 cr.]; S-N only; =[JOUR 5197]; prereq 2001, 3700, minimum 60 credits, instructor consent, no grad credit; fall, spring, summer, every year) Supervised professional experience as a working staff member with a newspaper, magazine, broadcast station or other communications organization.

JOUR 4500. Special Topics: (Various Titles to be Assigned). (3.0 cr. [max 6.0 cr.]; A-F or Audit; prereq 2001, 2101, no grad credit; fall, spring, offered periodically) Selected themes and issues in journalism, such as staff organization, policies, finance, law, photography, design, and the role of the student press.

JOUR 5102. Editing II: Newsroom Practicum. (3.0 cr.; A-F or Audit; =[JOUR 4102]; prereq Grad Student; credit will not be granted if already received for 5102; fall, spring, offered periodically) Experience in a working newsroom. Apply skills from other journalism classes to plan, produce and manage an online news publication. Basic principles as well as practical skills with advanced computer programs. Includes editing, managing and reporting, as well as the discussion of both journalism and leadership issues. Advance theory and practice in news selection, preparation, and display for newspaper, magazine, broadcast and photojournalism media. Emphasis on the ethical and professional responsibility of the journalist.

JOUR 5197. Journalism Internship. (1.0-3.0 cr.; S-N only; =[JOUR 4197]; prereq College Grad or grad student, instructor consent; fall, spring, summer, every year) Supervised professional experience as a working staff member with a newspaper, magazine, broadcast station or other communications organization.

Labovitz School of Business and Economics (LSBE)
Labovitz School of Business and Economics

LSBE 397. B.B.A. Business Internship. (0.0 cr.; S-N only; prereq LSBE Candidate, consent of Internship Director; fall, spring, every year) Provide practical work experience related to students' majors by participating in an approved program within cooperating businesses for a period of 12 weeks. Course will precede or follow a second credited internship for a total of 24 weeks. Internship term must be full-time as defined by host company and paid. Complete assigned written report and performance evaluations.

Language (LANG)

College of Liberal Arts

LANG 1101. Beginning Foreign Language I. (COMM & LAN; LE CAT3; 4.0 cr.; A-F or Audit; prereq instructor consent, department approval; fall, spring, summer, every year) For students studying beginning language where that language is spoken, under the auspices of another college or university or by individual arrangement with prior approval by the Department of Foreign Languages and Literatures; or students studying a less frequently taught language at UMD.

LANG 1102. Beginning Foreign Language II. (COMM & LAN; LE CAT3; 4.0 cr.; A-F or Audit; prereq 1101 or instructor consent; spring, summer, every year) For students studying beginning language where that language is spoken, under the auspices of another college or university or by individual arrangement with prior approval by the Department of Foreign Languages and Literatures; or students studying a less frequently taught language at UMD.

LANG 1201. Intermediate Foreign Language I. (COMM & LAN; LE CAT3; 4.0 cr.; prereq 1102 or instructor consent; fall, spring, summer, every year) For students studying intermediate language under the auspices of another college or university or by individual arrangement with prior approval by the Department of Foreign Languages and Literatures; or students studying a less frequently taught language at UMD.

LANG 1202. Intermediate Foreign Language II. (COMM & LAN; LE CAT3; LEIP CAT03; 4.0 cr.; A-F or Audit; prereq 1201 or instructor consent; fall, spring, summer, every year) For students studying intermediate language under the auspices of another college or university or by individual arrangement with prior approval by the Department of Foreign Languages and Literatures; or students studying a less frequently taught language at UMD.

LANG 2050. The Digital Humanities: Language as Interface. (HUMANITIES; 4.0 cr.; A-F or Audit; fall, every year) This course explores the use of digital technology in Humanities. To do so, we examine the impact digital technology has on the study of human culture in the language-centered disciplines. Language-centered disciplines, because they are often comparative, embrace the difficulties that

come with translation and other forms of communication over distance. This course explores the status of language as interface in the increasingly complex media landscape still emerging today. By focusing on language as interface and by focusing on the intersection of Comparative Literacy Studies and the Digital Humanities, this course provides students with the skills they will need to best make use of digital technology as an instrument of the study of human culture. Taught in English.

LANG 3093. Directed Study. (1.0-3.0 cr. [max 6.0 cr.]; A-F or Audit; prereq instructor consent, department approval; maximum 6 credits between LANG 3091 and 3093; fall, spring, summer, every year)
Directed Study

LANG 3095. Special Topics: (Various titles to be Assigned). (1.0-4.0 cr. [max 8.0 cr.]; fall, spring, summer, offered periodically)
Selected topics, not currently offered, that deal with genres, periods, specific authors, or cultural movements of Germanic, Hispanic, Francophone, or other foreign worlds.

LANG 4044. Language Teaching Methods. (4.0 cr.; A-F or Audit; =[EDUC 4040]; prereq Fr 2301 or Ger 2301 or Span 2301 or equiv; credit will not be granted if already received for EDUC 4040; spring, offered periodically)
Theory and practice of teaching a second language. Survey and application of current methods used to teach skills and cultural concepts of world languages.

Limnology (LIM)

Swenson College of Science and Engineering

LIM 5004. Field Limnology. (2.0 cr.; A-F or Audit; prereq Graduate student or instructor consent; summer, every year)
Field measurements on local lakes, streams; research cruise aboard R/V Blue Heron on Lake Superior; laboratory exercises in biological, chemical, geological and physical limnology.

LIM 5101. Physical Limnology. (3.0 cr.; A-F or Audit; =[LIM 5001]; prereq Math 1297, Phys 2012 or 2015 and 2016, or grad student; fall, odd years)
Physical description of lake dynamics including: lake morphometry, water budget, light distribution, circulation, fronts, waves and mixing. Descriptive, mathematical, numerical and data-analysis techniques are used to investigate the various topics.

LIM 5102. Chemical Limnology. (3.0 cr.; A-F or Audit; prereq Math 1296, Phys 1002 or 1202, Chem 1152 or 1162, or grad student; Credit will not be granted if already received for 5001; fall, odd years)
Organic and inorganic chemistry of natural waters, major and minor ions, pH-Eh relationships, carbon and nutrient cycles, pore water chemistry, sediment chemistry, microbial geochemistry. Offered alternate years.

LIM 5103. Geological Limnology. (3.0 cr.; A-F or Audit; =[LIM 5002]; prereq Math 1296, Phys 1002 or 1202, Chem 1152 or 1162, or grad student; fall, even years)

Geological aspects of freshwater systems: origins, tectonic and climatic settings of lakes, geophysical mapping, physical sedimentary processes, sedimentary geochemistry, geochronology and paleolimnology. Offered alternate years

LIM 5104. Geochemical, Physical, and Biological processes in Aquatic Sediments. (2.0 cr.; A-F or Audit; prereq Graduate student or instructor permission; spring, odd years)
The course covers the geochemical, physical, biogeochemical, and biological processes in the upper meters of aquatic sediments. Topics include biogeochemical cycles of C, N, P, S; sediment-water exchanges of nutrients, metals, and pollutants; pathways and rates of microbially catalyzed reactions; bioturbation and bioirrigation; measurement techniques and reaction-transport modeling.

LIM 5105. Research Frontiers and New Directions in Limnology and Environmental Science. (1.0 cr.; S-N or Audit; prereq Graduate student or instructor permission; spring, offered periodically)
An interdisciplinary graduate seminar with dual goal of reviewing most significant current developments in limnological science and helping students identify most significant knowledge gaps in their disciplinary research fields. The course involves guest lectures, student presentations and discussions. It aims to provide students with guidance on choosing research directions to achieve an optimal balance between difficulty and scientific payoff.

Linguistics (LING)

College of Liberal Arts

LING 1811. Introduction to Linguistics. (LOGIC & QR; LE CAT2; 3.0 cr.; A-F or Audit; fall, spring, summer, every year)
Provides an introduction to a theoretical study of the nature of natural language, using examples primarily from present-day English. Students are expected to learn analytical skills to understand how human languages (and the human mind) work and how the sub-components (sounds, words, sentences and meaning) of natural languages are systematically organized.

LING 2506. Language and Writing. (3.0 cr.; A-F or Audit; prereq WRIT 1120; spring, every year)
Different from a traditional linguistic approach, language and its system will be examined with emphasis on writing, as opposed to speech. Based on the formal theoretical foundations of language and linguistics, three main topics are discussed in detail. First, world's major writing systems and a short history of writing are introduced. Second, the English sentence structures are studied from a contemporary theoretical and historical linguistic perspective. Third, language use in writing is discussed in various genres.

LING 3101. Introduction to Phonology. (3.0 cr.; A-F or Audit; prereq 1811 or instructor consent; fall, spring, offered periodically)
Phonology is a grammar of sound for a language. The phonological component

of a language is the system of rules, representations and principles that govern the patterning of sounds. To understand the general patterns of sounds, students are expected to analyze data across the language families pre-theoretically. This pre-theoretical analysis will be scientifically explained within modern phonological theories.

LING 3102. Introduction to Syntax. (3.0 cr.; A-F or Audit; prereq 1811 or instructor consent; fall, spring, offered periodically)
Deals with how sentences are structured. After discussing lexical categories (parts of speech) and phrasal structures from a scientific perspective, several different theories are introduced under the blanket name Generative Grammar. Based on Generative Grammar, students learn how to analyze English sentence structures to understand universal properties of natural language.

LING 3103. Dimensions of Meaning. (3.0 cr.; A-F or Audit; prereq 1811; fall, every year)
This course will provide an introduction to the study of what is said (semantics) and what is meant (pragmatics) in natural language. It will provide an introduction to set theory, first- and higher- order logic, and lexical semantics. It will also cover pragmatic topics such as presupposition, implicature, and speech act theory. Beyond these basic topics, the course will focus on specific sub-topics from time to time such as negation, reference, information structure, reported speech, genre, and so on.

LING 3591. Independent Study in Linguistics. (1.0-3.0 cr. [max 6.0 cr.]; A-F or Audit; prereq 1811 or instructor consent, department consent; fall, spring, summer, every year)
Directed reading and/or research.

LING 4103. Morphology: Word Structures and Rules. (3.0 cr.; A-F or Audit; =[LING 5103]; prereq 1811, no grad credit; fall, odd years)
An introductory survey course on linguistic morphology that examines key concepts used to describe and explain the internal structures of words, and also deals with the central word formation processes across the typologically different languages. This theoretical knowledge acquired is then applied to the analysis of word formation in various discourse domains in present-day English and non-Indo-European languages.

LING 4195. Special Topics: (Various Titles to be Assigned). (1.0-4.0 cr. ; A-F or Audit; prereq Minimum 60 credits, no grad credit; spring, offered periodically)
Subdisciplines such as pragmatics, semantics, regional and social language variation, childhood language acquisition, second language learning, language change and linguistic reconstructions, cognitive linguistics, and history of linguistic inquiry.

LING 4400. Sociolinguistics. (3.0 cr.; A-F only; =[LING 5400, LING 5195]; prereq 1811 with a grade of C or instructor consent, no grad credit; fall, spring, offered periodically)
The study of the uses and varieties of language as it is used in society by various groups.

Among the topics to be examined are regional, social, and ethnic dialects.

LING 4852. Teaching Assistantship in Linguistics. (1.0-3.0 cr. ; A-F or Audit; =[LING 5852]; prereq 1811, 3101, 3102 or instructor consent, no grad credit; fall, spring, summer, every year)

Students gain practical experience in teaching-related activities for introductory linguistic courses. Students assist the instructor in administration of the class.

LING 5103. Morphology: Word Structures and Rules. (3.0 cr.; A-F or Audit; =[LING 4103]; prereq 1811, Grad students; fall, odd years)

An introductory survey course on linguistic morphology that examines key concepts used to describe and explain the internal structures of words, and also deals with the central word formation processes across the typologically different languages. This theoretical knowledge acquired is then applied to the analysis of word formation in various discourse domains in present-day English and non-Indo-European languages.

LING 5195. Special Topics: (Various Titles to be Assigned). (1.0-4.0 cr. ; A-F or Audit; =[LING 5400, LING 4400]; prereq Coll Grad or Grad student; spring, offered periodically) Subdisciplines such as pragmatics, semantics, regional and social language variation, sociolinguistics, childhood language acquisition, second language learning, language change and linguistic reconstructions, and history of linguistic inquiry.

LING 5400. Sociolinguistics. (3.0 cr.; A-F only; =[LING 5195, LING 4400]; prereq Graduate standing or collegiate graduate student; fall, spring, offered periodically) The study of the uses and varieties of language as it is used in society by various groups. Among the topics to be examined are regional, social, and ethnic dialects. (Field project)

LING 5811. Introduction to Modern English. (4.0 cr.; A-F or Audit; prereq Credit will not be granted if already received for ENGL 5811.; spring, offered periodically) Modern theories of English grammar.

LING 5852. Practicum in Teaching Linguistics. (3.0 cr.; A-F or Audit; =[LING 4852]; prereq College Grad or Grad student; fall, spring, every year) Supervised teaching in introductory linguistics courses. Experience in preparation for and in conduct of classes, in consultations with students, and in testing.

LING 8591. Independent Study in Linguistics. (1.0-3.0 cr. [max 6.0 cr.]; A-F or Audit; prereq department approval; fall, spring, summer, every year) Directed reading and/or research.

Management Studies (MGTS) Labovitz School of Business and Economics

MGTS 1101. The Business Environment. (LE CAT8; 3.0 cr.; A-F or Audit; fall, spring, offered periodically)

Introduction to context, environment, and operation of business and organizations. Study of foundations and functional areas of business and entrepreneurship. Analysis of technological, ethical, diversity, and global issues from business and organizational perspectives.

MGTS 3301. Production and Operations Management. (3.0 cr.; A-F or Audit; prereq LSBE candidate or approved non-LSBE business administration minor or college consent; credit will not be granted if already received for FMIS 3301; fall, spring, summer, every year)

Introductory survey of production and operations as a functional area of management, including operations strategy, process design, forecasting, resource allocation, inventory management, scheduling, quality management, and project management. Computer applications of quantitative techniques to support operations decision making.

MGTS 3401. Organizational Behavior and Management. (3.0 cr.; A-F only; prereq LSBE candidate or business administration minor or college consent; fall, spring, every year) Introduction to organizations, management processes, and understanding human behavior at work. Covers the effects of the external environment, organizational structure, job design, teams, and leadership on employees, attitudes, motivation, and behavior.

MGTS 3411. Honors: Organizational Behavior and Management. (3.0 cr.; A-F or Audit; prereq minimum 60 credits and instructor consent; spring, offered periodically) Introduction to organizations, management processes, and understanding human behavior at work. Covers the effects of the external environment, organizational structure, job design, teams, and leadership on employees' attitudes, motivation, and behavior. Same as MGTS 3401, but with more depth, rigor, and challenging assignments. For high-ability students with excellent preparation.

MGTS 3491. Independent Study. (1.0-3.0 cr. ; A-F only; prereq department consent; fall, spring, summer, every year) For students wishing to do special work in strategic, organizational, human resource, or marketing management that extends beyond, or in greater depth than, regular course offerings.

MGTS 3497. Organizational Management Internship. (3.0 cr.; A-F only; prereq LSBE candidate, consent of internship director; fall, spring, summer, every year) Work-integrated learning program providing practical experiences within students' major. Students participate in approved program within cooperating businesses, governmental agencies, or civic organizations. Requires minimum of 200 hours work experience, assigned written reports, and performance evaluations.

MGTS 3801. Human Resource Management. (3.0 cr.; A-F only; prereq LSBE candidate or

approved non-LSBE business administration or college consent; fall, spring, every year) Introduction to theory and practice of human resource management in private and public organizations. Organizational, legal, and ethical influences on major personnel functions, including planning, staffing, training, performance appraisal, compensation, and labor-management relations.

MGTS 3897. Human Resources Internship. (3.0 cr.; A-F only; prereq LSBE candidate, consent of Internship Director; fall, spring, summer, every year)

Work-integrated learning program providing practical experiences within students' major field. Students participate in approved program with businesses, governmental agencies, or civic organizations. Requires minimum of 200 hours work experience, assigned reports, and performance evaluations.

MGTS 3997. Management of Community Projects. (1.0-3.0 cr. ; A-F only; prereq 3401, 3801, LSBE candidate, instructor consent; fall, spring, summer, every year) Requires design and administration of community-related project involving volunteers. Interns identify project, contact appropriate persons, obtain approval, and submit written proposal. Requires completion of minimum of 100-300 hours, maintenance of weekly journal, oral presentation, and written analysis.

MGTS 4095. Entrepreneurship Special Topics: (various Titles to be Assigned).

(1.0-3.0 cr. [max 6.0 cr.]; A-F only; prereq LSBE candidate, 3401 or college consent, no grad credit; fall, spring, summer, offered periodically) Enables students, working closely with the instructional faculty, to explore one or more entrepreneurial management issues in substantial depth.

MGTS 4195. Micro Special Topics: (Various Titles to be Assigned). (1.0-3.0 cr. [max 6.0 cr.]; A-F only; prereq LSBE candidate, 3401 or college consent; maximum of 6 credits between MGTS 4195 and MGTS 4495 Micro Topics; fall, spring, summer, offered periodically) Enables students, working closely with the instructional faculty, to explore one or more micro management issues in substantial depth.

MGTS 4295. Special Macro Topics: (Various Titles to be Assigned). (1.0-3.0 cr. [max 6.0 cr.]; A-F only; prereq LSBE candidate, 3401 or college consent; maximum of 6 credits between MGTS 4295 and MGTS 4495 Macro Topics; fall, spring, summer, offered periodically) Enables students, working closely with the instructional faculty, to explore one or more contemporary macro management issues in substantial depth.

MGTS 4395. Process Special Topics: (Various Titles to be Assigned). (1.0-3.0 cr. [max 6.0 cr.]; A-F only; prereq LSBE candidate, 3401 or college consent; maximum of 6 credits between MGTS 4395 and MGTS 4495 Process Topics; fall, spring, summer, offered periodically)

Enables students, working closely with the instructional faculty, to explore one or more

contemporary process management issues in substantial depth.

MGTS 4411. Organizational Studies. (3.0 cr.; A-F only; prereq 3401, LSBE candidate or college consent; fall, spring, offered periodically)
Survey of organization theories and their application to organizational structuring, coordination, control, job design, organizational decision making, leadership, and organizational development.

MGTS 4421. Managing Change. (3.0 cr.; A-F only; prereq 3401, LSBE candidate or grad student or college consent; fall, spring, offered periodically)
Causes, goals, programs, and results of organizational change and employee responses to it. Assumptions, values, contingency factors, ethical considerations, models, and intervention strategies for organizational development. Role of managers as change agents.

MGTS 4431. Leadership. (3.0 cr.; A-F only; prereq 3401, LSBE candidate or college consent; fall, every year)
A survey of the leadership literature aimed at the development of an understanding of leaders and the leadership process. An exploration of such questions as: Who as a person is the leader? How do people come to the position of a leader? What is the nature of leadership as a process? How do leaders influence others? What is participative leadership? What is charismatic and transformational leadership?

MGTS 4443. Building and Leading Teams in Organizations. (3.0 cr.; A-F only; prereq LSBE candidate, 3401 or instructor consent; fall, spring, offered periodically)
Examines effective design and management of a variety of groups in organizations, including work groups, task forces, self-managed teams and coalitions. Covers group composition, goals, processes, and effectiveness; includes leadership, managing external relationships, and performance measurement.

MGTS 4451. Management Inquiry. (3.0 cr.; A-F only; prereq 3401, 3801, approved LSBE candidate or college consent; spring, every year)
Methods employed by organizational specialists in conducting applied inquiry (research) to assist organizational decision making, coupled with an examination of a contemporary management issue. Preparation and written/oral presentation of research findings from student-conducted field, laboratory, or library research projects focused on contemporary management issues.

MGTS 4461. Business and Society. (3.0 cr.; A-F only; prereq 3401, 3801, LSBE candidate or college consent; fall, every year)
Business as part of larger system--economic, political, social. Emphasis on external environment--economics, culture, government, technology, international relations, labor--within which business operates. Business ethics and social responsibility.

MGTS 4463. Sustainability and Sustainable Management. (3.0 cr.; A-F or Audit; prereq 3401 and LSBE candidate or instructor consent; no grad credit; spring, every year)
This course will introduce students to the concepts of sustainability in a managerial context.

MGTS 4472. Entrepreneurship. (3.0 cr.; A-F only; prereq LSBE candidate or college consent; fall, every year)
Seminar on the fundamentals of entrepreneurship, the characteristics of entrepreneurs, and the life cycle of a new venture: creating and starting a new venture; financing the new venture; managing, growing, and ending the new venture.

MGTS 4473. Management of Innovation and Technology. (3.0 cr.; A-F only; prereq 3401, LSBE candidate or college consent; fall, offered periodically)
Issues related to achieving maximum leverage from innovation competencies, skills, and resources. Factors distinguishing high-innovation companies, strategies for innovation, internal and external conditions, and market consequences of innovation. Integration of technology within the strategic management process.

MGTS 4474. International Management. (3.0 cr.; A-F only; prereq 3401, LSBE candidate or college consent; fall, spring, offered periodically)
Differences in culture, history, resources, etc. are explored in the context of managing global businesses and workforce. Students will reflect on their own managerial skills, and develop skills to become a global manager.

MGTS 4475. Negotiations, Bargaining and Conflict Resolution. (3.0 cr.; A-F only; prereq LSBE candidate, 3401 or instructor consent; fall, spring, offered periodically)
Combines analytical material on the negotiation process, with a series of negotiating experiences, to develop your understanding of, and skills in, negotiating and resolving conflicts in business. Covers topics and strategies appropriate for use between people, departments, organizations and countries, across a variety of industries.

MGTS 4481. Strategic Management. (3.0 cr.; A-F only; prereq 3401, 3801, Mktg 3701, FMIS 3301, FMIS 3601, 90 credits, LSBE candidate or college consent; no grad credit; fall, spring, every year)
Integration of basic functions of marketing, finance, production, and behavioral sciences. Emphasis on organizational environments and development and implementation of competitive strategies that respond to social, political, and economic conditions from perspective of top management.

MGTS 4483. Cooperative Strategy and Strategic Alliances. (3.0 cr.; A-F only; prereq LSBE candidate, 3401, 4481 preferred or instructor consent; spring, every year)
Introduces the concept that firms are engaged in cooperative as well as competitive relationships. Creates understanding for the nature of strategic alliances-forming,

negotiating, operating, evaluating-in an international context.

MGTS 4821. Staffing Work Organizations. (3.0 cr.; A-F only; prereq 3801, LSBE cand or department consent; spring, every year)
Theory and practice of staffing work organizations. Emphasis on design and implementation of staffing systems, legal requirements, and career planning.

MGTS 4831. Compensation Systems. (3.0 cr.; A-F only; prereq 3801, LSBE candidate or college consent; fall, every year)
Theory, design, and practice of employee compensation systems. Impacts of compensation, economic and institutional forces influencing employer compensation policies and practices, supplemental forms of compensation and administrative practices.

MGTS 4841. Training and Development. (3.0 cr.; A-F only; prereq 3801, LSBE candidate or college consent; spring, every year)
Elements of training and development program planning and delivery: learning theories and approaches, needs assessment, training objectives, design, training methods, transfer-of-training strategies, and evaluation. Assess, design, and evaluate human resource development systems. Develop training skills and techniques.

MGTS 4851. Unions and Collective Bargaining. (3.0 cr.; A-F only; prereq 3801, LSBE candidate or college consent; spring, offered periodically)
Nature of and basis for contractual relationships between employers and unions. Emphasis on background of labor movement, union organizing, bargaining relationships, labor law, and contemporary trends in private and public sector labor relations.

MGTS 4861. International Human Resource Management. (3.0 cr.; A-F only; prereq 3801, LSBE candidate or instructor consent; fall, every year)
Course combines theories of culture with HRM applications to develop students' awareness cultural issues as they apply in the workplace.

MGTS 4881. Human Resource Issues and Trends. (3.0 cr.; A-F only; prereq 3801, LSBE candidate or college consent; fall, spring, offered periodically)
Integrative, problem-solving approaches to contemporary human resource challenges, with emphasis on employment law.

MGTS 4895. Special Topics: (Various Titles to be Assigned). (1.0-3.0 cr. [max 9.0 cr.]; A-F only; prereq LSBE cand, 3801 or instructor consent; fall, spring, summer, offered periodically)
Enables students, working closely with the instructional faculty, to explore one or more contemporary human resource management issues in substantial depth.

MGTS 4931. Family Business Management. (3.0 cr.; A-F or Audit; prereq 3401, 3801, 4472, LSBE candidate or college consent; no grad credit; spring, summer, every year)
Family Business Management provides an introduction to understanding family owned, controlled, and influenced businesses. Family

Businesses are the most prevalent form of business organization all over the world. The course introduces the unique issues that arise due to the interaction of the family system with the business system. Issues such as governance, entrepreneurship, succession, growth, internationalization, strategy, and leadership are discussed in the context of family business management. The influence of family on the business values, goals, behavior, and performance is described. Finally, the management of non-family employees in family businesses is covered.

MGTS 4951. Environmental

Entrepreneurship. (3.0 cr.; A-F or Audit; prereq 4472, LSBE candidate or college consent; no grad credit; fall, every year) This course introduces students to the field of environmental entrepreneurship. Students will have the opportunity to learn about the screening and surveillance approach to the market, using the available resources, realizing ideas that are based on solving an environmental problem, and how to introduce successful solutions that will create financial turnover and influence market structures and even creative destruction leading to a more sustainable future. The course provides an overview of the processes, challenges, and demands associated with creating ventures that seek to integrate financial and environmental benchmarks of success. Additionally, the course introduces students to potential opportunities for environmentally related products, services, and markets. This course is designed to appeal to those who want to learn more about enterprise in business and environmental contexts.

MGTS 4961. Entrepreneurial Capstone

Experience. (3.0 cr.; A-F or Audit; prereq 4472, BLAW 3201, MKTG 4741, LSBE candidate, instructor consent; no grad credit; spring, summer, every year) Entrepreneurial Experience course gives our undergraduate students the unique opportunity of conceiving, launching, and operating a real business as part of their educational experience. Student put entrepreneurial thought and action into practice by developing, taking and building on key action steps to advance their own venture or on projects for existing enterprises. Key elements of the process involve both primary and secondary research while engaging prospective customers, experts, suppliers, stakeholders, analogous/complimentary ventures, and investors. Students are challenged to test ideas and gain a clearer understanding of the interdisciplinary complexities involved within the entrepreneurial landscape. The core is action based learning which will result in pivoting your venture based on information gained in experimenting and testing assumptions.

MGTS 4997. Entrepreneurial Internship.

(3.0 cr.; A-F or Audit; prereq 4472, BLAW 3201, MKTG 4741, LSBE candidate, instructor consent; no grad credit; spring, every year) Work-integrated learning program providing practical experiences within students' major

field. Students participate in approved program within entrepreneurial organizations (which the student identifies). Requires minimum of 200 hours work experience, assigned reports, and performance evaluations.

Marketing (MKTG)

Labovitz School of Business and Economics

MKTG 3701. Principles of Marketing.

(3.0 cr.; A-F only; prereq LSBE candidate or approved non-LSBE business administration minor or college consent; fall, spring, every year) Marketing as a process of exchange management. Emphasis on conceptual tools necessary to deal with both strategic marketing management issues and tactical management of product, price, promotion, and distribution.

MKTG 3711. Marketing Research. (3.0 cr.; A-F only; prereq MgtS 3701 or Mktg 3701, LSBE candidate or college consent; fall, spring, every year)

Emphasis on improving skills of conducting secondary research, designing a primary research study, and analyzing and reporting results of a research study.

MKTG 3721. Social Media Marketing. (3.0 cr.; A-F or Audit; prereq 3701, LSBE Candidate or college consent; fall, every year)

This course provides an overview of various aspects of social media marketing, including: (1) the social media planning process (2) how social media marketing platforms are coordinated with other traditional promotional elements (advertising, public relations, consumer promotion, customer service, personal selling) as a part of an integrated marketing communications campaign.

MKTG 3741. Fundamentals of Selling. (3.0 cr.; A-F only; prereq MgtS 3701 or Mktg 3701, LSBE candidate or college consent; fall, spring, every year)

Theory and practice of personal selling as used by organizations to develop long-term partnerships with customers. Emphasis on marketing, planning, communication, and presentation skills.

MKTG 3751. Marketing Ethics. (3.0 cr.; A-F or Audit; prereq 3701, LSBE candidate or college consent; summer, every year)

Introduces a broad range of ethical issues encountered by marketing practitioners, and helps discover, develop, and test personal sets of guidelines for making judgments when such issues arise.

MKTG 3761. Marketing Analytic I: Introduction to Marketing Metrics and Fundamental Analytic Techniques. (3.0 cr.; A-F or Audit; prereq Marketing Analytics Major; spring, every year)

This course introduces students to marketing metrics and develops core quantitative skills necessary to convert large amounts of data into actionable information for businesses. The course builds knowledge and understanding of the essential marketing metrics as well as the statistical techniques necessary for students to be able to competently summarize data,

appropriately classify data and use data to make predictions. Emphasis is placed on the application of skills and techniques to data sets and using the analysis to answer business questions and formulate recommendations.

MKTG 3767. Marketing Analytics Summer Internship. (1.0 cr.; A-F or Audit; prereq Marketing Analytics Major or Minor; summer, every year)

The Marketing Analytics Summer Internship provides students with an opportunity to work as a member of a marketing analytics team for a minimum of 100 hours during the summer. During the internship, students have the opportunity to apply their analytic knowledge and skills in a chosen business or industry sector.

MKTG 3771. Sports Marketing. (3.0 cr.; A-F or Audit; prereq 3701; spring, every year)

This course will provide an overview of various aspects of sports marketing including: (1) the marketing of sports products (2) the use of sports to market non-sports products.

MKTG 3781. International Marketing. (3.0 cr.; A-F only; prereq MGTS 3701 or MKTG 3701, LSBE candidate or college consent; fall, spring, every year)

Marketing across national boundaries; effects of foreign economic, legal/political, and sociocultural environments on multinational marketing strategies.

MKTG 3791. Independent Study. (1.0-3.0 cr.; A-F only; prereq department consent; fall, spring, summer, every year)

For students wishing to do special work in marketing that extends beyond, or in greater depth than, regular course offerings.

MKTG 3797. Marketing Internship. (3.0 cr.; A-F or Audit; prereq LSBE candidate, consent of internship director; credit will not be granted if already received for MgtS 3797; fall, spring, summer, every year)

Work-integrated learning program providing practical experiences within students' major. Students participate in approved program within cooperating businesses, governmental agencies, or civic organizations. Requires minimum of 200 hours work experience, assigned written reports, and performance evaluations.

MKTG 4711. Business-to-Business Marketing. (3.0 cr.; A-F only; prereq MgtS 3701 or Mktg 3701, LSBE candidate or college consent; fall, spring, offered periodically) Marketing goods and services to organizations. Emphasis on differences between marketing to organizations and consumers. Derived demand, long-term trade relationships, contact, negotiations, channels, promotion, physical distribution, product development, markets.

MKTG 4721. Advertising and Marketing Communications. (3.0 cr.; A-F only; prereq MgtS 3701 or Mktg 3701, LSBE candidate or college consent; fall, spring, offered periodically)

Promotional planning. Emphasis on planning for advertising, sales promotion, public relations/publicity, direct marketing, and

personal selling. Importance of integrated marketing communications to organizations.

MKTG 4731. Consumer Behavior. (3.0 cr.; A-F only; prereq MgtS 3701 or Mktg 3701, LSBE candidate or college consent; fall, spring, every year)

Buyer behavior and implications for marketing strategy. Emphasis on information processing concepts, influences on behavior, and decision-making processes from both conceptual and pragmatic perspectives. Students requiring graduate credit must complete additional coursework.

MKTG 4741. Developing and Marketing New Products. (3.0 cr.; A-F only; prereq MGTS 3701 or MKTG 3701, LSBE candidate or college consent; fall, spring, offered periodically)

A marketing-oriented new products management course that explores the new product development process with a focus on marketing strategies for the planning, development and launch of new products and services.

MKTG 4751. Retailing. (3.0 cr.; A-F only; prereq 3701, LSBE candidate or college consent, no grad credit; fall, spring, offered periodically)

Principles of establishing and operating a retail business. Topics include retail market analysis and research, store layout, retail accounting, merchandise selection and financing, pricing, selling, advertising, budgets and current trends. Emphasis on retail management from a strategic perspective.

MKTG 4762. Marketing Analytics II: Advanced Metrics and Analytic Techniques. (3.0 cr.; A-F or Audit; prereq 3761, no grad credit; fall, every year)

This course builds upon the quantitative knowledge and skills that were introduced in Marketing Analytics Fundamentals, and introduces students to important customer relationship management metrics for customer acquisition, retention and defection, and customer lifetime value measures.

MKTG 4763. Marketing Analytics Practicum. (2.0 cr.; A-F or Audit; prereq Marketing Analytics Major, no grad credit; fall, every year)

This course provides students the opportunity to apply their analytic knowledge and skills to an industry project and/or data sets. During the course, students will work with industry clients and the course instructor to formulate realistic recommendations based on their analysis of the information.

MKTG 4781. Marketing Management and Strategy. (3.0 cr.; A-F only; prereq MgtS 3701 or Mktg 3701, MgtS 3711 or Mktg 3711, 1 other Marketing course, 90 credits, LSBE candidate or grad or college consent; fall, spring, every year)

Planning, directing, and controlling an organization's marketing activity, including formulating marketing objectives, strategy, and tactics. Interpretation of information in decision making and strategy formulation. Case analysis used to develop marketing problem-solving, communication, and organization skills.

MKTG 4795. Special Topics (Various Topics to be Assigned). (3.0 cr. [max 9.0 cr.]; A-F only; prereq LSBE cand, MGTS 3701 or MKTG 3701 or concurrent registration, no grad cr; fall, spring, offered periodically)

This course covers marketing in the travel and tourism industry including the special challenges among complementary and competitive organizations to market an area or region to travelers.

Master in Advocacy and Political Leadership (MAPL)

College of Liberal Arts

MAPL 5110. Ethics in Politics: Developing a Shared Ethical Code for Involvement in MN Advocacy, Political Life. (3.0 cr.; A-F only; prereq Grad student or instructor consent; spring, odd years)

Develop a shared, rudimentary ethical code for participation in Minnesota advocacy and political life. The exercise in developing the code will be informed by reading a few of the major political/ethical theorists, by dialogue with various political/advocacy figures, and by case studies.

MAPL 5111. Labor Organizing. (3.0 cr.; A-F or Audit; prereq Grad student or instructor consent; fall, every year)

Historical overview of the evolution of modern labor movement, examine the state of organized labor and labor organizing today, and analyze two emerging models of union leadership--social movement leadership and institutional leadership.

MAPL 5113. Labor and Political Economy.

(3.0 cr.; A-F or Audit; prereq Grad student or instructor consent; spring, every year)
Overview of political economy and labor, examine different economic theories, changing economic policies and their impact on workers and labor, and examine specific case studies of political economy: the New Deal/Great Society policies, deindustrialization, monetary policy, globalization, welfare reform and taxation.

MAPL 5200. Advocacy and Lobbying: Strategies and Tactics. (3.0 cr.; A-F or Audit; prereq Grad student or instructor consent; spring, every year)

History, theory and current practice of nonprofits in educating and activating citizens to participate in the public dialogue. Special attention is given to the role of nonprofits as resources to elected and appointed policy makers.

MAPL 5202. Nonprofits and Government: The Public and Private Partnership. (3.0 cr.; A-F or Audit; prereq Grad student or instructor consent; fall, every year)

Focuses on understanding the nonprofit sector and its many relationships with governments. Nonprofits and governments can be partners, adversaries, or sectors working on parallel paths. Students gain a better understanding of the nonprofit sectors history, revenue sources, historic and current relationships with government, and strategies for positioning nonprofits for leadership in nonprofit and governmental interactions.

MAPL 5301. Campaigns and Elections.

(3.0 cr.; A-F or Audit; prereq Grad student or instructor consent; fall, odd years)
Overview of campaigns and elections, to include both the party nomination process and general elections, at the national, state, and local levels.

MAPL 5308. The Impact of Art on Social Change. (3.0 cr.; A-F or Audit; prereq Grad student or instructor consent; fall, even years)

Analysis and understanding of how art influences public perception, political will and social policy. Topics include environmental protection, the labor movement, attitudes toward war, civil rights, and gay and lesbian rights. Art forms examined include drama, literature, film, music, photography, painting.

MAPL 5309. Legal System and Public Policy.

(3.0 cr.; A-F only; prereq Grad student or instructor consent; spring, odd years)
Prepares advocates to understand the extent to which courts or more precisely the issues confronting our legal system drive policy and social change. Students will develop practical skills to seek legal remedies for their constituencies, and strategies for knowing when to choose the courts instead of the legislative process.

MAPL 5311. Advocacy in the Public Sector: Service in the Elected Branch.

(3.0 cr.; A-F or Audit; prereq Grad student or instructor consent; fall, every year)
Prepares students for current or future careers in the elected branches of government, at the local, regional, state or national level as members of councils, boards, the Legislature or Congress, or as staff to those elected. Familiarizes students with three essential skills for persons interested in such careers, instruction on understanding and using public opinion measurement, instruction on best practices for those operating as staff to elected or appointed officials, and instruction on media relations in a political setting; all three skills-oriented segments will be taught by guest lecturers with outstanding credentials; the first and last three-hour periods of the class will discuss the ethical dimensions of working in the political realm.

MAPL 5312. Advocacy in the Public Sector: Service in the Executive Branch. (3.0 cr.; A-F or Audit; prereq Grad student or instructor consent; spring, every year)

Designed for use by students wishing to work in government. Prepares students who have or will have careers in the executive branches of government, at the local, regional, state or national levels as elected officials, as political staff to these various elected officials, or as members of the bureaucracy. Students will become familiar with how to find and use the best administrative practices as they related to personnel, resource and information management, with special emphasis on finding innovative solutions to management problems.

MAPL 5315. Sustainable Development Policy Advocacy.

(3.0 cr.; A-F or Audit; prereq Grad student or instructor consent; fall, even years)

Focus on the politics of sustainable development, specifically transit and transportation, housing, community planning, business development, and the environment. Students will develop working knowledge of the legislative and legal processes surrounding sustainable development policy at the local/state/federal levels: how, when and by whom development decisions are made and how the process works.

MAPL 5395. Special Topics: (Various Titles to be Assigned). (1.0-3.0 cr. [max 9.0 cr.]; A-F or Audit; prereq Grad student or instructor consent; fall, spring, summer, offered periodically)
Opportunity to explore diverse topics in advocacy, to take advantage of new developments in the field and to explore current issues or events related to advocacy.

MAPL 5400. Political Organizing and Advocacy in the Digital Age. (3.0 cr.; A-F or Audit; prereq Grad student or instructor consent; summer, every year)
This course will explore the rapid growth of online advocacy and the central role digital media play in political and advocacy campaigns. Students will develop their own mini-campaigns using the techniques and principles discussed in the class.

MAPL 5405. The Impact of Group Identity on the Policymaking Process. (3.0 cr.; A-F or Audit; prereq Grad Student or instructor consent; spring, odd years)
Ways that group identity advocacy, including advocacy focused on race, disability, religion, sexuality, class and gender justice and influences on political and policymaking process. Consideration of the opportunities and risks of suing such identities as a strategy for connected activism, community building and responsive public policy.

MAPL 5414. Current Issues in Advocacy & Political Leadership. (3.0 cr. [max 6.0 cr.]; A-F or Audit; prereq Graduate student; fall, odd years)
This course provides students with in-depth insight into timely political advocacy issues of the day. Students will become proficient in the context, the arguments, and the specific techniques used to advocate for and against these specific issues.

MAPL 6001. Political Process and Public Policy. (3.0 cr.; prereq MAPL student or instructor consent; fall, spring, every year)
Offers familiarity with the concepts of agenda setting and policy development and with the variable meanings used in the political arena to define core concepts like equitable and efficient. After reading and reporting on a leading book from the public affairs literature, students focus primarily on a policy they wish to see enacted or changed, then prepare background papers and oral presentations arguing for that enactment or change.

MAPL 6002. Policy Evaluation. (3.0 cr.; prereq MAPL student or instructor consent; fall, spring, every year)
Prepares students to understand and, in some cases, to perform, formal evaluations of policy

proposals, including cost benefit analysis and other efficacy-based measures. Students will learn that neither public policy nor politics are or can be ethically neutral.

MAPL 6003. Civic Engagement and Political Cultures. (3.0 cr.; prereq MAPL student or instructor consent; fall, spring, every year)
Identification of at least four major issues currently facing the policymakers in Minnesota and/or the nation. Using historical analysis, students will ascertain how these issues came to be what they currently are and attempt to analyze where they might go, given the political culture in the state and nation. Students will quickly survey and critique the philosophical foundations of American politics, from Jefferson and Madison to Rawls and Martin Luther King.

MAPL 6004. Political Organizing and Communication. (3.0 cr.; prereq MAPL student or instructor consent; fall, spring, every year)
Designed to give students an understanding of the sociological, intra-personal nature of political and advocacy communication as well as familiarity with successful advocacy writing and with modern organizing strategies.

MAPL 6005. Political and Advocacy Leadership. (3.0 cr.; A-F or Audit; prereq MAPL student or instructor consent; credit will not be granted if already received for MAPL 5307; spring, even years)
Help advocates strengthen abilities to lead wisely, ethically and effectively in political settings. Provides an interdisciplinary framework to explore the principles of power and leadership, and features effective political leaders from Minnesota and Wisconsin who discuss their principles of leadership.

MAPL 6008. Advocacy Internship I. (3.0 cr.; S-N or Audit; prereq MAPL student or instructor consent; fall, spring, summer, every year)
Internship experiences will be offered in the advocacy and political leadership program. Students will have supervised direct experience with an individual or organizational sponsor in advocacy.

MAPL 6009. Advocacy Internship. (2.0 cr. [max 4.0 cr.]; S-N or Audit; prereq MAPL student or instructor consent; fall, spring, summer, every year)
Internship experiences will be offered in the advocacy and political leadership program. Students will have supervised direct experience with an individual or organizational sponsor in advocacy.

Master of Business Administration (MBA)

Labovitz School of Business and Economics

MBA 8111. Business Ethics. (2.0 cr.; A-F or Audit; prereq MBA student or college consent; fall, spring, offered periodically)
How cultural, political, global, legal, and economic factors impact business activities. Issues of business ethics and social responsibility.

MBA 8211. Data Analysis and Statistics for Managers. (2.0 cr.; A-F or Audit; prereq Econ

2020 or equivalent, MBA student or college consent; fall, offered periodically)
Concepts/principles of business statistics, data analysis, and presentation of results. Research process and design, secondary and primary data collection, measurement concepts, sampling design, use and interpretation of statistical techniques, research ethics, reporting, and evaluating research findings.

MBA 8311. Operations Management. (3.0 cr.; A-F or Audit; prereq FMIS 3301 or equivalent, MBA student or college consent; fall, spring, offered periodically)
Operations management strategies for the organization. Computer-implemented decision support models introduced in contexts such as project management, resource allocation, forecasting, quality management, inventory management, and simulation.

MBA 8333. FTE: Master's. (1.0 cr.; No Grade Associated; prereq Master's student, adviser and DGS consent; fall, spring, offered periodically)
(no description)

MBA 8411. Policy Formulation and Implementation. (3.0 cr.; A-F or Audit; prereq 8311, 8501, 8611, 8711, 8811, MBA student or college consent; spring, every year)
Formulation and implementation of organizational strategy and policy that results in a sustainable competitive advantage. Develop skills in integrating all functional areas of business as well as identifying industry and competitive trends to determine organizational strategy.

MBA 8501. Management Accounting. (3.0 cr.; A-F or Audit; prereq Acct 2005 or equivalent, MBA student or college consent; fall, spring, offered periodically)
Interpreting and using accounting reports and supplementary information for management planning, coordination, and control; emphasis on using accounting information for decision making in problems of product mix, cost-volume-profit analysis, and other profit planning and control areas.

MBA 8512. Managerial Economics. (2.0 cr.; A-F or Audit; prereq Econ 1022, Econ 1023 or equivalent, MBA student or college consent; fall, offered periodically)
Application of economic theory and economic methodology to managerial decision making. Supply and demand, production, consumer behavior, business and economic forecasting, pricing and marketing strategies under differing competitive conditions, government's role, and the global market.

MBA 8611. Financial Management. (3.0 cr.; A-F or Audit; prereq FMIS 3601 or equivalent, MBA student or college consent; fall, spring, offered periodically)
Overview of fundamental concepts and principles of financial management and how these analyses are implemented by financial managers in making strategic financial decisions in a corporate setting. Topics include developments in capital market theory, capital budgeting analysis in terms of the NPV and

real options approaches, costs of capital, long term financing, capital structure analysis and international financial strategies.

MBA 8711. Marketing Management. (3.0 cr.; A-F or Audit; prereq Mktg 3701 or equivalent, MBA student or college consent; fall, spring, offered periodically)
Planning, implementation, evaluation, and control of organizational marketing activities. This process includes environmental market analysis in order to achieve competitive advantage and effective resource allocation.

MBA 8811. Human Resource Challenges. (3.0 cr.; A-F or Audit; prereq MBA student or college consent; fall, spring, offered periodically)
Overview of contemporary human resource issues, human resource systems, procedures, and decisions that guide effective, efficient, and equitable management of people in organizations.

MBA 8991. Independent Study. (1.0-3.0 cr. [max 6.0 cr.]; A-F or Audit; prereq college consent; fall, spring, summer, offered periodically)
Provides opportunity for focused, integrative or interdisciplinary projects or research, under the guidance of a faculty member in various areas of business administration that extend beyond, or in greater depth than, regular courses.

MBA 8994. Directed Research. (1.0-6.0 cr.; A-F or Audit; prereq MBA student, college consent; fall, spring, summer, offered periodically)
Directed research.

MBA 8995. Special Topics: (Various Titles to be Assigned). (1.0-3.0 cr. [max 8.0 cr.]; A-F or Audit; prereq MBA student or department approval; fall, spring, summer, every year)
Special topics on or integrative, interdisciplinary study of problems in accounting, economics, and business administration.

Master of Liberal Studies (MLS) College of Liberal Arts

MLS 8001. Theories, Methods and Applications of Graduate Study. (4.0 cr.; A-F or Audit; prereq MLS candidate or instructor consent; fall, every year)
Introduction to theories, methods and applications of interdisciplinary liberal studies. This course provides M.L.S. students with a thorough review of analytical writing and research methods as well as an introduction to university disciplines and interdisciplinarity at the graduate level.

MLS 8501. Seminar: Community Engagement. (4.0 cr.; A-F or Audit; prereq graduate student and instructor consent; spring, odd years)
Examination of various community issues and means of addressing them through issue-identification, description, polity and political organization. Depending on the instructor's pedagogical goals, this course may require students to engage in work off-campus with community partners.

MLS 8591. Directed Study. (1.0-8.0 cr.; A-F or Audit; prereq MLS candidate or department consent; fall, spring, summer, every year)
Individualized study under supervision of the director of the liberal studies program.

Master of Tribal Administrative Governance (MTAG) College of Liberal Arts

MTAG 5110. Principles of Tribal Sovereignty I. (3.0 cr.; A-F or Audit; prereq MTAG student or instructor consent; fall, every year)
This course provides students with a general background of the history, development, structure, and politics associated with indigenous governments. We will examine North American indigenous governance from pre-colonial times to the present, focusing on both the evolution and alteration of these governments as well as the difficult political decisions indigenous peoples faced when confronted by the colonizing forces of European states, the U.S., and individual states, and the modifications developed by indigenous nations in their efforts to retain and exercise their sovereign powers.

MTAG 5120. Principles of Tribal Sovereignty II. (3.0 cr.; A-F or Audit; prereq 5110 or instructor consent; spring, every year)
This course examines the challenges facing tribal governments as they exercise their sovereignty and involves political, economic, and intergovernmental perspectives. Part one examines tribal resource management, analyzing historical use of land, land loss, and contemporary efforts to develop sustainable environmental plans for water, timber, wildlife, and subsurface resources. Part two focuses on the various means tribal governments have devised to exercise sovereignty, such as gaming, small business development, tourism, and joint ventures with partners. Part three concentrates attention at the sub-national level and pays close attention to the political, legal, and economics relationships that have developed between Native nations, state governments, county governments, and municipal entities.

MTAG 5210. Administration Governance I (Strategic). (3.0 cr.; A-F or Audit; prereq MTAG student or instructor consent; fall, every year)
This course will provide an overview of the integration and application of strategic management principles in tribal governments. Topics will include the development of mission statements, goals, strategies, and approaches to implementation. The course will focus on tribal strategic plans and issues specific to tribes, such as the federal-tribal relationship, tribal constitutions, and tribal ordinances and regulations. Also, the role of federal and state government policymakers as they interrelate with administrators in strategic management decisions will be studied.

MTAG 5220. Administration and Governance II (Operations). (3.0 cr.; A-F or Audit; prereq 5210 or instructor consent; spring, every year)

This course will provide an overview of organizational management theories with an emphasis on tribal governments. It will focus on the various types of tribal governments, the role of tribal managers, tribal management functions, communications processes, and management information systems design and development. It will also explore different models of delivering services on reservations, including the direct federal service model, the 638 contact model, and the self-governance compact. Also, the role of federal and state government policymakers as they interrelate with administrators in operations management decisions will be studied.

MTAG 5230. Advanced Tribal Administration and Governance I (Human Resources). (3.0 cr.; A-F or Audit; prereq 5220 or instructor consent; fall, every year)
This course will focus on the theoretical and practical aspects of solving problems, the activity that takes up the majority of a tribal manager's day. Human resource management will be emphasized. The use of tribal hypotheticals and real-life situations will be heavily relied upon. Case studies of reservations and tribal organizations will be utilized to define problems, collect and analyze data, and seek creative solutions. The use of analogy, brainstorming, the scientific method, systems analysis, and graphic representations will be studied. Also, the role of federal and state government policymakers as they interrelate with administrators on human resources matters will be studied.

MTAG 5240. Advanced Tribal Administration and Governance II (Project). (3.0 cr.; A-F or Audit; prereq 5230 or instructor consent; spring, every year)
This course will focus on the theory and implementation of project management and managing personnel engaged in project management. It will provide an overview of project management principles and concepts. Each student will select an actual reservation project and an aspect of tribal management (e.g., health care, natural resources, housing, or other area) for his or her final research paper. Each student will describe the project form beginning to end through the lens of management theory, as well as critique the implementation of the project. Also, the role of federal and state government policymakers as they interrelate with administrators on project management matters will be studied.

MTAG 5310. Foundations of Leadership and Ethics in Indigenous Community Life and Organizations. (3.0 cr.; A-F or Audit; prereq MTAG student or instructor consent; fall, every year)
This course will develop a general understanding of leadership and ethics. Content will include a survey of basic philosophies, models, figures, and applications to community-based scenarios and institutions. Western scholarship will be contrasted with Indigenous perspectives and lived experience as a means of exploring cultural difference. The role of traditional values and beliefs, internalized oppression, and contemporary

community institutional dynamics are core course topics.

MTAG 5320. Applied Leadership and Ethics in an Indigenous Organizational Context.

(3.0 cr.; A-F or Audit; prereq 5310 or instructor consent; spring, every year)

This course explores leadership and ethics in an applied context. Students will explore what it means to be an effective ethical leader from a personal and community-based perspective. This involves a critical study of organizational culture and systems-based change processes. Case studies will be used to facilitate exploration and analysis. Reflecting on theories and philosophies of ethics and leadership, students will identify a personal leadership style, and determine what it means to be a decolonized leader in contemporary community life.

MTAG 5430. Tribal Finance, Accounting and Budgets I.

(3.0 cr.; A-F or Audit; prereq MTAG student or instructor consent; fall, every year)

The course will provide an overview of financial terms, processes, agencies and laws as they apply to tribal governments. It will focus on overseeing budgeting, bookkeeping, accounting, and purchasing functions; interpreting financial statements; conducting due diligence; and negotiating indirect cost rates with the federal government. Emphasis will be placed on the role of the federal government in tribal financial management, the role of tribal sovereign immunity in financial transactions, and the roles of tribal accountants and auditors.

MTAG 5440. Tribal Finance, Accounting and Budgets II.

(3.0 cr.; A-F or Audit; prereq 5430 or instructor consent; spring, every year)

This course will focus on the federal laws and regulations that tribal managers are required to comply with annually. These laws and regulations include the Indian Gaming Regulatory Act, Title 31, the Single Audit Act, and auditing rules under the Tribal Self-Determination Act. The course will also focus on compliance with federal grants, the preparation of year-end financial statements, and the role of circulars from the federal Office of Management and Budget. The general standards for accountants and the penalties for non-compliance will be studied. The role of federal auditors and investigators will be compared to the role of tribes' internal auditors.

MTAG 5530. Federal Indian Law I.

(3.0 cr.; A-F or Audit; prereq MTAG student or instructor consent; fall, every year)

This course examines the formulation, implementation, and evolution of Indian policy from pre-colonial times to the self-governance era. This course provides a chronological framework and theoretical context in which policies, programs, and events can be seen interacting with each other to produce the cumulative body of treaties, statutes, and court decisions. Students analyze major federal Indian policies that define indigenous/federal political relationship, examining the views and attitudes of policy-makers and gauging the reactions of indigenous nations to those policies.

MTAG 5540. Federal Indian Law II.

(3.0 cr.; A-F or Audit; prereq 5530 or instructor consent; spring, every year)

Federal Indian law has had profound affect on the lives, liberties, and properties of indigenous peoples. At times, U.S. policy and Supreme Court rulings have worked to protect aboriginal rights; at other times, these policies and decisions have had devastating consequences.

This course examines the role and practice of the U.S. Supreme Court as a policy-making institution in their dealings with Indigenous nations. This examination requires us to think historically and theoretically; to question the origins and exercise of federal judicial power; and examine the application of federal law to indigenous peoples and Indian citizens.

MTAG 5997. Tribal Administration and Governance Directed Project.

(2.0 cr. [max 4.0 cr.]; S-N only; prereq 12 credits in MTAG or instructor consent; summer, every year)

The Tribal Administration and Governance Directed Project is designed to give MTAG students practical experience in the field while assisting a tribe with a project that meets their own identified priorities.

Mathematics (MATH)

Swenson College of Science and Engineering

MATH 1005. College Algebra.

(5.0 cr.; A-F or Audit; prereq Math ACT 21 or higher or SSP 0103 or department consent; fall, spring, summer, every year)

Computer based, on site course with students working at a semi-self pace taking notes in a guided notebook and completing online homework while asking the instructor questions as needed. Course topics include basic concepts of solving equations and inequalities as well as an introduction to function concepts and graphing for polynomial, rational, logarithmic, and exponential functions.

MATH 1007. Algebra Review.

(1.0 cr.; S-N or Audit; prereq Must be taken after or concurrently with MATH 1160 or 1250 or 1290 or 1296, a grade of C- or better in is required in all prerequisite courses; fall, spring, every year)

College-level algebra: solving equations and inequalities. Designed for students who need to review high-school algebra topics and/or supplement previous courses, such as College Algebra.

MATH 1024. Introduction to Contemporary Mathematics.

(LOGIC & QR; LE CAT2; 3.0 cr.; A-F or Audit; prereq Math ACT 18 or higher or SSP 0103 or department consent, a grade of C- or better in is required in all prerequisite courses; fall, spring, summer, every year)

Increases awareness and appreciation of uses, richness, and power of mathematics. Sample topics: graph theory for management science, scheduling, linear programming, statistical sampling and inference, coding information, decision making, voting theory, game theory, geometric growth, symmetry, and patterns.

MATH 1140. Mathematics for Elementary Education I.

(LOGIC & QR; 3.0 cr.; A-F or Audit; prereq Pre-ESE and Math ACT 18 or higher or a grade of at least C- in SSP 103 or

department consent; credit will not be granted if already received for Math 1141.; fall, every year)

Subject matter for effective elementary school teaching. Problem solving and structure of number systems.

MATH 1142. Mathematics for Elementary Education II.

(3.0 cr.; A-F or Audit; prereq 1140; spring, every year)

Part two of subject matter for effective elementary school teaching. Properties of geometric figures, probability, statistics.

MATH 1160. Finite Mathematics and Introduction to Calculus.

(LOGIC & QR; LE CAT2; 5.0 cr.; A-F or Audit; prereq Math ACT 24 or higher or a grade of at least C- in Math 1005 or department consent; if you have received credit for 1290 or 1296 or 1596, you will not receive credit for Math 1160.; fall, spring, summer, every year)

Elementary functions, matrices, graphical and algebraic methods for solving systems of linear equations and inequalities, introduction to linear programming, and abbreviated treatment of calculus with emphasis on business and social science applications.

MATH 1234. Freshman Seminar: Topics: (Various Titles to be Assigned).

(LE CAT2; 3.0 cr.; A-F or Audit; prereq Freshman, fewer than 30 cr.; fall, spring, offered periodically) Concepts from mathematics/statistics and their areas of use. See Class Schedule for topics.

MATH 1250. Precalculus Analysis.

(LOGIC & QR; LE CAT2; 4.0 cr.; A-F or Audit; prereq Math ACT 24 or higher or a grade of at least C- in Math 1005 or department consent; fall, spring, every year)

Inequalities, analytical geometry; relations, functions, and graphs; exponential, logarithmic, and trigonometric functions; complex numbers and De Moivre's Theorem; permutations, combinations, binomial theorem, and mathematical induction.

MATH 1290. Calculus for the Natural Sciences.

(LOGIC & QR; LE CAT2; 5.0 cr.; A-F or Audit; =[MATH 1596, MATH 1296]; prereq Math ACT 27 or higher or a grade of at least C- in Math 1250 or department consent; fall, spring, every year)

Differential and integral calculus needed for modeling in earth and life sciences.

Computational software. Not intended for students in mathematics, engineering, or physical sciences.

MATH 1296. Calculus I.

(LOGIC & QR; LE CAT2; 5.0 cr.; A-F or Audit; =[MATH 1596, MATH 1290]; prereq Math ACT 27 or higher or a grade of at least C- in Math 1250 or department consent; fall, spring, summer, every year)

First part of a standard introduction to calculus of functions of a single variable. Limits, continuity, derivatives, integrals, and their applications.

MATH 1297. Calculus II.

(LOGIC & QR; 5.0 cr.; A-F or Audit; =[MATH 1597]; prereq A grade of at least C- in 1290 or 1296 or 1596; fall, spring, summer, every year)

Second part of a standard introduction to calculus. Vectors, applications of integrals, transcendental functions, series, and multivariable functions and partial derivatives.

MATH 1596. Honors: Calculus I. (LOGIC & QR; LE CAT2; 5.0 cr.; A-F or Audit; =[MATH 1290, MATH 1296]; prereq 1250 or 3 1/2 years high school mathematics including trigonometry, department consent, a grade of C- or better in is required in all prerequisite courses; fall, every year)
First part of standard introduction to calculus of functions of single variable. Limits, continuity, derivatives, integrals, and their applications, indeterminate forms. Same as Math 1296, but with more depth, rigor, more challenging assignments. For high-ability students with excellent preparation.

MATH 1597. Honors: Calculus II. (LOGIC & QR; 5.0 cr.; A-F or Audit; =[MATH 1297]; prereq 1596 or a grade of A in 1290 or 1296, department consent; spring, every year)
Same as Math 1297, but with more depth, rigor, and challenging assignments. Techniques of integration, transcendental functions, exponentials and logarithms, infinite sequences and series, vectors, partial differentiation, and applications. Intended for high-ability students with excellent preparation.

MATH 3091. Independent Study. (1.0-3.0 cr. [max 8.0 cr.]; A-F or Audit; prereq department consent; fall, spring, summer, every year)
Directed reading and/or research in mathematics. Must be arranged with instructor and department head before registration.

MATH 3097. Internship. (1.0-3.0 cr. ; S-N or Audit; prereq Math major, department consent; fall, spring, summer, every year)
Practical, independent project in commercial, government, or industrial setting. Department approval required before beginning project.

MATH 3110. Foundations of Mathematics and Geometry. (4.0 cr.; A-F or Audit; prereq 1290, or 1296 or 1596, teaching math major, a grade of C- or better in is required in all prerequisite courses; spring, every year)
Introduction to foundations of mathematics. Non-Euclidean geometries, postlational systems, and models. History of mathematics. Importance and use of mathematics in modern society.

MATH 3120. Mathematics Tutorial Project. (1.0-2.0 cr. [max 4.0 cr.]; S-N or Audit; prereq 1290 or 1296 or 1596, SSP 3003, instructor consent, a grade of C- or better in is required in all prerequisite courses; fall, spring, summer, every year)
Primarily for tutoring 1xxx mathematics courses, under supervision of mathematics department member.

MATH 3280. Differential Equations with Linear Algebra. (4.0 cr.; A-F or Audit; prereq A grade of at least C- in 1297 or 1597; fall, spring, summer, every year)
First, second, and higher order equations; series methods; Laplace transforms; systems; software; modeling applications; introduction to vectors; matrix algebra, eigenvalues.

MATH 3298. Calculus III. (4.0 cr.; A-F or Audit; prereq A grade of at least C- in 1297 or 1597; fall, spring, summer, every year)
Third part of a standard introduction to calculus. Conic sections, vectors and vector-valued functions, partial derivatives and multiple integrals, vector fields, Green's and Stokes' theorems.

MATH 3326. Vectors and Matrics. (3.0 cr.; A-F or Audit; prereq 1297 or 1597 with a grade of C- or better; fall, every year)
Solving systems of linear equations; matrix algebra; determinants; an introduction to vector spaces, subspaces, linear independence, span, basis; coordinates, matrix transformations, eigenvalues, eigenvectors, matrix factorizations and applications to computer graphics.

MATH 3355. Discrete Mathematics. (4.0 cr.; A-F or Audit; prereq 1297 or 1597 or instructor consent, a grade of C- or better in is required in all prerequisite courses; fall, spring, every year)
Introduction to mathematical logic, predicates and quantifiers, sets, proof techniques, recursion and mathematical induction, recursive algorithms, analysis of algorithms, assertions and loop invariants, complexity measures of algorithms, combinatorial counting techniques, relations, graph theory.

MATH 3810. Applied Mathematics: Numerical Methods. (4.0 cr.; A-F or Audit; prereq previous or concurrent registration in 3280; spring, every year)
Methods for the numerical solution of mathematical problems. Computer representation of numbers; courses of error; introduction to interpolation, approximation, numerical integration, solution of linear and nonlinear systems, initial-value problem approximation; use of highly structured computer software such as MATLAB, Octave, Mathematical and/or SAGE.

MATH 3941. Undergraduate Colloquium. (1.0 cr.; S-N or Audit; prereq Math major or minor, department consent; must register during semester of 16th point; fall, spring, summer, every year)
Exposure to UMD mathematics-related colloquia. Sixteen points required: one for attending a colloquium; one for writing an acceptable report on a colloquium (at least four must be earned through writing); up to eight for giving a colloquium.

MATH 4201. Elementary Real Analysis. (4.0 cr.; A-F or Audit; prereq 3280, 3355, a grade of C- or better in is required in all prerequisite courses, no grad credit; credit will not be granted if already received for 3299; fall, spring, every year)
In-depth study of concepts fundamental to the theory of single-variable calculus, including topology of the real numbers, convergence of sequences and series, function continuity, the derivative, and the Riemann integral.

MATH 4230. Applied Mathematics: Complex Variables. (3.0 cr.; A-F or Audit; prereq 3280 with a grade of C- or better; spring, odd years)
Complex numbers and analytic functions; complex integration; complex power series,

Taylor series, and Laurent series; theory of residues; conformal mapping.

MATH 4240. Applied Mathematics: Operational Methods. (3.0 cr.; A-F or Audit; prereq 3280 with a grade of C- or better; spring, even years)
Laplace transform; Fourier series, integrals, and transforms; Sturm-Liouville operator- and boundary-value problems; orthogonal functions; operator solutions of partial differential equations.

MATH 4326. Linear Algebra. (3.0 cr.; A-F or Audit; prereq A grade of at least C- in 3280, 3355, no grad credit; fall, spring, every year)
Systems of linear equations, matrix algebra, determinants, vector spaces, subspaces, linear independence, span, basis, coordinates, linear transformations, matrix representations of linear transformations, eigenvalues and eigenvectors, diagonalization, Gram-Schmidt orthogonalization, orthogonal projection and least squares.

MATH 4370. Introduction to Abstract Algebra for Teaching Majors. (3.0 cr.; A-F or Audit; prereq 3355, 4326 or 3280, a grade of C- or better in is required in all prerequisite courses, teaching math major, cannot be used for math major elective; credit will not be granted if already received for Math 4371; no grad cr; fall, every year)
Introduction to groups and rings appropriate for students majoring in teaching mathematics.

MATH 5201. Real Variables. (4.0 cr.; A-F or Audit; prereq 4201 with a grade of C- or better; fall, every year)
Limits, sequence and series of real numbers, tests for convergence, rearrangements, summability, and the class L-SQUARED. Metric spaces; continuous functions, connectedness, completeness, compactness. Banach fixed-point theorem and Piccard existence theorem for differential equations.

MATH 5233. Mathematical Foundations of Bioinformatics. (3.0 cr.; A-F or Audit; prereq any two of the following: Biol 5233, Math 3355, CS 1511, Stat 3611 or instructor consent, a grade of C- or better in is required in all prerequisite courses; spring, every year)
Mathematical, algorithmic, and computational foundations of common tools used in genomics and proteomics. Topics include: sequence alignment algorithms and implementations (Needleman-Wunsch, Smith-Waterman, BLAST, Clustal), scoring matrices (PAM, BLOSUM), statistics of DNA sequences (SNPs, CpG islands, isochores, satellites), and phylogenetic tree methods (UPGMA, parsimony, maximum likelihood). Other topics will be covered as time permits: RNA and protein structure prediction, microarray analysis, post-translational modification prediction, gene regulatory dynamics, and whole-genome sequencing techniques.

MATH 5260. Dynamical Systems. (3.0 cr.; prereq 3280 with a grade of C- or better; fall, odd years)
Fundamentals of differential equations (existence, uniqueness, continuation of

solutions); linear systems, autonomous systems, and Poincare-Bendixson theory; periodic systems; discrete dynamical systems; bifurcation theory; chaos.

MATH 5270. Modeling with Dynamical Systems. (3.0 cr.; prereq 3280 with a grade of C- or better; spring, odd years)
Application and analysis of continuous and discrete dynamical systems. Model construction, simulation, and interpretation.

MATH 5280. Partial Differential Equations. (3.0 cr.; A-F or Audit; prereq A grade of at least C- in 3280 or grad standing; fall, even years)
Introduction, emphasizing use of Fourier series, Green's functions, and other classical techniques.

MATH 5327. Advanced Linear Algebra. (3.0 cr.; A-F or Audit; prereq Graduate student or instructor consent; spring, every year)
Vector spaces over fields, subspaces, linear transformations, matrix representations, change of basis, inner-product spaces, singular value decomposition, eigenspaces, diagonalizability, annihilating polynomials, Jordan form.

MATH 5330. Theory of Numbers. (3.0 cr.; A-F or Audit; prereq 3355 with a grade of C- or better or instructor consent; spring, even years)
Properties of integers, primes, divisibility, congruences, and quadratic reciprocity. Computational aspects include factoring algorithms and RSA cryptosystem.

MATH 5365. Graph Theory. (3.0 cr.; A-F or Audit; prereq 3355 with a grade of C- or better or instructor consent; fall, every year)
Finite graphs, including trees, connectivity, traversability, planarity, colorability, labeling, and matchings.

MATH 5366. Enumerative Combinatorics. (3.0 cr.; A-F or Audit; prereq 3355 with a grade of C- or better; spring, even years)
Permutations, combinations, binomial coefficients, inclusion-exclusion, recurrence relations, ordinary and exponential generating functions, Catalan numbers, selected topics from designs, finite geometries, Polya's enumeration formula.

MATH 5371. Abstract Algebra I. (3.0 cr.; A-F or Audit; prereq 3355 or 4326 with a grade of C- or better or grad standing or instructor consent; fall, every year)
Introduction to groups and rings and their applications.

MATH 5372. Abstract Algebra II. (3.0 cr.; A-F or Audit; prereq 5371 with a grade of C- or better or instructor consent; spring, every year)
Polynomial rings, divisibility in integral domains, field extensions, finite fields, special topic, and applications.

MATH 5810. Linear Programming. (3.0 cr.; A-F or Audit; prereq 3280 or 4326 with a grade of C- or better; spring, even years)
Motivation problems, modeling, theory of simplex method, duality and sensitivity analysis, large-scale problems, complexity, and Karmarkar algorithm.

MATH 5830. Numerical Analysis: Approximation and Quadrature. (4.0 cr.; prereq 3280 or 4326 with a grade of C- or better, proficiency in FORTRAN or C or C++; fall, every year)

Error analysis, interpolation and approximation, numerical integration, solution of nonlinear systems.

MATH 5840. Numerical Analysis: Systems and Optimization. (4.0 cr.; prereq 3280 or 4326 with a grade of C- or better, proficiency in FORTRAN or C or C++; spring, odd years)
Solution of systems of linear equations; elimination and factorization methods; iterative methods; error analysis; eigenvalue/eigenvector approximation; unconstrained optimization; nonlinear least squares.

MATH 5850. Numerical Differential Equations. (4.0 cr.; A-F or Audit; prereq 3280 with a grade of C- or better, proficiency in FORTRAN or C or C++; spring, even years)
Computational differencing techniques as applied to initial- and boundary-value problems. Introduction to variational formulations of differential equations and general technique of weighed residuals.

MATH 5991. Independent Study. (1.0-4.0 cr. [max 8.0 cr.]; A-F or Audit; prereq department consent; Maximum 6 credits to a grad program.; fall, spring, summer, every year)
Directed individual reading and/or research in mathematics; must be arranged with instructor and department head before registration.

MATH 8201. Real Analysis. (3.0 cr.; A-F or Audit; prereq 5201 with a grade of C- or better; spring, offered periodically)
Rigorous development of abstract measure spaces, measurable functions, and corresponding theory of integration. Lebesgue measure and Lebesgue integral developed as a particular model. (offered alt yrs)

MATH 8333. FTE: Master's. (1.0 cr.; No Grade Associated; prereq Master's student, adviser and DGS consent; fall, spring, summer, every year)
(No description)

MATH 8777. Thesis Credits: Master's. (1.0-18.0 cr. [max 50.0 cr.]; No Grade Associated; prereq Maximum 18 credits per semester or summer; 10 credits total required (Plan A only); fall, spring, summer, every year)
(No description)

MATH 8811. Mathematics Seminar. (3.0 cr.; S-N or Audit; prereq 8980 with a grade of C- or better; spring, offered periodically)
Applications of mathematical and computational modeling methods; high-performance computation, visualization, and modeling techniques. Case-study analyses of models from areas such as the sciences, medicine, engineering, and industry.

MATH 8980. Graduate Seminar. (1.0 cr.; A-F or Audit; prereq instructor consent; fall, every year)
Survey of applications of discrete, continuous, and stochastic modeling techniques. For first-year graduate students in applied and computational mathematics.

MATH 8994. Directed Research. (1.0-4.0 cr. [max 12.0 cr.]; A-F or Audit; prereq instructor consent; fall, spring, summer, every year)
TBD

Mechanical Engineering (ME)

Swenson College of Science and Engineering

ME 2105. Introduction to Material Science for Engineers. (3.0 cr.; A-F or Audit; prereq Chem 1151 or 1153 and 1154; credit will not be granted if previous given for Engr 2110 or IE 2105.; fall, spring, every year)
Structures and properties of engineering materials, emphasizing metals, composites, polymers, and ceramics.

ME 2211. Thermodynamics. (3.0 cr.; A-F or Audit; prereq PHYS 2013, BSME or BSCE or BSCE or BSEE candidate or instructor consent; credit will not be granted if already received for ME 3211; fall, spring, every year)
Thermodynamics, thermodynamic properties of liquids and gases, 1st and 2nd laws of thermodynamics, irreversibility and entropy. Carnot systems, work producing systems, combustion engine cycles, work absorbing systems, refrigeration cycles, psychrometrics.

ME 2226. Dynamics. (3.0 cr.; A-F or Audit; =[ENGR 2026]; prereq CE 2017 and Math 3280 (concurrent registration allowed); fall, spring, every year)
Review of particle dynamics. Mechanical systems and rigid-body model. Kinematics and dynamics of plane systems.

ME 3111. Fluid Mechanics. (3.0 cr.; A-F or Audit; prereq Engr 2026 or ME 2226, ME 2211 or 3211, BSME candidate or instructor consent; credit will not be granted if already received for ChE 3111 or CE 3221; fall, spring, every year)
Mass and energy balances, Bernoulli's Equation, momentum balance, laminar and turbulent flow, boundary layer theory, flow through porous media.

ME 3140. System Dynamics and Control. (3.0 cr.; A-F or Audit; prereq CS 1121 or 1131 or 1211 or 1511 or 2121, ECE 2006, Math 3280, BSME candidate or instructor consent; fall, spring, every year)
Mathematical modeling of mechanical, electrical, thermal, fluid, and hybrid systems. System response using numerical integration and Laplace transforms. Fourier transform and convolution. Transfer functions and frequency response. Classical control theory.

ME 3222. Controls and Kinematics Laboratory. (2.0 cr.; A-F only; prereq 3140 with a grade of C- or better and 3230 (concurrent registration allowed); fall, spring, every year)
Perform computer simulations and hands on laboratory exercises to explore effective control systems design. Robotic programming exercises using industrial robots will be performed. Design and construction of mechatronic devices will be completed.

ME 3230. Kinematics and Mechatronics. (3.0 cr.; A-F only; =[IE 4135]; prereq 3140, Math 3298; spring, every year)

Classical closed and open form kinematics modeling will be developed. Use of Denavit Hartenberg structural analysis will be explored. Kinetic models of structures will be developed. Explores the design and use of mechatronic devices.

ME 4050. Fundamentals of Nuclear

Engineering. (3.0 cr.; A-F or Audit; prereq Chem 1151 or Chem 1153 and 1154, Math 3280, Phys 2012 or 2015 and 2016; no grad credit; spring, odd years)

Introduction to the fundamentals of nuclear engineering including atomic and nuclear physics, fission, fusion, isotopes, radioactivity, nuclear reactions, radiation detection, criticality, and reactor kinetics. Overview of types of reactors and some operational considerations.

ME 4060. Machine Vision and Image Based

Robot Control. (3.0 cr.; A-F or Audit; prereq CS 1511, Math 3280, ME 3140 or equivalent; no grad credit; fall, even years)

Senior-level course on vision and control. In this course, students will be introduced to the up-to-date techniques of autonomous image-based robot control. The covered topics include algorithms on image acquisition, camera calibration, object identification, and visual servoing. The methods and concepts introduced will be combined with engineering applications such as obstacle avoidance in traffic safety, image-guided robotic surgery, and human-robot interaction in life support. Through this course, student will acquire both hardware and software development experiences on vision-based robot control, which could be directly applied to their future engineering career or advanced academic pursuance.

ME 4112. Heat and Mass Transfer. (3.0 cr.; A-F or Audit; = [CHE 3112]; prereq 3111, Math 3298, BSME or BSChE candidate or instructor consent; fall, spring, every year)

Theory and practice of heat and mass transfer. Fundamentals of diffusion, conduction, convection, and radiation with application to the design of heat and mass transfer equipment and systems.

ME 4122. Heat Transfer, Thermodynamics and Fluid Mechanics Laboratory. (2.0 cr.; A-F or Audit; prereq Must be taken after or concurrently with ME 4112 or ChE 3112 or instructor consent, BSME candidate; fall, spring, every year)

Heat transfer and Thermo-Fluids lab, experimental evaluation of conductive, convective and radiation heat transfer, and analysis of performance of various energy systems such as compressors, turbines, fans, refrigerators and combustion engines.

ME 4135. Robotics and Controls. (3.0 cr.; A-F or Audit; prereq ME 3140, 3230, ENGR 2026 or ME 2226, BSME or BSIE candidate or instructor consent; fall, offered periodically) Exploration of Forward and Inverse Kinematics models for individual robots. Study of robot motion trajectories at the micro- and macroscopic level. Study of PE, PD and PID controllers for robots. Exploration of efficient methods for developing stable controllers for various geometric configurations.

ME 4145. CAD/CAM. (4.0 cr.; A-F or Audit; prereq IE 1225 or Engr 1222, Engr 2016 or CE 2017, BSME cand, or instructor consent; credit will not be granted if already received for IE 4145; fall, spring, every year)

Description of hardware for CAD/CAM, principles of solid modeling, data structures, visualization, calculation of mass properties, surface modeling. Introduction to FEM usage, lab use of CAD/CAM system for solid modeling, cutter path generation, and FEM problems in vibration, stress analysis.

ME 4175. Machine Design. (3.0 cr.; A-F or Audit; prereq Engr 2016 or CE 2017 and ME 2105, BSME candidate or instructor consent; credit will not be granted if already received for IE 4175; fall, spring, every year)

Analysis of mechanical components as used in mechanical devices. Theories of material failures, lubrication, and corrosion. Design of machinery considering performance, safety, packaging, wear, and recycling.

ME 4196. Cooperative Education. (1.0 cr. [max 2.0 cr.]; A-F or Audit; = [IE 4196]; prereq BSME candidate, instructor consent, no grad credit; fall, spring, summer, every year)

Practical work experience with employer closely associated with student's academic area; arranged by mutual agreement among student, department, and employer. Biweekly status reports and final written report must be submitted to department.

ME 4255. Multidisciplinary Senior Design.

(4.0 cr.; A-F or Audit; = [IE 4255]; prereq 3230, 4112, 4175, EMgt 4110, BSME candidate, or instructor consent, no grad credit; fall, spring, every year)

Capstone design course in mechanical engineering. Project Management, problem definition, root cause analysis, baseline analysis, alternative solutions, analysis, reporting. Societal, economic, ethical, environmental, political considerations. Oral and written reports. Work is in teams focused on industrial or competition-based projects.

ME 4296. Cooperative Education II. (2.0 cr.; A-F or Audit; prereq 4196 or IE 4196; no grad credit; fall, spring, summer, every year)

Advanced practical work experience with employer closely associated with student's academic area; arranged by mutual agreement among student, department, and employer. Biweekly status reports and final written report must be submitted to department.

ME 4365. Global Sustainability Experience in Design/Manufacturing in Africa. (3.0 cr.; A-F or Audit; prereq 2105, IE 3130; summer, every year)

Sustainability within the manufacturing and design context will be taught and explored. As we live in a global economy, this course exposes students to some of the leaders in sustainability and alternative businesses and manufacturing methods, reinforced by visits to local manufacturing facilities, art centers, museums, and historical villages in Ghana. Also cultural activities including: cultural dance, keyboarding, textile dying, and basketweaving are integrated into the experience. Students will

design and manufacture procure like bicycle, water faucet, using local environmentally friendly material like bamboo. An Eco-tool audit software is used to analyze and select material and manufacturing processes at design state that have low environmental impact and energy efficient.

ME 4375. Pipeline Engineering. (3.0 cr.; A-F or Audit; prereq ME 3111 or ChE 3111 or CE 3221; spring, offered periodically)

Overview of basic elements of pipeline transportation. Multi-disciplined introduction to concepts and methods of Pipeline Engineering. Topics include Mechanical, Electrical and Geotechnical Design, Hydraulics, Route Selection, Materials Selection, Construction, Operation and Maintenance.

ME 4491. Independent Study in Mechanical

Engineering. (1.0-4.0 cr. ; prereq Senior standing in engineering discipline, instructor consent; fall, spring, summer, every year) Directed study of special interest topics not available in standard curriculum. Must be arranged with instructor before registration. May include readings, research and/or special projects.

ME 4495. Special Topics: (Various Titles to be Assigned). (1.0-4.0 cr. [max 12.0 cr.]; A-F or Audit; prereq BSME candidate or instructor consent, no grad credit; fall, spring, summer, every year)

Topics not available in regular department curriculum. May involve specialties of department or visiting faculty.

ME 5305. Computational Fluid Dynamics.

(3.0 cr.; A-F only; prereq 4112 (concurrent registration allowed) or ChE 3112, BSChE, or BSME or BSIE candidate or instructor consent; spring, odd years)

Finite-difference methods for steady and transient diffusion and convection-diffusion problems. Finite-volume technique for the solution of multi-dimensional fluid flow, and heat and mass transfer problems. Utilize CFD software to solve complex problems.

ME 5315. Nondestructive Evaluation of Engineering Materials. (3.0 cr.; A-F only; prereq 3140; fall, offered periodically)

Fundamentals of Ultrasonic and Acoustic Emission NDE are considered including wave propagation, experimental measurement systems, flaw detection and characterization, and material characterization. Labs are used to support the study of ultrasonic and acoustic emission NDE. Other NDE techniques including magnetics, penetrants, eddy currents, thermography, are surveyed.

ME 5325. Sustainable Energy System. (3.0 cr.; A-F only; = [EE 5501]; prereq 3211, BSChE or BSECE or BSIE or BSME candidate, or instructor consent; spring, even years)

A comparison of different energy systems will be made in terms of economic, environmental and political implications. Specific energy alternatives will include coal, oil, geothermal, bioenergy, solar, wind, fission, fusion, hydrogen, fuel cell.

ME 5335. Introduction to Finite Element Analysis. (3.0 cr.; A-F only; prereq Engr

2016, BSME or BSIE or MSEM candidate or instructor consent; fall, even years)

An introduction to finite element analysis, including theoretical and applied components in mechanical and thermal systems.

ME 5345. Smart Materials and Structures.

(3.0 cr.; A-F or Audit; prereq 3140, 3222; spring, odd years)

Introduction to smart materials and structures, such as piezoelectric materials, shape memory alloys, magnetostrictive materials, adaptive structures, and active vibration control systems. The course will cover their material properties, modeling methods, and engineering applications in sensors, actuators, energy harvesting, and biomedical devices.

ME 5355. Gas Turbines. (3.0 cr.; A-F or Audit; prereq 3111, 3211 and BSME or MEng or MSEM or instructor consent; fall, even years)

Gas turbine cycles, regenerations, recuperation, reheat, intercooling, combined cycle plants, and thermochemical regeneration. Axial and radial flow compressors and turbines; combustor designs, energy analysis, emissions, and noise. Turbojet, fanjet, turboprop engine performance. Stationary power plants.

ME 5991. Independent Study in Mechanical Engineering. (1.0-4.0 cr. [max 6.0 cr.]; prereq MSEM candidate, department consent; fall, spring, summer, offered periodically)

Directed study of special interest topics not available in standard curriculum. Must be arranged with instructor before registration. May include readings, research and/or special projects.

ME 8310. Mechanical Engineering Capstone Project. (3.0 cr.; A-F or Audit; prereq MEng or MSME candidates and minimum of 12 credits successfully completed or department consent; fall, spring, summer, every year)

Capstone project in which each student should utilize their acquired mechanical engineering skills and demonstrate their mastery of mechanical engineering concepts by completing a well-defined project that addresses a real-world problem. The project is to be documented with a formal paper and an oral presentation.

Medical Microbiology and Immunology (MICB)

Medical School - Duluth Campus

MICB 5545. Immunobiology. (3.0 cr.; A-F or Audit; prereq department consent; fall, every year)

The immune system including the cells and molecules which work cooperatively to resist disease and aberrations resulting in immune disorders.

MICB 5546. Immunopathology. (3.0 cr.; A-F or Audit; prereq 5545, instructor consent; spring, every year)

A rigorous analysis of the immune-defense mechanisms in disease processes, including infection, inflammation and autoimmune disorders utilizing the Problem-Based Learning

method to address the selected content and to study current technical literature.

MICB 5555. Molecular Pathogenesis:

Current Concepts. (3.0 cr.; A-F or Audit; prereq Biol 2201 or equivalent, Biol 4501 or equivalent or instructor consent; spring, odd years)

Study of current discoveries in microbial pathogenesis and the molecular techniques used in elucidating pathogenic mechanisms of viral, bacterial and parasitic agents. A survey of current literature related to human infectious disease including malignant transformation.

MICB 5591. Problems in Medical

Microbiology and Immunology. (1.0-4.0 cr. [max 8.0 cr.]; prereq Open to med students or qualified upper division and grad students with instructor consent; fall, spring, summer, every year)

Independent study on tutorial basis. Emphasis on basic and clinical microbiology problems, including immunology. Investigative work and appropriate reading arranged with tutorials consistent with interests and capabilities of individual students.

MICB 8333. FTE: Master's. (1.0 cr.; No Grade

Associated; prereq Master's student, adviser and DGS consent; fall, spring, every year) (No description)

MICB 8444. FTE: Doctoral. (1.0 cr.; No Grade

Associated; prereq Doctoral student, adviser and DGS consent; fall, spring, every year) (No description)

MICB 8554. Advanced Immunology and Immunobiology. (2.0 cr.; A-F or Audit; prereq

5545 or instructor consent; spring, every year) Detailed study of mechanisms involved in immunologic defense. Emphasis on concepts and current literature.

MICB 8777. Thesis Credits: Master's.

(1.0-18.0 cr. [max 50.0 cr.]; No Grade Associated; prereq Max 18 cr per semester or summer; 10 cr total required (Plan A only); fall, spring, every year) (No description)

MICB 8888. Thesis Credits: Doctoral.

(1.0-24.0 cr. [max 100.0 cr.]; No Grade Associated; prereq Max 18 cr per semester or summer; 24 cr required; fall, spring, every year) (No description)

Medical and Molecular Physiology (PHSL)

Medical School - Duluth Campus

PHSL 3011. General Physiology. (4.0 cr.; A-F or Audit; prereq Biol 1761 or Chem 1102 or instructor consent; spring, every year)

Lectures and demonstrations illustrate key aspects of function and mechanisms of action of major organ systems. Primarily for students preparing for nursing, dental hygiene, pre-professional programs, communication disorders, life science teaching, majors in natural sciences.

PHSL 5211. Literature Seminar. (1.0-2.0 cr. ; S-N or Audit; fall, spring, every year)

Oral presentation of written literature review and research data reflecting student's research interests and thesis research results.

PHSL 5292. Readings in Physiology.

(1.0-3.0 cr. ; prereq instructor consent; fall, spring, summer, every year) Topics in physiology selected for each student; written reviews prepared and discussed.

PHSL 5294. Research in Physiology.

(1.0-15.0 cr. ; prereq instructor consent; fall, spring, summer, every year) Introduction and use of lab techniques and equipment used for research in various subspecialties of physiology, including neurophysiology, cardiovascular physiology, endocrinology, respiratory and transport process, electrophysiology, and renal physiology.

PHSL 5601. Physiology of Organ Systems I. (4.0 cr.; A-F or Audit; prereq Biol 2101 or Biol 2201 or Chem 3322 or 4341 or instructor consent; fall, every year)

Survey of physiologic functions and interrelationships of organ systems in mammals (musculoskeletal, cardiovascular, renal, respiratory, nervous, endocrine, and reproductive). Framework for understanding physiological processes, allowing students to integrate knowledge gained at molecular level with functions of whole organism.

PHSL 5602. Physiology of Organ Systems II.

(2.0 cr.; A-F or Audit; prereq 5601 or instructor consent; spring, every year) Advanced study of organ system functions in context of interaction of organism with environment.

PHSL 8333. FTE: Master's. (1.0 cr.; No Grade

Associated; prereq Master's student, adviser and DGS consent; fall, spring, every year) (No description)

PHSL 8401. Physiology of Aging. (2.0 cr.;

prereq 5601, instructor consent; fall, spring, every year) In-depth study of several theories concerning physiological processes that appear to set the limits of maximum human life span.

PHSL 8405. Muscle Physiology. (2.0 cr.; A-F or Audit; prereq 5601, instructor consent; fall,

spring, every year) In-depth review and discussion of physiological processes involved in muscle contraction from subcellular events to neural-controlled function of whole muscle (skeletal, cardiac, and smooth muscle).

PHSL 8415. Special Topics: (Various Titles to be Assigned). (2.0 cr.; prereq 5601,

instructor consent; fall, spring, every year) Selected topics of current endocrine research interest examined in depth; historical background, questions posed by current research, and implications of current research for future development in the area.

PHSL 8441. Transport Processes. (2.0 cr.;

prereq 5601, instructor consent; fall, spring, every year) In-depth, quantitative approach to transport processes in biological systems.

PHSL 8444. FTE: Doctoral. (1.0 cr.; No Grade Associated; prereq Doctoral student, adviser and DGS consent; fall, spring, every year)
(No description)

PHSL 8666. Doctoral Pre-Thesis Credits. (1.0-6.0 cr. [max 12.0 cr.]; No Grade Associated; prereq Max 6 cr per semester or summer; doctoral student who has not passed prelim oral; no required consent for the first two registrations up to 12 cr; departmental consent for the third and fourth registrations up to an additional 12 cr, or 24 cr total (for doctoral students admitted summer 2007 and beyond; doctoral students admitted prior to summer 2007 may register up to 4 times totaling 60 cr); fall, spring, summer, every year)
(No description)

PHSL 8777. Thesis Credits: Master's. (1.0-18.0 cr. [max 50.0 cr.]; No Grade Associated; prereq Max 18 cr per semester or summer; 10 cr total required (Plan A only); fall, spring, summer, every year)
(No description)

PHSL 8888. Thesis Credits: Doctoral. (1.0-24.0 cr. [max 100.0 cr.]; No Grade Associated; prereq Max 18 cr per semester or summer; 24 cr required; fall, spring, summer, every year)
(No description)

Medicine (MED)

Medical School - Duluth Campus

MED 405. Stepping Stones to Health Careers. (0.0 cr.; prereq Department consent required.; summer, every year)
The Stepping Stones to Health Career program is a residential program for American Indian students entering grades 10, 11 or 12. Students will explore health-related sciences, healthy living, research, and college preparation. Each week we will have different topics and activities. Current medical students provide advice and inspiration as they interact with the participants in various activities during the sessions. Students may participate in week 1, week 2 or both weeks but must return home between week 1 and week 2. On campus housing and meals are provided. Students are required to stay on campus.

MED 601. Basic Science I. (0.0 cr.; P-N or Audit; prereq Regis Med Student; fall, spring, summer, every year)
For selected medical students working toward an M.D. who are doing continuing work in their first year. Students must be recommended by the Scholastic Standing Committee or associate dean for student affairs. May be repeated.

MED 602. Basic Science II. (0.0 cr.; P-N or Audit; prereq Regis Med Student; fall, spring, summer, every year)
For selected students working towards an M.D. who are doing continuing work in their second year. Students must be recommended by the Scholastic Standing Committee or associate dean for student affairs. May be repeated.

MED 691. Independent Study. (0.0 cr.; P-N or Audit; prereq Regis Med Student; fall, spring, every year)
For selected medical students working toward an M.D. who are pursuing independent study (e.g., remedial coursework, repeating a course, medical leave). Students must be recommended by the Scholastic Standing Committee or associate dean for student affairs.

MED 693. Directed Study. (0.0 cr.; No Grade Associated; prereq Regis Med Student; fall, spring, summer, every year)
For selected medical students working toward an M.D. who are in a supervised program preparing for the National Boards Exam. Students must be recommended by the Scholastic Standing Committee or associate dean for student affairs.

MED 694. Research. (0.0 cr.; P-N or Audit; prereq Regis Med Student; fall, spring, every year)
For selected medical students working toward an M.D. who are doing research over an extended period of time. Students must be recommended by the Scholastic Standing Committee or associate dean for student affairs. May be repeated.

MED 3998. Human Biology and Behavior Topics. (1.0-10.0 cr. [max 12.0 cr.]; prereq instructor consent; fall, spring, every year)
Advanced undergraduate or graduate students can study in depth normal human biology and behavior. During the academic year, students may elect to enroll in one or several subtopics. No basic science clinical correlation.

MED 5085. Medical Research Ethics, Responsible Conduct of Research. (1.0 cr.; S-N only; prereq instructor consent; fall, every year)
Designed for postdoctoral fellows and graduate and undergraduate students to define and investigate ethical behavior in research. The potential pitfalls encountered when doing medical research also will be emphasized. Topics include morality and ethics; rationale for training in responsible conduct of research; definition of research misconduct; fabrication and falsification; conflict of interest; financial misconduct; authorship; grant writing; peer review; mentorship; animal research issues; human research issues; technology transfer; gender/race issues; and whistleblowing

MED 6023. Seminars in Indian Health. (1.0-2.0 cr. [max 3.0 cr.]; P-N or Audit; prereq 2nd year med student; spring, every year)
Current issues impacting health of Indian people. Causes of morbidity and mortality, including social, cultural, and economic issues. Discussion focuses on solutions to problems in context of Indian communities.

MED 6102. Introduction to Rural Family Medicine. (4.0 cr.; P-N Grade Basis; prereq Registered medical student; fall, every year)
The Introduction to Rural Family Medicine course for first year medical students illustrates the positive qualities of practicing primary care medicine in rural Minnesota. This course

will include lectures, panel discussions, small group discussion, and a site visit to a rural community in Minnesota. Also included in this course are didactic lectures and hands-on learning of medical interviewing and physical examination skills taught in a small group setting.

MED 6420. Introduction to Rural Family Medicine. (2.0 cr.; P-N or Audit; prereq Regis med student; fall, spring, summer, every year)
Introduces medical students to rural medicine and community health assessments through lecture, panel discussions, small group encounters and rural community site visits.

MED 6520. Foundations of Medicine. (9.0 cr. [max 18.0 cr.]; P-N Grade Basis; prereq Regis med student; fall, every year)
Introduction to cellular homeostatic principles and mechanisms associated with normal and abnormal structure and function. Basic science principles of integrative medical sciences. Interdisciplinary sessions emphasize fundamental concepts of biochemistry, molecular biology, anatomy, microbiology, physiology, and pharmacology.

MED 6530. Rural Medical Scholars Program I (RMSP I). (4.0 cr.; P-N Grade Basis; prereq Medical School Student; summer, every year)
Rural Family Medicine, Native American and Minority students clinical, cultural, interprofessional and community experiential program, As health care professional in-training the learner will participate in acute an longitudinal care, electronic portfolio use and Faculty Advisor interaction to develop an understanding of rural medicine and educational competencies. The preceptorship course will occur in conjunction with Rural Family Medicine.

MED 6531. Rural Medical Scholars Program II (RMSP II). (4.0 cr.; P-N Grade Basis; prereq Medical Student; spring, every year)
Rural Family Medicine, Native American and Minority students clinical, cultural, interprofessional and community experiential program, As health care professional in-training the learner will participate in acute an longitudinal care, electronic portfolio use and Faculty Advisor interaction to develop an understanding of rural medicine and educational competencies. The preceptorship course will occur in conjunction with Rural Family Medicine.

MED 6541. Hematology Immunology Oncology. (9.0 cr.; P-N Grade Basis; prereq Regis med student; summer, every year)
Introduction to principles of human immunology and hematology. Basic science principles, including pharmacology and pathology together with clinical aspects of innate and acquired immunity within context of hemato-lympho-reticular system.

MED 6566. Cardiovascular Respiratory, Renal, Acid-Base Medicine 1. (8.0 cr.; P-N Grade Basis; prereq Regis med student; fall, spring, every year)
Integrated comprehensive overview of cardiovascular system. Anatomical, biochemical, physiological, pathological, and

pharmacologic aspects of heart, blood vessels, and blood, including histology, embryology, anatomy, gross and microscopic pathology, as well as clinical features, diagnosis, and pharmacological therapy.

MED 6573. Neurological Medicine. (11.0 cr.; P-N Grade Basis; prereq Registered med student or instructor consent; spring, every year)

Interdisciplinary study of human nervous system, including consideration of eye and ear. Basic sciences of anatomy, behavioral science, biochemistry, microbiology, pathology, pharmacology, and physiology correlated with clinical material.

MED 6724. Gastrointestinal Medicine. (6.0 cr.; P-N Grade Basis; prereq Registered med student; spring, every year)

Interdisciplinary integrative course discusses fundamental concepts of anatomy, physiology, nutrition, pathology, clinical medicine, and microbiology as they relate to issues of gastrointestinal and hepatobiliary system.

MED 6728. Cardiovascular Respiratory, Renal, Acid-Base Medicine 2. (8.0 cr.; P-N Grade Basis; prereq Registered med student; fall, every year)

Maintenance and regulation of human internal environment by the respiratory system. Histology of upper airways and lungs; respiratory gas exchange; introduction to respiratory component of acid-base balance. Integrative lab covering cardiovascular-respiratory adjustments to exercise.

MED 6762. Hormonal and Reproductive Medicine. (5.0 cr.; P-N Grade Basis; prereq Registered med student; summer, every year)

Structure and function of endocrine and reproductive systems. Essential background for understanding findings of clinical medicine related to endocrine regulation of reproduction and homeostasis.

MED 6788. Skin/Musculoskeletal System.

(5.0 cr.; P-N Grade Basis; prereq Registered med student; spring, summer, every year) Interdisciplinary study of integument and musculoskeletal system. Basic sciences of anatomy, microbiology, pathology, pharmacology, and physiology correlated with clinical material.

MED 6997. Summer Internship in Medicine. (3.0-12.0 cr. ; P-N or Audit; prereq Registered med, satisfactory completion of first year of medical school, instructor consent; summer, every year)

Medical students, typically between their first- and second-year of medical school, may elect to participate in either directed clinical experiences in small communities or research studies.

Music (MU)

School of Fine Arts

MU 100. Recital Hour. (0.0 cr.; S-N only; prereq Concurrent registration in applied instruction; fall, spring, every year)
Attendance at scheduled musical events.

MU 200. Basic Piano Proficiency. (0.0 cr.; S-N only; prereq 1421, 1422, 2422; fall, spring, summer, every year)

Departmental basic piano proficiency exam

MU 250. Advanced Piano Proficiency. (0.0 cr.; S-N only; prereq 200; fall, spring, summer, every year)

Departmental advanced piano proficiency exam.

MU 300. Advanced Standing Exam. (0.0 cr.; S-N only; prereq three semesters of 1xxx level applied study, department consent; fall, spring, every year)

Applied performance requirement to qualify for advanced applied study.

MU 1001. Introduction to Music. (FINE ARTS; LE CAT9; LEIP CAT09; 3.0 cr.; prereq Not for music majors or minors; fall, spring, every year)

Various historical style periods; listening to develop understanding and enjoyment of music.

MU 1003. Beethoven to the Beatles. (LE CAT9; 3.0 cr.; fall, spring, every year)
Survey of 19th- and 20th-century classical, jazz, rock, pop, and ethnic music genres.

MU 1004. Music in Film. (FINE ARTS; 3.0 cr.; A-F or Audit; fall, spring, every year)

Music in Film explores several aspects of music in motion pictures including its connection to other orchestral music styles, modern and historical, and how it aids in the entertainment of the film. This course examines how many modern films use musical storytelling techniques to add to the film's narrative.

MU 1005. Jazz Studies. (FINE ARTS; LE CAT9; CDIVERSITY; LECD CAT09; 3.0 cr.; A-F only; fall, spring, every year)

Evolution of jazz; social problems in America that fostered its origin and continues to shape its development.

MU 1010. Introductory Theory. (2.0 cr.

[max 4.0 cr.]; A-F only; prereq Music major or musical theatre major or department consent, must be taken after or concurrently with 1011; credit will not be granted if already received for Th 1114, MU 1112; fall, every year)

Introduction to basic Western theoretical concepts: music reading, key signatures, key signatures, intervals, scale and chord construction, elementary harmonic analysis, basic time signatures and rhythms, form, terminology, elementary keyboard, transposition, and musical communication with other musicians. Prepares students for successful entry into MU 1111 (Tonal Harmony I).

MU 1111. Tonal Harmony I. (3.0 cr.; A-F or Audit; prereq Music major or music minor; credit will not be granted if already received for Mu 1010 or Th 1114; fall, every year)

Introduction to four-part harmony, Common Practice methods of composition and analysis.

MU 1112. Ear-Training and Sight-Singing I. (1.0 cr.; A-F only; prereq Music major or music minor; credit will not be granted if already

received for Mu 1112 or Th 1114; fall, every year)

Introduction to ear-training and sight-singing of tonal music.

MU 1121. Tonal Harmony II. (3.0 cr.; A-F only; prereq 1111; spring, every year)

Continued study of four-part harmon, Common Practice methods of composition and analysis. Introduction to secondary dominants and modulation.

MU 1122. Ear-Training II. (1.0 cr.; A-F only; prereq 1112; spring, every year)

Continued study of ear-training and sight-singing of tonal music.

MU 1311. Voice-Major. (2.0-3.0 cr. [max 18.0 cr.]; A-F only; prereq Music major, department consent, performance majors register for 3 cr in major instrument only; all others register for 2 cr; fall, spring, every year)

Individual lesson weekly plus arranged group lessons.

MU 1312. Voice-Non Major. (1.0 cr. [max 12.0 cr.]; A-F or Audit; prereq Non-music major or music major secondary instr; may be repeated; fall, spring, summer, every year)
Individual lesson: one-half hour weekly.

MU 1321. Piano-Major. (2.0-3.0 cr. [max 18.0 cr.]; A-F only; prereq Prereq-Music major, performance majors register for 3 cr; all others register for 2 cr.; fall, spring, every year)
Individual lesson weekly plus arranged group lessons.

MU 1322. Piano-Non Major. (1.0 cr. [max 12.0 cr.]; A-F or Audit; prereq Non-music major or music major sec instr; may be repeated; fall, spring, summer, every year)
Individual lesson: one-half hour weekly.

MU 1325. Jazz Piano-Major. (2.0-3.0 cr. [max 18.0 cr.]; A-F only; prereq Prereq-Music major, performance majors register for 3 cr; all others register for 2 cr.; fall, spring, every year)
Individual lesson weekly plus arranged group lesson.

MU 1326. Jazz Piano-Non Major. (1.0 cr. [max 12.0 cr.]; A-F only; prereq Non-music major or music major sec instrument; fall, spring, every year)
Individual lesson: one-half hour weekly.

MU 1327. Jazz Applied. (2.0 cr. [max 20.0 cr.]; A-F or Audit; prereq 2803, instructor consent; fall, spring, every year)
Individual instruction in jazz music, focusing on jazz literature, jazz improvisation and jazz styles. For jazz studies majors only.

MU 1328. Jazz Applied. (1.0 cr. [max 12.0 cr.]; A-F only; prereq Non-music major or music major secondary instrument; instructor consent; fall, spring, every year)
Individual lesson; 1/2 hour weekly.

MU 1331. Organ-Major. (2.0-3.0 cr. [max 18.0 cr.]; A-F only; prereq Prereq-Music major, performance majors register for 3 cr; all others register for 2 cr.; fall, spring, every year)
Individual lesson weekly plus arranged group lesson.

MU 1332. Organ-Non Major. (1.0 cr. [max 12.0 cr.]; A-F or Audit; prereq Non-music major or music major sec instr; may be repeated; fall, spring, every year)
Individual lesson: one-half hour weekly.

MU 1350. Violin - Non-Major. (1.0 cr. [max 12.0 cr.]; A-F or Audit; prereq Non-music major or music major sec instrument; fall, spring, summer, every year)
Individual violin lesson: on-half hour weekly

MU 1351. Violin - Major. (2.0-3.0 cr. [max 18.0 cr.]; A-F only; prereq Music major, performance majors register for 3 cr; all others register for 2 cr.; fall, spring, every year)
Individual violin lesson weekly plus arranged group lesson.

MU 1352. Viola - Non-Major. (1.0 cr. [max 12.0 cr.]; A-F or Audit; prereq Non-music major or music major sec instrument; fall, spring, summer, every year)
Individual violin lesson: one-half hour weekly.

MU 1353. Viola - Major. (2.0-3.0 cr. [max 18.0 cr.]; A-F or Audit; prereq Music major, performance majors register for 3 cr; all others register for 2 cr.; fall, spring, summer, every year)
Individual viola lesson weekly plus arranged group lesson.

MU 1354. Cello - Non-Major. (1.0 cr. [max 12.0 cr.]; A-F or Audit; prereq Non-music major or music sec instrument; fall, spring, summer, every year)
Individual cello lesson on half-hour weekly

MU 1355. Cello - Major. (2.0-3.0 cr. [max 18.0 cr.]; A-F or Audit; prereq Music major, performance majors register for 3 cr; all others register for 2 cr.; fall, spring, summer, every year)
Individual cello lesson weekly plus arranged group lesson.

MU 1356. Harp - Non-Majors. (1.0 cr. [max 12.0 cr.]; A-F or Audit; prereq Non-music major or music major sec instrument; fall, spring, summer, every year)
Individual harp lesson one half-hour weekly

MU 1357. Harp - Major. (2.0-3.0 cr. [max 18.0 cr.]; A-F only; prereq Music major, performance majors register for 3 cr; all others register for 2 cr.; fall, spring, every year)
Individual harp lesson weekly plus arranged group lesson.

MU 1358. Bass - Non-Majors. (1.0 cr. [max 12.0 cr.]; A-F or Audit; prereq Non-music major or music major sec instrument; fall, spring, every year)
Individual bass lesson: one-half hour weekly.

MU 1359. Bass - Major. (2.0-3.0 cr. [max 18.0 cr.]; A-F or Audit; prereq Music major, performance majors register for 3 cr; all others register for 2 cr; fall, spring, summer, every year)
Individual bass lesson weekly plus arranged group lesson.

MU 1360. Clarinet - Non-Major. (1.0 cr. [max 12.0 cr.]; A-F or Audit; prereq Non-music major

or music major sec instrument; fall, spring, summer, every year)
Individual clarinet lesson one-half hour weekly

MU 1361. Clarinet - Major. (2.0-3.0 cr. [max 18.0 cr.]; A-F only; prereq Music major, performance majors register for 3 cr; all others register for 2 cr.; fall, spring, every year)
Individual clarinet lesson weekly plus arranged group lesson.

MU 1362. Saxophone - Non-Major. (1.0 cr. [max 12.0 cr.]; A-F or Audit; prereq Non-music major or music major sec instrument; fall, spring, summer, every year)
Individual saxophone lesson: one-half hour weekly.

MU 1363. Saxophone - Major. (2.0-3.0 cr. [max 18.0 cr.]; A-F or Audit; prereq Music major, performance majors register for 3 credits, all others register for 2 credits.; fall, spring, summer, every year)
Individual saxophone lesson weekly plus arranged group lesson.

MU 1364. Flute - Non-Major. (1.0 cr. [max 12.0 cr.]; A-F or Audit; prereq Non-music major or music major sec instrument; fall, spring, summer, every year)
Individual flute lesson one-half hour weekly

MU 1365. Flute - Major. (2.0-3.0 cr. [max 18.0 cr.]; A-F or Audit; prereq Music major, performance majors register for 3 cr; all others register for 2 cr.; fall, spring, summer, every year)
Individual flute lesson weekly plus arranged group lesson.

MU 1366. Oboe - Non-Major. (1.0 cr. [max 12.0 cr.]; A-F or Audit; prereq Non-music major or music major sec instrument; fall, spring, summer, every year)
Individual oboe lesson one-half hour weekly

MU 1367. Oboe - Major. (2.0-3.0 cr. [max 18.0 cr.]; A-F or Audit; prereq Music major, performance majors register for 3 cr all others register for 2 cr; fall, spring, summer, every year)
Individual oboe lesson weekly plus arranged group lesson

MU 1368. Bassoon - Non-Major. (1.0 cr. [max 12.0 cr.]; A-F or Audit; prereq Non-music major or music major sec instrument; fall, spring, summer, every year)
Individual bassoon lesson one-half hour weekly

MU 1369. Bassoon - Major. (2.0-3.0 cr. [max 18.0 cr.]; A-F or Audit; prereq Music major, performance majors register for 3 cr all others register for 2 cr; fall, spring, summer, every year)
Individual bassoon lesson weekly plus arranged group lesson

MU 1370. Trumpet - Non-Major. (1.0 cr. [max 12.0 cr.]; A-F or Audit; prereq Non-music major or music major sec instrument; fall, spring, summer, every year)
Individual trumpet lesson one-half hour weekly

MU 1371. Trumpet - Major. (2.0-3.0 cr. [max 12.0 cr.]; A-F only; prereq Music major,

performance majors register for 3 cr; all others register for 2 cr.; fall, spring, every year)
Individual trumpet lesson weekly plus arranged group lesson.

MU 1372. Trombone - Non-Major. (1.0 cr. [max 12.0 cr.]; A-F or Audit; prereq Non-music major or music major sec instrument; fall, spring, summer, every year)
Individual trombone lesson: one-half hour weekly.

MU 1373. Trombone - Major. (2.0-3.0 cr. [max 12.0 cr.]; A-F or Audit; prereq Music major, performance majors register for 3 cr all others register for 2 cr; fall, spring, summer, every year)
Individual trombone lesson weekly plus arranged group lesson

MU 1374. French Horn - Non-Major. (1.0 cr. [max 12.0 cr.]; A-F or Audit; prereq Non-music major or music major sec instruments; fall, spring, summer, every year)
Individual French Horn lesson one-half hour weekly

MU 1375. French Horn - Major. (2.0-3.0 cr. [max 12.0 cr.]; A-F or Audit; prereq Music major, performance majors register for 3 cr all others register for 2 cr; fall, spring, summer, every year)
Individual French Horn lesson weekly plus arranged group lesson

MU 1376. Tuba - Non-major. (1.0 cr. [max 12.0 cr.]; A-F or Audit; prereq Non-music major or music major sec instrument; fall, spring, summer, every year)
Individual tuba lesson one-half hour weekly

MU 1377. Tuba - Major. (2.0-3.0 cr. [max 12.0 cr.]; A-F or Audit; prereq Music major, performance majors register for 3 cr all other register for 2 cr; fall, spring, summer, every year)
Individual tuba lesson weekly plus arranged group lesson

MU 1378. Euphonium - Non-Major. (1.0 cr. [max 12.0 cr.]; A-F or Audit; prereq Non-music major or music major sec instrument; fall, spring, summer, every year)
Individual euphonium lesson one-half hour weekly

MU 1379. Euphonium - Major. (2.0-3.0 cr. [max 12.0 cr.]; A-F or Audit; prereq Music major, performance majors register for 3 credits all others register for 2 cr; fall, spring, summer, every year)
Individual euphonium lesson weekly plus arranged group lesson

MU 1381. Percussion-Major. (2.0-3.0 cr. [max 12.0 cr.]; A-F only; prereq Prereq-Music major, performance majors register for 3 cr; all others register for 2 cr.; fall, spring, every year)
Individual lesson weekly plus arranged group lessons.

MU 1382. Percussion-Non Major. (1.0 cr. [max 12.0 cr.]; A-F or Audit; prereq Non-music major or music major sec instrument; fall, spring, every year)
Individual lesson: one-half hour weekly.

MU 1391. Classical Guitar-Major. (2.0-3.0 cr. [max 12.0 cr.]; A-F only; prereq Prereq-Music major, performance majors register for 3 cr; all others register for 2 cr.; fall, spring, every year) Individual lesson weekly plus arranged group lessons.

MU 1392. Classical Guitar-Non Major. (1.0 cr. [max 12.0 cr.]; A-F or Audit; prereq Non-music major or music major sec instrument; fall, spring, summer, every year) Individual lesson: one-half hour weekly.

MU 1395. Jazz Guitar-Major. (2.0-3.0 cr. [max 12.0 cr.]; A-F only; prereq Prereq-Music major, performance majors register for 3 cr; all others register for 2 cr.; fall, spring, every year) Individual lesson weekly plus arranged group lessons.

MU 1396. Jazz Guitar-Non Major. (1.0 cr. [max 12.0 cr.]; A-F or Audit; fall, spring, summer, every year) Individual lesson: one-half hour weekly.

MU 1398. Pop Styles Guitar- Non Major. (1.0 cr. [max 12.0 cr.]; A-F only; prereq Non-music major or music major sec instrument; fall, spring, summer, every year) Individual lesson: one-half hour weekly.

MU 1411. Diction: Italian and English. (1.0 cr.; A-F or Audit; prereq Principal instr voice or instructor consent; fall, every year) Proper enunciation of English and Italian as applied to vocal literature.

MU 1412. Diction: German. (1.0 cr.; A-F or Audit; prereq 1411 or instructor consent; spring, odd years) Proper enunciation of German as applied to vocal literature.

MU 1413. Diction: French. (1.0 cr.; A-F or Audit; prereq 1411 or instructor consent; spring, even years) Proper enunciation of French as applied to vocal literature.

MU 1421. Piano Class I. (1.0 cr.; A-F or Audit; prereq Music major or instructor consent; fall, every year) Basic piano technique; sight reading, harmonizing melodies, improvisation for music major working toward department piano proficiency requirement.

MU 1422. Piano Class II. (1.0 cr.; A-F or Audit; prereq Music major or instructor consent; spring, every year) Continuation of piano skills introduced in MU 1421: sight-reading, harmonizing meolodies, scale playing, transposition, score reading, improvisation for the music major working toward the departmental piano proficiency requirement.

MU 1440. Survey of Instrumental Techniques. (1.0 cr.; A-F or Audit; prereq Music major or instructor consent; spring, every year) Pedagogical, technical and acoustical principles of percussion, brass, woodwinds, and strings; practical experience with each instrument group.

MU 1441. Vocal Techniques. (1.0 cr.; prereq Music major or instructor consent; spring, every year) Beginning group instruction in voice and vocal pedagogy; principles of vocal acoustics.

MU 1442. Percussion Techniques. (1.0 cr.; A-F or Audit; prereq Music major or instructor consent; fall, every year) Beginning group instruction and pedagogy on instruments in the percussion family; principles of percussion acoustics.

MU 1501. Concert Band. (FINE ARTS; LE CAT10; 1.0 cr. [max 12.0 cr.]; prereq Instructor determines placement; fall, spring, every year) Study and performance of transcribed and original concert literature.

MU 1502. Symphonic Wind Ensemble. (FINE ARTS; LE CAT10; LEIP CAT10; 1.0 cr. [max 12.0 cr.]; prereq Instructor determines placement; fall, spring, every year) Study and performance of symphonic wind ensemble and contemporary band literature by a select group.

MU 1503. Symphony Orchestra. (FINE ARTS; LE CAT10; LEIP CAT10; 1.0 cr. [max 12.0 cr.]; prereq Instructor determines placement; fall, spring, every year) Rehearsal and performance of representative musical literature for symphony orchestra.

MU 1504. Chamber Orchestra. (FINE ARTS; LE CAT10; 1.0 cr. [max 12.0 cr.]; prereq instructor consent; fall, spring, every year) Rehearsal and performance of chamber orchestra literature.

MU 1505. Jazz Ensemble. (FINE ARTS; LE CAT10; LECD CAT10; 1.0 cr. [max 12.0 cr.]; prereq Instructor determines placement; fall, spring, every year) Study and performance of large jazz ensemble literature.

MU 1510. Concert Chorale. (FINE ARTS; LE CAT10; 1.0 cr. [max 12.0 cr.]; prereq Instructor determines placement; fall, spring, every year) Rehearsal and performance of representative choral literature from a variety of periods and cultures.

MU 1511. University Singers. (FINE ARTS; LE CAT10; LEIP CAT10; 1.0 cr. [max 12.0 cr.]; prereq Instructor determines placement; fall, spring, every year) A select group for study and performance of distinctive choral literature from diverse historical periods, cultures, and languages. Regional tour usually taken during spring semester. Extended domestic or international tours when possible.

MU 1512. Chamber Singers. (FINE ARTS; LE CAT10; 1.0 cr. [max 12.0 cr.]; prereq concurrent registration in 1511 or 4511; instructor determines placement; fall, spring, every year) Study and performance of vocal chamber music.

MU 1513. Vocal Jazz Ensemble. (FINE ARTS; LE CAT10; LECD CAT10; 1.0 cr.

[max 12.0 cr.]; prereq Instructor determines placement; fall, spring, every year) Study and performance of music for vocal jazz ensemble.

MU 1515. Percussion Ensemble. (1.0 cr. [max 10.0 cr.]; A-F or Audit; prereq Instructor consent; maximum of 10 credits between MU 1515 and 4515; fall, spring, every year) Study and performance of diverse repertoire for the percussion ensemble: historically significant works, contemporary works; world music; popular music; and new works. For both music and non-majors.

MU 1541. Chamber Music. (1.0 cr. [max 12.0 cr.]; A-F or Audit; prereq Instructor determines placement; fall, spring, every year) Study and performance of chamber music literature, classical and/or jazz.

MU 1901. Music Technology. (1.0 cr.; A-F or Audit; fall, spring, offered periodically) Introduction to music notation software and ear-training software.

MU 2001. Ethnic and Folk Music of the World. (FINE ARTS; LE CAT9; LEIP CAT09; 3.0 cr.; fall, spring, every year) Survey of music of selected world cultures.

MU 2003. Survey of American Music. (FINE ARTS; LE CAT9; 3.0 cr.; fall, spring, every year) American folk, popular, and art music from colonial times to present.

MU 2005. African Roots of American Music. (FINE ARTS; LE CAT9; LECD CAT09; 3.0 cr.; spring, every year) Traditional African music and culture and their influence on American musical styles.

MU 2105. Composition I. (2.0 cr. [max 4.0 cr.]; A-F or Audit; prereq 1121 or 1122; fall, spring, every year) Beginning music composition technique leading to creation of original works.

MU 2110. Jazz Theory. (2.0 cr.; A-F or Audit; prereq 1111, 1421 or instructor consent; spring, every year) Introduction to jazz harmony, chord/scale relationships, and jazz piano skills.

MU 2111. Tonal Harmony III. (3.0 cr.; A-F only; prereq 1102 or 1121; fall, every year) Continued study of tonal theory with an emphasis on late 18th and early 19th century methods of composition and analysis.

MU 2112. Ear-Training III. (1.0 cr.; A-F only; prereq 1122; fall, every year) Continued study of ear-training and sight-singing of tonal music.

MU 2121. Tonal Harmony IV. (3.0 cr.; A-F only; prereq 2111; spring, every year) Continued study of tonal theory with an emphasis on 19th century methods of composition and an introduction to 20th century and contemporary modes of musical organization.

MU 2122. Ear-Training, Sight Singing and Improvisation. (1.0 cr.; A-F only; prereq 2112; spring, every year)

Continued study of ear-training and sight-singing of tonal music; introduction to post-tonal music and basic principles and techniques of improvisation.

MU 2422. Piano Proficiency Preparation. (1.0 cr. [max 2.0 cr.]; A-F only; prereq Music major, department consent; spring, every year) For students who have completed 1422 or studied piano privately, this course provides training in specific skills required by the departmental piano proficiency exam.

MU 2443. Woodwind Techniques. (1.0 cr.; A-F or Audit; prereq Music major or instructor consent; fall, every year) Beginning group instruction and pedagogy on single reed instruments; principles of woodwind acoustics.

MU 2445. String Techniques. (1.0 cr.; A-F or Audit; prereq Music major or instructor consent; spring, every year) Beginning group instruction and pedagogy on high string instruments; acoustic principles for strings.

MU 2447. Brass Techniques. (1.0 cr.; A-F or Audit; prereq Music major or instructor consent; spring, every year) Beginning group instruction and pedagogy on high brass instruments; acoustic principles for brass instruments.

MU 2605. Introduction to Music Education. (1.0 cr.; A-F or Audit; prereq Music Ed major or instructor consent; spring, every year) Introduction to the music education profession; includes career options, history of the profession, professional writings, current research.

MU 2624. Group Piano Teaching Techniques. (2.0 cr.; A-F or Audit; prereq Music major or instructor consent; spring, even years) Study of recognized group piano curricula and materials; discussion of significant research. Group keyboard teaching (various ages) in a lab setting.

MU 2701. Fundamentals of Conducting. (1.0 cr.; A-F or Audit; prereq 1121, 1122, Music major or instructor consent; spring, every year) Beginning instruction in leading musical ensembles: meter patterns, conventional gestures, instrumental transposition, choral techniques.

MU 2802. Jazz Improvisation I. (2.0 cr.; A-F or Audit; prereq 2110; fall, every year) Beginning techniques and concepts.

MU 2803. Jazz Improvisation II. (2.0 cr.; A-F or Audit; prereq 2101, 2802 or instructor consent; spring, every year) Study and development of improvisational facility as used in the jazz idiom.

MU 3101. Form and Analysis. (2.0 cr.; A-F or Audit; prereq 2121, 2122; fall, every year) Overview of form in music; structure from Renaissance through 20th-century.

MU 3105. Composition II. (2.0 cr. [max 4.0 cr.]; A-F or Audit; prereq 2105; fall, spring, every year)

Continued study of musical composition techniques leading to creation of original works.

MU 3201. Music History I. (3.0 cr.; A-F or Audit; prereq Mu 1121/1122 or instructor consent; fall, every year) Study of Medieval, Renaissance, Baroque, and Classical eras of Western musical development, emphasizing works of Josquin, Palestrina, J.S. Bach, Handel, Haydn, Mozart, and Beethoven.

MU 3202. Music History II. (3.0 cr.; A-F or Audit; prereq 3201 or instructor consent; spring, every year) Styles in 19th- and 20th-century Western music from romanticism through impressionism, atonality, primitivism, serialism, neo-classicism, to avant-garde and contemporary composers; non-Western musics.

MU 3211. Art Song Literature. (2.0 cr.; A-F or Audit; prereq Mu [1121, 1122], music major or instructor consent; fall, odd years) Survey of art song, emphasizing German, French, and English compositions and composers.

MU 3212. Opera Literature. (2.0 cr.; A-F or Audit; prereq [1121, 1122], music major or instructor consent; fall, even years) Survey of opera solo and ensemble literature from Italian, German, French, English, and American traditions.

MU 3300. Junior Recital. (1.0 cr. [max 3.0 cr.]; A-F or Audit; prereq department consent, may be repeated; fall, spring, every year) Preparation and presentation of a solo performance. For performance majors required to complete a recital in the next-to-final year of their program.

MU 3350. Half-Recital. (0.0 cr.; S-N or Audit; fall, spring, every year) Preparation and public presentation of approximately 25 minutes of music appropriate to the student's principal instrument. Primarily for music education majors.

MU 3510. Opera Studio. (1.0 cr. [max 10.0 cr.]; A-F or Audit; prereq instructor consent; fall, spring, every year) Production techniques and performances of solo and ensemble opera literature.

MU 3600. Music in the Elementary Classroom. (3.0 cr.; A-F or Audit; prereq Elementary/middle school teacher education candidate; credit will not be granted if already received for MU 1601 and 3601; fall, spring, every year) Functional skills, methods, and materials for teaching music in elementary school classrooms: Music notation, elements of music, philosophies and methodologies, curriculum design and implementation, integrated arts experiences.

MU 3606. Field Experience: Classroom Music Pre K-8. (1.0 cr.; A-F or Audit; =[ELED 3425]; prereq 45 cr, music ed major, concurrent registration in Mu 3608; fall, every year) Observations and micro-teaching in general music classrooms grades Pre-K through 8.

Supervised by music education faculty member from the department of music, in cooperation with general music teachers.

MU 3607. Instrumental Music Methods. (3.0 cr.; A-F or Audit; prereq music major or instructor consent; spring, every year) Methods and materials for teaching instrumental students in the secondary setting: role and extent of instrumental music in the school curriculum, philosophies and current trends in instrumental music education, recruiting, scheduling, administrative tasks, literature, organizing and training athletic bands.

MU 3608. Teaching Elementary Music I. (2.0 cr.; A-F or Audit; prereq 45 cr, music ed major or instructor consent; credit will not be granted if credit was received for 3605.; fall, every year) Philosophy, theory, techniques of instruction for general classroom music, grades K-8.

MU 3609. Teaching Elementary Music II. (2.0 cr.; A-F or Audit; prereq MU 3606, 3608 or instructor consent; credit will not be granted if credit was received for 3605.; spring, every year) Continued study of concepts of philosophy, theory, techniques of instruction for general classroom music, grades K-8.

MU 3627. Art of Accompanying: Vocal Music. (2.0 cr.; A-F or Audit; prereq instructor consent; fall, even years) Vocal accompanying (art song, recitative and aria, choral music, and functional skills (e.g., score reading, keyboard harmony). Vocal coaching techniques, listening to standard vocal repertoire, performance.

MU 3628. Art of Accompanying: Instrumental Music. (2.0 cr.; A-F or Audit; prereq instructor consent; spring, even years) Instrumental accompanying (strings, brass, and woodwinds) and functional skills (e.g., score reading, keyboard harmony). Rehearsal techniques, listening to standard instrumental repertoire, performance.

MU 3701. Choral Conducting and Methods I. (3.0 cr.; A-F or Audit; prereq 2701 or instructor consent; fall, every year) Conducting, vocal pedagogy, and methods and materials related to choral rehearsal, emphasizing elementary and middle/junior high.

MU 3702. Choral Conducting and Methods II. (3.0 cr.; A-F or Audit; prereq 3701 or instructor consent; spring, every year) Continued conducting instruction, with methods and materials related to high school choral ensembles.

MU 3703. Choral Conducting. (1.0 cr.; A-F or Audit; prereq 2701 or instructor consent; credit will not be granted if credit already received for MU 3701 or 3702; fall, every year) Conducting techniques and score interpretation applied to choral ensembles. Not for students in the vocal music education emphasis.

MU 3705. Instrumental Conducting I. (1.0 cr.; A-F or Audit; prereq 2701 or instructor consent; fall, every year)

Intermediate techniques, reading, and interpretation of full and condensed orchestral, band, and vocal scores; lab practice in rehearsal procedures.

MU 3706. Instrumental Conducting II. (1.0 cr.; A-F or Audit; prereq 3705 or instructor consent; spring, every year)
Advanced techniques, reading, and interpretation of full and condensed orchestral, band, and vocal scores; lab practice in rehearsal procedures.

MU 3805. Jazz Writing I. (2.0 cr.; A-F or Audit; prereq Mu [2121, 2122] or instructor consent; fall, even years)
Transpositions, voicings, and arranging concepts for large and small jazz ensembles; development of composition in jazz idiom.

MU 3806. Jazz Writing II. (2.0 cr.; A-F or Audit; prereq Mu 3805 or instructor consent; spring, even years)
Continuation of arranging concepts for large and small jazz ensembles; further development of composition in jazz idiom.

MU 3807. Jazz Literature. (2.0 cr.; A-F or Audit; prereq Music majors or instructor consent.; fall, even years)
Learn and memorize standard jazz repertoire.

MU 3991. Independent Study. (1.0-3.0 cr. [max 6.0 cr.]; A-F or Audit; prereq instructor consent; fall, spring, every year)
Directed study in area of student interest arranged with instructor before registration.

MU 3995. Special Topics: (Various Titles to be Assigned). (1.0-3.0 cr. [max 9.0 cr.]; A-F or Audit; prereq instructor consent; summer, offered periodically)
Selected topics defined by type, period, or composer.

MU 3997. Field Study in Music. (1.0-4.0 cr. ; A-F or Audit; prereq Department consent required; fall, spring, offered periodically)
Off-campus travel, research, and creative activities in specialized area. Credit allowed depends on nature and scope of study. Requires advance planning with faculty sponsor.

MU 4101. Instrumental Arranging. (2.0 cr.; A-F or Audit; prereq Mu 2121, 2122 or instructor consent; fall, every year)
Idiomatic scoring for instruments; individual assignments in problems and possibilities of various instrument combinations.

MU 4103. Contrapuntal Techniques. (2.0 cr.; A-F or Audit; prereq Mu 2121, 2122 or instructor consent; spring, every year)
Study of, and practice in, use of polyphonic devices in Western art music.

MU 4105. Composition III. (2.0 cr. [max 4.0 cr.]; A-F or Audit; prereq 3105; fall, spring, every year)
Advanced creative composition; individual assignments in various contexts.

MU 4201. Piano Literature. (3.0 cr.; A-F or Audit; prereq Music major or instructor consent; spring, even years)

Study of representative piano literature from various periods of music history.

MU 4300. Senior Recital. (1.0 cr. [max 2.0 cr.]; A-F or Audit; fall, spring, every year)
Preparation and public presentation of a solo performance of at least 50 minutes of music appropriate to the student's principal instrument or principal compositional media. This is the capstone requirement for students in music performance or theory-composition.

MU 4311. Voice-Major. (2.0-3.0 cr. [max 12.0 cr.]; A-F only; prereq Prereq-Music major, performance majors register for 3 cr; all others register for 2 cr.; fall, spring, every year)
Individual lesson weekly plus arranged group lessons.

MU 4312. Voice- Non Major. (1.0 cr. [max 12.0 cr.]; A-F or Audit; prereq Non-Music major or music major secondary instrument; fall, spring, summer, every year)
Individual lesson: one-half hour weekly.

MU 4321. Piano-Major. (2.0-3.0 cr. [max 12.0 cr.]; A-F only; prereq Prereq-Music major, performance majors register for 3 cr; all others register for 2 cr.; fall, spring, every year)
Individual lesson weekly plus arranged group lessons.

MU 4322. Piano-Non Major. (1.0 cr. [max 12.0 cr.]; A-F or Audit; prereq Non-music major or music major secondary instrument; fall, spring, summer, every year)
Individual lesson: one-half hour weekly.

MU 4325. Jazz Piano-Major. (2.0-3.0 cr. [max 12.0 cr.]; A-F only; prereq Prereq-Music major, performance majors register for 3 cr; all others register for 2 cr.; fall, spring, every year)
Individual lesson weekly plus arranged group lessons.

MU 4331. Organ-Major. (2.0-3.0 cr. [max 12.0 cr.]; A-F only; prereq Prereq-Music major, performance majors register for 3 cr; all others register for 2 cr.; fall, spring, every year)
Individual lesson weekly plus arranged group lessons.

MU 4332. Organ-Non Major. (1.0 cr. [max 12.0 cr.]; A-F or Audit; prereq Non-music major or music major secondary instrument; fall, spring, every year)
Individual lesson; one-half hour weekly.

MU 4350. Violin - Non-Major. (1.0 cr. [max 12.0 cr.]; A-F or Audit; prereq Non-music major or music major second instrument; fall, spring, summer, every year)
Individual violin lesson one half hour weekly

MU 4351. Violin - Major. (2.0-3.0 cr. [max 12.0 cr.]; A-F only; prereq Music major, performance majors register for 3 cr; all others register for 2 cr.; MU 300; fall, spring, every year)
Individual violin lesson weekly plus arranged group lessons.

MU 4352. Viola - Non-Major. (1.0 cr. [max 12.0 cr.]; A-F or Audit; prereq Non-music major or music major secondary instrument; fall, spring, summer, every year)

Individual viola lesson; one-half hour weekly.

MU 4353. Viola - Major. (2.0-3.0 cr. [max 12.0 cr.]; A-F or Audit; prereq Music major, MU 300, performance majors register for 3 cr all others register for 2 cr; fall, spring, every year)
Individual viola lesson weekly plus arranged group lessons

MU 4354. Cello - Non-Major . (1.0 cr. [max 12.0 cr.]; A-F or Audit; prereq Non-music major or music major secondary instrument; fall, spring, every year)
Individual cello lesson one half hour weekly

MU 4355. Cello - Major. (2.0-3.0 cr. [max 12.0 cr.]; A-F or Audit; prereq Music major, MU 300, performance majors register for 3 cr all others register for 2 cr; fall, spring, every year)
Individual cello lesson weekly plus arranged group lessons

MU 4356. Harp - Non-Major. (1.0 cr. [max 12.0 cr.]; A-F or Audit; prereq Non-music major or music major secondary instrument; fall, spring, every year)
Individual harp lesson one half hour weekly

MU 4357. Harp - Major. (2.0-3.0 cr. [max 12.0 cr.]; prereq Music major, performance majors register for 3 cr; all others register for 2 cr., MU 300; fall, spring, every year)
Individual harp lesson weekly plus arranged group lessons.

MU 4358. Bass - Non-major. (1.0 cr. [max 12.0 cr.]; prereq Non-music major or music major secondary instrument; fall, spring, every year)
Individual bass lesson; one-half hour weekly.

MU 4359. Bass - Major. (2.0-3.0 cr. [max 12.0 cr.]; A-F or Audit; prereq Music major, MU 300, performance majors register for 3 cr all others register for 2 cr; fall, spring, every year)
Individual bass lesson weekly plus arranged group lessons

MU 4360. Clarinet - Non-Major. (1.0 cr. [max 12.0 cr.]; A-F or Audit; prereq Non-music major or music major secondary instrument; fall, spring, every year)
Individual clarinet lesson one half hour weekly

MU 4361. Clarinet - Major. (2.0-3.0 cr. [max 12.0 cr.]; A-F only; prereq Music major, performance majors register for 3 cr; all others register for 2 cr., MU 300; fall, spring, every year)
Individual clarinet lesson weekly plus arranged group lessons.

MU 4362. Saxophone - Non-Major. (1.0 cr. [max 12.0 cr.]; A-F or Audit; prereq Non-music major or music major secondary instrument; fall, spring, summer, every year)
Individual saxophone lesson; one-half hour weekly.

MU 4363. Saxophone - Major. (2.0-3.0 cr. [max 12.0 cr.]; A-F or Audit; prereq Music major, MU 300, performance majors register for 3 cr all others register for 2 cr; fall, spring, every year)
Individual saxophone lesson weekly plus arranged group lessons

MU 4364. Flute - Non-Major. (1.0 cr. [max 12.0 cr.]; A-F or Audit; prereq Non-music major or music major secondary instrument; fall, spring, every year)
Individual flute lesson one half hour weekly

MU 4365. Flute - Major. (2.0-3.0 cr. [max 12.0 cr.]; A-F or Audit; prereq Music major, MU 300, performance majors register for 3 cr all others register for 2 cr; fall, spring, every year)
Individual flute lesson weekly plus arranged group lessons

MU 4366. Oboe - Non-major. (1.0 cr. [max 12.0 cr.]; A-F or Audit; prereq Non-music major or music major secondary instrument; fall, spring, every year)
Individual oboe lesson one half hour weekly

MU 4367. Oboe - Major. (2.0-3.0 cr. [max 12.0 cr.]; A-F or Audit; prereq Music major, MU 300, performance majors register for 3 cr all others register for 2 cr; fall, spring, every year)
Individual oboe lesson weekly plus arranged group lessons

MU 4368. Bassoon - Non-Major. (1.0 cr. [max 12.0 cr.]; A-F or Audit; prereq Non-music major or music major secondary instrument; fall, spring, every year)
Individual bassoon lesson one half hour weekly

MU 4369. Bassoon - Major. (2.0-3.0 cr. [max 12.0 cr.]; A-F or Audit; prereq Music major, MU 300, performance majors register for 3 cr all others register for 2 cr; fall, spring, every year)
Individual bassoon lesson weekly plus arranged group lesson

MU 4370. Trumpet - Non-Major. (1.0 cr. [max 12.0 cr.]; A-F or Audit; prereq non-music major or music major secondary instrument; fall, spring, every year)
Individual trumpet lesson one half hour weekly

MU 4371. Trumpet - Major. (2.0-3.0 cr. [max 12.0 cr.]; A-F only; prereq Music major, MU 300, performance majors register for 3 cr; all others register for 2 cr.; fall, spring, every year)
Individual trumpet lesson weekly plus arranged group lessons.

MU 4372. Trombone - Non-Major. (1.0 cr. [max 12.0 cr.]; A-F or Audit; prereq Non-music major or music major secondary instrument; fall, spring, summer, every year)
Individual trombone lesson; one-half hour weekly.

MU 4373. Trombone - Major. (2.0-3.0 cr. [max 12.0 cr.]; A-F or Audit; prereq Music major, MU 300, performance major register for 3 cr all others register for 2 cr; fall, spring, every year)
Individual trombone lesson weekly plus arranged group lesson

MU 4374. French Horn - Non-Major. (1.0 cr. [max 12.0 cr.]; A-F or Audit; prereq non-music major or music major secondary instrument; fall, spring, every year)
Individual French Horn lesson one half hour weekly

MU 4375. French Horn - Major. (2.0-3.0 cr. [max 12.0 cr.]; A-F or Audit; prereq Music major, MU 300, performance majors register

for 3 cr all others register for 2 cr; fall, spring, every year)
Individual French Horn lesson weekly plus arranged group lessons

MU 4376. Tuba - Non-Major. (1.0 cr. [max 12.0 cr.]; A-F or Audit; prereq Non-music major or music major secondary instrument; fall, spring, every year)
Individual tuba lesson one half hour weekly

MU 4377. Tuba - Major. (2.0-3.0 cr. [max 12.0 cr.]; A-F or Audit; prereq Music major, MU 300, performance majors register for 3 cr all others register for 2 cr; fall, spring, every year)
Individual tuba lesson weekly plus arranged group lessons

MU 4378. Euphonium - Non-Major. (1.0 cr. [max 12.0 cr.]; A-F or Audit; prereq non-music major or music major secondary instrument; fall, spring, every year)
Individual euphonium lesson one half hour weekly

MU 4379. Euphonium - Major. (2.0-3.0 cr. [max 12.0 cr.]; A-F or Audit; prereq Music major, MU 300, performance majors register for 3 cr all others register for 2 cr; fall, spring, every year)
Individual euphonium lesson weekly plus arranged group lessons

MU 4381. Percussion-Major. (2.0-3.0 cr. [max 12.0 cr.]; A-F only; prereq Prereq-Music major, performance majors register for 3 cr; all others register for 2 cr.; fall, spring, every year)
Individual lesson weekly plus arranged group lessons.

MU 4382. Percussion-Non Major. (1.0 cr. [max 12.0 cr.]; A-F or Audit; prereq Non-music major or music major secondary instrument; fall, spring, every year)
Individual lesson; one-half hour weekly.

MU 4391. Classical Guitar-Major. (2.0-3.0 cr. [max 12.0 cr.]; A-F only; prereq Prereq-Music major, performance majors register for 3 cr; all others register for 2 cr.; fall, spring, every year)
Individual lesson weekly plus arranged group lessons.

MU 4392. Classical Guitar-Non Major. (1.0 cr. [max 12.0 cr.]; A-F or Audit; prereq Non-music major or music major secondary instrument; fall, spring, every year)
Individual lesson; one-half hour weekly.

MU 4395. Jazz Guitar-Major. (2.0-3.0 cr. [max 12.0 cr.]; A-F only; prereq Prereq-Music major, performance majors register for 3 cr; all others register for 2 cr.; fall, spring, every year)
Individual lesson weekly plus arranged group lessons.

MU 4396. Jazz Guitar-Non Major. (1.0 cr. [max 12.0 cr.]; A-F or Audit; prereq Non-music major or music major secondary instrument; fall, spring, summer, every year)
Individual lesson; one-half hour weekly.

MU 4501. Concert Band. (1.0 cr. [max 6.0 cr.]; A-F or Audit; prereq Instructor determines placement; fall, spring, every year)
Study and performance of transcribed and original concert literature.

MU 4502. Symphonic Wind Ensemble. (1.0 cr. [max 6.0 cr.]; A-F or Audit; prereq Instructor determines placement; fall, spring, every year)
Study and performance of symphonic wind ensemble and contemporary band literature by a select group.

MU 4503. Symphony Orchestra. (1.0 cr. [max 6.0 cr.]; A-F or Audit; prereq Instructor determines placement; fall, spring, every year)
Rehearsal and performance of representative literature for symphony orchestra.

MU 4504. Chamber Orchestra. (1.0 cr. [max 6.0 cr.]; A-F or Audit; prereq Instructor determines placement; fall, spring, every year)
Study and performance of chamber orchestra literature.

MU 4505. Jazz Ensemble. (1.0 cr. [max 6.0 cr.]; A-F or Audit; prereq Instructor determines placement; fall, spring, every year)
Study and performance of large jazz ensemble literature.

MU 4510. Concert Chorale. (1.0 cr. [max 6.0 cr.]; A-F or Audit; prereq Instructor determines placement; fall, spring, every year)
Study and performance of representative choral literature from various style periods and cultures.

MU 4511. University Singers. (1.0 cr. [max 6.0 cr.]; A-F or Audit; prereq Instructor determines placement; fall, spring, every year)
A select group for study and performance of distinctive choral literature from diverse historical periods, cultures, and languages. Regional tour usually taken during spring semester. Extended domestic or international tours when possible.

MU 4512. Chamber Singers. (1.0 cr. [max 6.0 cr.]; A-F or Audit; prereq concurrent registration in 1511 or 4511; instructor determines placement; fall, spring, every year)
Study and performance of vocal chamber music.

MU 4513. Vocal Jazz Ensemble. (1.0 cr. [max 6.0 cr.]; A-F or Audit; prereq Instructor determines placement; fall, spring, every year)
Study and performance of music for vocal jazz ensemble.

MU 4515. Percussion Ensemble. (1.0 cr. [max 10.0 cr.]; A-F or Audit; prereq Instructor consent; maximum of 10 credits between MU 1515 and 4515; fall, spring, every year)
Study and performance of diverse repertoire for the percussion ensemble: historically significant works, contemporary works; world music; popular music; and new works. For both music and non-majors.

MU 4541. Chamber Music. (1.0 cr. [max 12.0 cr.]; A-F or Audit; prereq instructor consent; fall, spring, every year)
Study and performance of chamber music literature, classical and/or jazz.

MU 4601. Applied Music Teaching. (1.0 cr.; A-F or Audit; prereq instructor consent; fall, spring, every year)
Procedures and materials for class and individual instruction in approved fields of

applied music; evaluation of solo literature; discussion of approved and experimental pedagogical practice; lesson observation; and supervised student teaching.

MU 4621. Piano Pedagogy and Practicum

I. (2.0 cr.; A-F or Audit; prereq Music major or instructor consent; fall, odd years)
Principles and materials for teaching elementary piano students; supervised practice teaching.

MU 4622. Piano Pedagogy and Practicum

II. (2.0 cr.; A-F or Audit; prereq Mu 4621 or instructor consent; spring, odd years)
Principles and materials for teaching intermediate piano students; supervised practice teaching.

MU 4623. Piano Techniques and Style. (3.0

cr.; A-F or Audit; prereq 1321 or instructor consent; fall, even years)
Technical and stylistic considerations for teaching and performing advanced piano literature.

MU 4801. Evolution and Analysis of Jazz

Styles. (2.0 cr.; A-F or Audit; prereq Mu [2121, 2122]; fall, offered periodically)
Study and analysis of various jazz styles and idioms.

MU 4803. Jazz Pedagogy. (2.0 cr.; A-F or

Audit; prereq Mu [2121, 2122]; fall, odd years)
Techniques and materials necessary to organize and develop a jazz band in junior and senior high school.

MU 4807. Music Industry. (2.0 cr.; A-F or

Audit; prereq instructor consent; spring, odd years)
Study of developing commercial applications and trends in the music industry, including basic concepts of business and marketing.

MU 4997. Internship in Music. (1.0-2.0 cr.

[max 4.0 cr.]; A-F or Audit; prereq department consent; fall, spring, every year)
Participation in music tutoring or recognized campus/community activity related to student's musical program and career objectives.

MU 5005. African Roots of American Music.

(3.0 cr.; A-F or Audit; prereq 60 cr or instructor consent; spring, every year)
Traditional African music and culture and their influences on American musical styles.

MU 5201. Advanced Music History. (2.0 cr.;

A-F or Audit; prereq 3201, 3202 or instructor consent; fall, every year)
Specialized study of selected composers and/or genres.

MU 5203. Advanced Choral Literature. (2.0

cr.; A-F or Audit; prereq 3702 or instructor consent; fall, spring, offered periodically)
Study of representative choral literature from various periods of music history.

MU 5204. Instrumental Ensemble Literature.

(2.0 cr.; A-F or Audit; prereq Grad Student or instructor consent; fall, spring, offered periodically)
Study of major works for large wind and orchestral ensembles.

MU 5205. Instrumental Solo Literature.

(1.0 cr. [max 3.0 cr.]; A-F or Audit; prereq Grad student or instructor consent; fall, spring, offered periodically)
Survey of instrumental solo literature within the student's applied field of study.

MU 5206. Vocal Solo Literature. (1.0-2.0 cr. ;

A-F or Audit; prereq Grad student or instructor consent; fall, spring, offered periodically)
A historical survey of standard repertoire for solo voice in art song, opera, and oratorio; focus varies by semester.

MU 5207. Instrumental Chamber Music

Literature. (1.0 cr.; A-F or Audit; prereq Grad student or instructor consent; fall, spring, offered periodically)
Study of chamber music literature with emphasis on student's major applied area.

MU 5208. Vocal Chamber Literature. (1.0 cr.;

A-F or Audit; prereq Grad student or instructor consent; fall, spring, offered periodically)
A survey of standard repertoire for solo voice with chamber ensembles.

MU 5510. Opera Studio. (1.0 cr. [max 6.0 cr.];

A-F or Audit; prereq 3510 or equivalent, Grad student or instructor consent; fall, spring, every year)
Opera production techniques; performance of solo and ensemble opera literature.

MU 5627. Art of Accompanying: Vocal Music.

(2.0 cr.; A-F or Audit; prereq Graduate Enrollment, credit will not be granted if already received for MU 3627.; fall, even years)
Vocal accompanying art song, recitative and aria, choral music, and functional skills (e.g., score reading, keyboard harmony). Vocal coaching techniques, listening to standard vocal repertoire, performance.

MU 5628. Art of Accompanying:

Instrumental Music. (2.0 cr.; A-F or Audit; prereq Graduate enrollment; credit will not be given if already received for MU 3628; spring, even years)
Instrumental accompanying (string, brass, and woodwinds) and functional skills (e.g., score reading, keyboard harmony). Rehearsal techniques, listening to standard instrumental repertoire, performance.

MU 5695. Special Topics: (Various Titles to

be Assigned). (1.0-3.0 cr. [max 9.0 cr.]; A-F or Audit; prereq instructor consent; can apply max 6 cr to grad program; fall, spring, summer, offered periodically)
Selected topics of interest to music educators concerning philosophy, history, and teaching/learning theory and practice.

MU 5701. Advanced Conducting. (3.0 cr.; A-

F or Audit; prereq 3702 or instructor consent; fall, spring, offered periodically)
Score reading, analysis, styles, and conducting and rehearsal techniques related to performance.

MU 5991. Independent Study. (1.0-3.0 cr.

[max 9.0 cr.]; A-F or Audit; prereq Min 60 cr or Grad Student or instructor consent; can apply max 6 cr to a Grad program; fall, spring, every year)

Directed study in areas of student interest arranged with instructor before registration.

MU 5995. Special Topics: (Various Titles to be Assigned). (1.0-3.0 cr. [max 6.0 cr.]; A-F

or Audit; prereq instructor consent; summer, offered periodically)
Selected studies in topics defined by type, period, or composer.

MU 8101. Graduate Music Theory. (2.0

cr.; A-F or Audit; prereq Graduate student or instructor consent; spring, every year)
Advanced analytical studies of representative historical musical compositions. Students will utilize multiple analytical processes and compose model pieces.

MU 8222. Music Bibliography and Research.

(3.0 cr.; A-F or Audit; prereq Grad student or instructor consent; fall, every year)
Research methods in music; preparation for writing plan B project.

MU 8300. Graduate Recital. (1.0 cr. [max

2.0 cr.]; A-F or Audit; prereq Grad student, instructor consent; fall, spring, every year)
Preparation and presentation of a solo musical performance.

MU 8301. Graduate Applied Music: Major

Instrument. (2.0 cr. [max 10.0 cr.]; A-F or Audit; prereq Advanced proficiency, grad student, instructor consent; fall, spring, summer, every year)
Studio lesson on major instrument or voice; one-half hour per week per credit.

MU 8302. Graduate Applied Music:

Secondary Instrument. (1.0 cr.; A-F or Audit; prereq Intermediate proficiency, grad student, instructor consent; may be repeated; fall, spring, summer, every year)
Half-hour weekly studio lesson; instrument or voice.

MU 8333. FTE: Master's. (1.0 cr.; No Grade Associated; prereq Master's student, adviser and DGS consent; fall, spring, offered periodically)
(no description)

MU 8401. Graduate Music Pedagogy. (1.0

cr.; A-F or Audit; prereq Graduate Student or instructor consent; spring, every year)
Principles and techniques of music pedagogy with emphasis on the student's applied field of study.

MU 8600. Methods of Research in Music

Education. (3.0 cr. [max 9.0 cr.]; A-F or Audit; prereq Grad student or instructor consent; fall, spring, offered periodically)
Survey and analysis of current issues in music education research and/or practice.

MU 8601. Foundations of Music Learning.

(3.0 cr.; A-F or Audit; prereq Grad student or instructor consent; spring, every year)
Principles and foundations of philosophical aesthetics, psychology of music, music advocacy, history of music education, current issues and research in music learning.

MU 8605. Curricular Trends in Music

Education. (3.0 cr.; A-F or Audit; prereq

Grad student or instructor consent; fall, spring, offered periodically)

Techniques, theories, and models of music and arts leadership; considerations for supervising music personnel, facilities, budgets, curricular programs, and policies.

MU 8701. Graduate Applied Conducting. (1.0-2.0 cr. [max 12.0 cr.]; A-F or Audit; prereq 3702, 3706 or equivalent; Graduate Student or instructor consent; fall, spring, offered periodically)
Studio lessons in conducting; one half-hour per week per credit.

MU 8899. Directed Project in Music Education. (1.0-12.0 cr. ; A-F or Audit; prereq Grad, instructor consent; fall, spring, offered periodically)
Directed project, Plan B. Research project on selected theoretical or practical issue/topic in Music Education.

MU 8900. Psychology of Music. (3.0 cr. [max 9.0 cr.]; A-F or Audit; prereq Grad student, instructor consent; spring, every year)
The nature of musical behaviors and how they are perceived. Understanding physical properties of musical sound, fundamental concepts concerning musical measurement and musical preference.

MU 8991. Independent Study. (1.0-2.0 cr. [max 6.0 cr.]; A-F or Audit; prereq Grad student, instructor consent; fall, spring, offered periodically)
Directed study in areas of student interest arranged with instructor before registration; written report required.

Ojibwe Education (OJED)

College of Education and Human Service Professions

OJED 3100. Advanced Ojibwe Grammar and Narrative. (4.0 cr.; A-F only; prereq 3101, 3102, 3103, 3104 (concurrent registration allowed), admission to Ojibwe elem/middle school program, two years college-level Ojibwe or AMIN 2204 or instructor consent; fall, offered periodically)
Advanced study of grammatical forms in Ojibwe; identification and conjugation of major verb types; formation of simple and complex sentences; language learning styles.

OJED 3101. Circle of Life. (4.0 cr.; A-F only; prereq 3100, 3102, 3103, 3104, Comp 3140 (concurrent registration allowed), admission to Ojibwe elem/middle school program; fall, offered periodically)
Explores human development from an Anishinaabeg perspective, from birth through death; emphasis on early childhood through adolescence. Western theories of development and traditional Anishinaabe development.

OJED 3102. Historical and Contemporary Issues in American Indian Education. (3.0 cr.; A-F only; prereq 3100, 3101, 3104, Comp 3140 (concurrent registration allowed), admission to Ojibwe elem/middle school program; fall, offered periodically)
Past and present educational experiences of American Indian people in the U.S.;

professional conduct and dispositions for teachers; best practices in contemporary American Indian education.

OJED 3103. Teaching American Indian Students. (3.0 cr.; A-F only; prereq 3100, 3102, 3104 (concurrent registration allowed), admission to Ojibwe elem/middle school program; fall, offered periodically)
Contemporary American Indian education; evaluation of attitudes toward American Indian students; identity development in the middle school years, direct interaction with American Indian communities; teaching plans reflective of American Indians, specifically for the middle school.

OJED 3104. College Skills for Pre-service Teachers. (2.0 cr.; S-N only; prereq 3100, 3102, 3103 (concurrent registration allowed), admission to Ojibwe elem/middle school program; fall, offered periodically)
Familiarizes students with the campus community, resources, and the tribal college transition, both personally and academically. Successful college student strategies, including: study skills, balancing life and school, and Praxis test-taking approaches.

OJED 3110. Advanced Dakota Grammar and Narrative. (4.0 cr.; A-F or Audit; prereq instructor consent, admission to Gekinoo'imaagejig Elem/Middle School Program; two years college-level Dakota or demonstrated level IV language ability; fall, spring, offered periodically)
Advanced study of grammatical forms in Dakota; identification and conjugation of major verb types; formation of simple and complex sentences; language learning styles.

OJED 3200. Ojibwe Language for Teachers. (4.0 cr.; A-F only; prereq 3100, 3201, 3202, 3203, Math 1141 (concurrent registration allowed), admission to Ojibwe elem/middle school program; spring, offered periodically)
Provides pre-service teachers the requisite knowledge to interact with students in a classroom. General and specialized language for each of the core subjects taught, daily routines, and common classroom discourse. Relevant methods for teaching Ojibwe language in the classroom.

OJED 3201. Holistic Instruction and Assessment. (3.0 cr.; A-F only; prereq 3200, 3202, 3203, Math 1141 (concurrent registration allowed), admission to Ojibwe elem/middle school program; spring, offered periodically)
Student-centered methods of instruction, classroom management, and formal and informal assessments that enhance the whole child. Draws from the American Indian Learner Outcomes for methods and materials to guide instruction and assessment strategies.

OJED 3202. Anishinaabe Art, Music and Dance. (3.0 cr.; A-F or Audit; prereq 3200, 3201, 3203, Math 1141 (concurrent registration allowed), admission to Ojibwe elem/middle school program; spring, offered periodically)
Selecting and evaluating materials appropriate for elementary classrooms in American Indian art, music, dance, singing & drumming;

developing integrated cross-curriculum elementary programs.

OJED 3203. Health, Wellness and Movement. (3.0 cr.; A-F only; prereq 3200, 3201, 3202, Math 1141 (concurrent registration allowed), admission to Ojibwe elem/middle school program; spring, offered periodically)
Health and wellness from an Anishinaabeg perspective; teaching strategies appropriate for holistic health, physical education activities, healthy diets, drug education, mental health and spirituality; comprehensive school health and physical fitness for elementary and middle school levels.

OJED 3220. Dakota Language for Teachers. (4.0 cr.; A-F or Audit; prereq Admission to Ojibwe Elem/Middle School Program.; fall, offered periodically)
Provides pre-service teachers the requisite knowledge to interact with students in a classroom. General and specialized language for each of the core subjects taught, daily routines, and common classroom discourse. Relevant methods for teaching Dakota language in the classroom.

OJED 4100. Conversational Ojibwe for the Classroom and Community. (4.0 cr.; A-F only; prereq 3200, 4101, 4102, 4103, 4104 (concurrent registration allowed), admission to Ojibwe elem/middle school program or instructor consent, no grad credit; fall, offered periodically)
Applications of Ojibwe language use to interactions between school and the surrounding community. Key vocabulary, phrases, and dialogues; strategies through which this material may be shared with the community at large.

OJED 4101. Language, Literacy and Literature. (4.0 cr.; A-F only; prereq 4100, 4102, 4103, 4104 (concurrent registration allowed), admission to Ojibwe elem/middle school program, no grad credit; fall, offered periodically)
Development and instruction in children's literature-based reading, writing and oral language in elementary schools. Methods, materials, research findings related to teaching integrated language arts.

OJED 4102. Oral Tradition and Language Acquisition. (4.0 cr.; A-F only; prereq 4100, 4101, 4103, 4104 (concurrent registration allowed), admission to Ojibwe elem/middle school program, no grad credit; fall, offered periodically)
Elementary school teaching methods and materials for integrated language arts instruction; understanding of children's language acquisition skills; role of stories in Anishinaabeg culture.

OJED 4103. Elementary Mathematics Methods. (4.0 cr.; A-F only; prereq 4100, 4101, 4102, 4104 (concurrent registration allowed), admission to Ojibwe Elem/Middle School Program; no grad credit; fall, offered periodically)
Mathematics concepts, classroom methods, curriculum and materials; exploring the

nature of mathematics, how children learn mathematics; effective mathematics instruction.

OJED 4104. Professional Development. (2.0 cr.; A-F only; prereq 4100, 4101, 4102, 4103 (concurrent registration is allowed), admission to Ojibwe Elementary/Middle School Program; no grad credit; fall, offered periodically) Documentation, reflection, synthesis of learning; professional portfolio, reflective journaling, dialogue, and goal setting. The Good Path, which reflects personal/professional growth and development related to integrity of teaching; analyzing how internalized oppression affects families, schools, communities and tribes.

OJED 4110. Conversational Dakota for the Classroom and Community. (4.0 cr.; A-F or Audit; prereq Admission to Ojibwe Elem/Middle School Program; no grad credit; fall, offered periodically) Applications of Dakota language use to interactions between school and the surrounding community. Key vocabulary, phrases, and dialogues; strategies through which this material may be shared with the community at large.

OJED 4200. Ojibwe Language Methods. (4.0 cr.; A-F only; prereq 4100 or instructor consent, 4201, 4202, 4203 (concurrent registration allowed), admission to Ojibwe Elem/Middle School Program, successful completion of block one, no grad credit; spring, offered periodically) Methods for teaching Ojibwe, an endangered, indigenous language. Curriculum development to support Ojibwemowin; grammatical structure of the Ojibwe language; indigenous language revitalization movement; developmental and cognitive understanding of children, especially as related to language learning.

OJED 4201. Understanding Our Environment and Mother Earth. (4.0 cr.; A-F only; prereq 4200, 4202, 4203 (concurrent registration allowed), admission to Ojibwe Elem/Middle School Program; successful completion of block one courses; no grad credit; spring, offered periodically) Methods and materials for elementary school science instruction based on research, Anishinaabeg culture & traditions. Integration of theory and practice; understanding our relationship as human beings to the world around us.

OJED 4202. Minnesota Based Treaties, Sovereignty, and Tribal Government. (4.0 cr.; A-F only; prereq 4200, 4201, 4203 (concurrent registration allowed), admission to Ojibwe Elem/Middle School Program; successful completion of block one courses; no grad credit; spring, offered periodically) Content and organization of social studies; treaties, sovereignty, and tribal government of Minnesota Ojibwe & Dakota people. Planning instruction, methods, and assessment; relationships among humans, the environment, and land.

OJED 4203. The Inclusive Classroom. (4.0 cr.; A-F only; prereq 4200, 4201, 4202 (concurrent registration allowed), admission to Ojibwe Elem/Middle School Program;

successful completion of block one courses; no grad credit; spring, offered periodically) Philosophy and psychology of the inclusive classroom; management, materials and methods; understanding children with a variety of special needs; FAS/FAE; writing IEPs; making adaptations and accommodations; working with American Indian families.

OJED 4220. Ojibwe/Dakota Language Methods. (4.0 cr.; A-F or Audit; prereq admission to Ojibwe Elem/Middle School Program; no grad credit; spring, offered periodically) Methods for teaching Ojibwe, and Dakota an endangered, indigenous language. Curriculum development to support Ojibwemowin and Dakota lapi; grammatical structure of the Ojibwe and Dakota language; indigenous language revitalization movement; developmental and cognitive understanding of children, especially as related to language learning.

OJED 4310. American Indians and Special Education. (4.0 cr.; A-F or Audit; =[OJED 5310]; prereq Naadamaadiwin Tribal Special Education cohort (SpEd licensure), no grad credit; fall, even years) Exploration of disability awareness in traditional and contemporary native culture, exploring historical and contemporary issues effecting American Indian students in special education. Overview of special education including standards, law theories, rules, and examination of the high incidence of American Indians in special education including FAS, autism, biological and environmental conditions. Portfolio requirements will be introduced. A field component will accompany this course.

OJED 4320. Assessment of American Indian Learners. (4.0 cr.; A-F or Audit; =[OJED 5320]; prereq Naadamaadiwin Tribal Special Education cohort (special education licensure), 4310, no grad credit; spring, odd years) Examination of the cultural bias and discrimination issues with mainstream educational systems, providing alternative assessments appropriate with native populations. Identify differences in assessment tools and strategies, native student learning and best practices in assessment. Core skills and strategies will meet special education standards of effective practice. Characteristics of learning deficits and how they interfere with the Circle of Courage will be examined and approaches for compensation will be developed. A field component will accompany this course.

OJED 4330. Working with American Indian Families and Community. (4.0 cr.; A-F or Audit; =[OJED 5330]; prereq Naadamaadiwin Tribal Special Education cohort (special education licensure, 4310, no grad credit; spring, odd years) Examines techniques appropriate for working with American Indian families, extended families, professionals, paraprofessionals and the community when planning and implementing IEPs and transitions for American Indian students with special needs. Skills and strategies to build partnerships to work within

and among Native families and communities to best meet the needs of the student. Resiliency will be examined within the context of the Circle of Courage. A field component will accompany this course.

OJED 4340. Manifestation of Multi-generational Trauma and Internalized Oppression. (4.0 cr.; A-F or Audit; prereq Naadamaadiwin Tribal Special Education cohort (special education licensure), 4310, no grad credit; summer, odd years) Focus on how multi-generational trauma and internalized oppression manifests itself in families, communities, schools and student's learning. Examine and explore strategies that provide practical skills and tools to mitigate these effects. EBD, ADHA, Autism, and fetal alcohol syndrome will be examined as contemporary issues of American Indian children. Behavioral support options appropriate for students identified with EDB will be provided. A field component will accompany this course.

OJED 4350. Indigenous Learners and Disabilities. (4.0 cr.; A-F or Audit; =[OJED 5350]; prereq Naadamaadiwin Tribal Special Education cohort (special education licensure), 4310, no grad credit; fall, odd years) Identify best practices in American Indian education incorporating culturally appropriate methods and materials for students in special education. Exploration of cultural differences in learning and behavior modifications, community and environment variables; examining the high incidence of AI students in special education, cultural misunderstandings that impedes placement, services and diagnosis. A field component will accompany this course.

OJED 4360. Indigenous Methods of Instruction: Practical Application. (4.0 cr.; A-F or Audit; prereq Naadamaadiwin Tribal Special Education cohort (special education licensure), 4310, no grad credit; fall, odd years) Current best practices in American Indian education will provide students with hands on skills and strategies for curriculum development including unit planning, lesson planning and individualization. Various models of instruction for teaching students that include development of intervention plans that are culturally, academically and socially appropriate based on assessment and observation to meet the needs of American Indian special education students. A field component will accompany this course.

OJED 4600. Student Teaching. (12.0 cr.; S-N only; prereq 4610 (concurrent registration allowed), admission to Ojibwe Elementary/Middle School Program, successful completion of block one and block two courses, instructor consent, no grad credit; fall, offered periodically) Fifteen weeks of full-time student teaching in a K-8 classroom. Demonstration of competence in planning, teaching, and evaluating elementary curriculum, age-appropriate Ojibwe language, and American Indian Learner Outcomes. Application of knowledge and skills in assessing and meeting the learning needs of children.

OJED 4610. Professional Issues. (2.0 cr.; A-F only; prereq 4600 (concurrent registration allowed), admission to Ojibwe Elementary/Middle School Program, successful completion of block one and block two courses, instructor consent, no grad credit; fall, offered periodically)
Reflections on current issues and ethical dilemmas in the fields of elementary education, American Indian education, and Ojibwe language education. Preparation for professional job-seeking, interviewing, and continued professional development as a teacher.

OJED 5100. Educational Foundations in Ojibwe Language. (2.0 cr.; A-F only; prereq instructor consent; fall, spring, offered periodically)
Introduces the fundamentals of teaching and learning language, advanced writing features, pronunciation skills, basic grammar and the formal structure of words and sentences. Offers an appreciation for the cultural and social context of language use, and how this is important to the teaching and learning of Ojibwe.

OJED 5110. Teaching and Learning Ojibwe As A Second Language. (2.0 cr.; A-F only; prereq instructor consent; spring, offered periodically)
Study of advanced writing features, grammatical structure of sentences and paragraphs, and key methodologies of teaching Ojibwe as a second language. Advanced topics include introduction to narrative structure and dialectology.

OJED 5120. Ojibwe Language Grammatical Pedagogy. (2.0 cr.; A-F only; prereq instructor consent; fall, offered periodically)
Provides students with a knowledge of core Ojibwe grammar structures for use in second language and immersion programs. Students will investigate the teaching and learning of grammar, its socio-linguistic application, and how advanced structures are created. Includes a strong written and oral component.

OJED 5130. Narrative and Conversation Structures in Ojibwe. (2.0 cr.; A-F or Audit; prereq instructor consent; spring, offered periodically)
Provides knowledge of how to design, compose, and use conversational and narrative structures. Students will develop oral and written proficiency in the production of basic structures. The use and application of conversation and narrative in the teaching and learning of Ojibwe is a central theme.

OJED 5200. Methods in Ojibwe Language Immersion. (2.0-6.0 cr. [max 12.0 cr.]; A-F only; prereq instructor consent; summer, every year)
Designed to improve comprehension and oral proficiency in Ojibwemowin. A total immersion approach will be complemented by structured conversational patterns, language mini-lessons, and defined situational experiences.

OJED 5310. American Indians and Special Education. (4.0 cr.; A-F or Audit; =[OJED 4310]; prereq Naadamaadwin Tribal Special

Education cohort (special education licensure); fall, even years)
Exploration of disability awareness in traditional and contemporary native culture, exploring historical and contemporary issues effecting American Indian students in special education. Overview of special education including standards, law theories, rules, and examination of the high incidence of American Indians in special education including FAS, autism, biological and environmental conditions. Portfolio requirements will be introduced. A field component will accompany this course.

OJED 5320. Assessment of American Indian Learners. (4.0 cr.; A-F or Audit; =[OJED 4320]; prereq Naadamaadwin Tribal Special Education cohort, 4310; spring, odd years)
Examination of the cultural bias and discrimination issues with mainstream educational systems, providing alternative assessments appropriate with native populations. Identify differences in assessment tools and strategies, native student learning and best practices in assessment. Core skills and strategies will meet special education standards of effective practice. Characteristics of learning deficits and how they interfere with the Circle of Courage will be examined and approaches for compensation will be developed. A field component will accompany this course.

OJED 5330. Working with American Indian Families and Community. (4.0 cr.; A-F or Audit; =[OJED 4330]; prereq Naadamaadwin Tribal Special Education cohort (special education licensure), (4310 or 5310); spring, odd years)
Examines techniques appropriate for working with American Indian Families, extended families, professionals, paraprofessionals and the community when planning and implementing IEPs and transitions for American Indian students with special needs. Skills and strategies to build partnerships to work within and among Native families and communities to best meet the needs of the student. Resiliency will be examined within the context of the Circle of Courage. A field component will accompany this course.

OJED 5340. Manifestation of Multi-generational Trauma and Internalized Oppression. (4.0 cr.; A-F or Audit; prereq Naadamaadwin Tribal Special Education cohort (special education licensure), 4310 or 5310; summer, odd years)
Focus on how multi-generational trauma and internalized oppression manifests itself in families, communities, schools and student's learning. Examine and explore strategies that provide practical skills and tools to mitigate these effects. EBD, ADHA, Autism, and fetal alcohol syndrome will be examined as contemporary issues of American Indian children. Behavioral support options appropriate for students identified with EDB will be provided. A field component will accompany this course.

OJED 5350. Indigenous Learners and Disabilities. (4.0 cr.; A-F or Audit; =[OJED 4350]; prereq Naadamaadwin Tribal Special

Education cohort (special education licensure), 4310 or 5310; fall, odd years)
Identify best practices in American Indian education incorporating culturally appropriate methods and materials for students in special education. Exploration of cultural differences in learning and behavior modifications, community and environment variables; examining the high incidence of AI students in special education, cultural misunderstandings that impedes placement, services and diagnosis. A field component will accompany this course.

OJED 5360. Indigenous Methods of Instruction: Practical Application. (4.0 cr.; A-F or Audit; prereq Naadamaadwin Tribal Special Education cohort (special education licensure), 4310 or 5310; fall, odd years)
Current best practices in American Indian education will provide students with hands on skills and strategies for curriculum development including unit planning, lesson planning and individualization. Various models of instruction for teaching students that include development of intervention plans that are culturally, academically and socially appropriate based on assessment and observation to meet the needs of American Indian special education students. A field component will accompany this course.

OJED 5370. Reading Instruction of Indigenous Learners with Special Needs. (4.0 cr.; A-F or Audit; prereq department consent; summer, odd years)
This course involves instruction in and discussion of reading instruction for K-12 Native American students with learning and/or behavioral special education needs. In this course, we will study reading as a complex developmental behavior influenced by many interrelated subskills and factors, such as phonemic awareness, word analysis, vocabulary, fluency, comprehension, language, motivation, and contemporary Native American literacy instruction.

OJED 5600. Tribal Special Education Student Teaching. (3.0-12.0 cr. ; S-N only; prereq instructor consent; spring, even years)
Demonstrate competency in planning, teaching, and evaluating special education curriculum. Application of knowledge and skills in assessing and meeting the learning needs SpEd students. A student teaching experience.

OJED 5610. Professional Issues in Special Education. (2.0 cr.; A-F or Audit; prereq Naadamaadwin Tribal Special Education cohort (special education licensure), 4310 or 5310; spring, even years)
Reflections on professional development, current issues and ethical dilemmas in the fields of special education/American Indian education. Documentation, reflection, synthesis of learning; professional portfolio, reflective journaling, dialogue, and goal setting. The Circle of Courage, which reflects personal/professional growth and development, related to integrity of teaching. Preparation for continued professional development as a teacher.

Pharmacology (PHCL)

Medical School - Duluth Campus**PHCL 4094. Directed Research in**

Pharmacology I. (1.0-10.0 cr. ; A-F or Audit; prereq Upper div sci major, instructor consent; fall, spring, summer, every year)
Directed Research in Pharmacology

PHCL 5001. Introduction to Pharmacology.

(2.0 cr.; A-F only; prereq 5601 or 3011 or equivalent; spring, every year)
Elementary course in pharmacology. Actions and use of drugs in selected health conditions.

PHCL 5204. Pharmacology Seminar.

(1.0 cr. [max 4.0 cr.]; A-F or Audit; prereq Grad student, instructor consent; fall, spring, every year)
Presentation of selected research problems and current journal articles.

PHCL 8333. FTE: Master's.

(1.0 cr.; No Grade Associated; prereq Master's student, adviser and DGS consent; fall, spring, summer, every year)
(No description)

PHCL 8444. FTE: Doctoral.

(1.0 cr.; No Grade Associated; prereq Doctoral student, adviser and DGS consent; fall, spring, every year)
(No description)

PHCL 8666. Doctoral Pre-Thesis Credits.

(1.0-6.0 cr. [max 12.0 cr.]; No Grade Associated; prereq Max 6 cr per semester or summer; doctoral student who has not passed prelim oral; no required consent for the first two registrations up to 12 cr; departmental consent for the third and fourth registrations up to an additional 12 cr, or 24 cr total (for doctoral students admitted summer 2007 and beyond; doctoral students admitted prior to summer 2007 may register up to 4 times totaling 60 cr); fall, spring, summer, every year)
(No description)

PHCL 8777. Thesis Credits: Master's.

(1.0-18.0 cr. [max 50.0 cr.]; No Grade Associated; prereq Max 18 cr per semester or summer; 10 cr total required (Plan A only); fall, spring, summer, every year)
(No description)

PHCL 8888. Thesis Credits: Doctoral.

(1.0-24.0 cr. [max 100.0 cr.]; No Grade Associated; prereq Max 18 cr per semester or summer; 24 cr required; fall, spring, summer, every year)
(No description)

Pharmacy (PHAR)

College of Pharmacy

PHAR 1001. Orientation to Pharmacy.

(2.0 cr.; fall, spring, summer, every year)
Pharmaceutical care practice model, various pharmacy settings, pharmacy education. Current opportunities/challenges within profession.

PHAR 1002. Health Sciences Terminology.

(2.0 cr.; fall, spring, summer, every year)
How to analyze/build words by using combining forms, suffixes, and prefixes. Course

information is sent to U e-mail address of registered students. Partially Internet-delivered course.

PHAR 1003. Non-Prescription Medications and Self-Care: Treating Minor Conditions.

(2.0 cr.; fall, spring, every year)
Self study. Nonprescription medication, self care. How to become informed consumer of over-the-counter medications and testing devices. Textbook supplemented with online course work. Partially Internet-delivered course.

PHAR 1004. Common Prescription Drugs and Diseases.

(2.0 cr.; fall, spring, every year)
Self study. Frequently prescribed medications. Conditions medications are intended to treat. Diagnostic criteria, complications, mechanism-of-action, side effects. Direct-to-consumer advertising. Students use Vista to view presentation, download materials, and complete study guides. Partially Internet-delivered course.

PHAR 1005. Introduction to Drug Therapies of Addiction: Medicine or Menace?.

(2.0 cr.; prereq Medical terminology recommended; fall, spring, summer, every year)
Online, self-study course. Drug therapies of addiction. Rational behind drug regulation. Strategies to treat pain. How concept of tolerance, physical dependence, and addiction influence care. Mechanisms of action of illicit/prescription medications.

PHAR 1006. Orientation to Health Literacy and Communication.

(2.0 cr.; A-F only; spring, every year)
Health literacy issues. Misunderstandings in health-related communication. Ways in which health literacy impacts public health. Ways in which health literacy can be improved/ steps individual health-care professions can take to ensure that patients have a better understanding of their health-related issues.

PHAR 3206. Issues in Health Literacy and Communication.

(SOC SCI; 3.0 cr.; A-F only; =[PHAR 5206]; fall, spring, summer, every year)
Issues associated with health literacy. Dimensions associated with misunderstandings that occur in health-related communication.

PHAR 3207. Leadership in Health Care.

(3.0 cr.; A-F only; =[PHAR 5207]; fall, spring, summer, every year)
Leadership skills/theories to create positive change in health care settings.

PHAR 3208. Directed Study: Wellness Communication and Behavior Change in Patient Populations.

(3.0 cr.; fall, spring, every year)
Health behavior change is key for the management of/and cure of preventable diseases. While most healthcare professionals try to encourage patients to make these changes, they are only occasionally successful. This course examines issues associated with behavior change and wellness in patient populations. The first part of the course examines theories and models of health education and individual behavior change.

The second part of the class examines factors that impact health and habitual behavior. The third part of the class focuses on solutions -- creation health campaigns and patient compliance.

PHAR 3501. Introduction to Epidemiology.

(3.0 cr.; A-F or Audit; prereq Prior completion or concurrent enrollment in an undergraduate statistics course is recommended but not required.; fall, spring, every year)
Introduction to epidemiology, the basic science of public health. Epidemiology provides a systematic approach for acquiring and evaluating information on the distribution and causes of disease and other health outcomes in populations. Topics include the history of epidemiology, overview of epidemiologic methods (e.g., study design, measure of disease distribution and association, interpretation), and the application of epidemiology research to the development and evaluation of disease prevention and control strategies. Current or historically relevant infectious and chronic disease will be explored through lecture, interactive exercise, and independent assignments. Students will gain a greater appreciation for the complexities of disease processes in populations and the application of epidemiological methods to clinical and basic science, population health, and public health policy. Prior or concurrent completion of an undergraduate statistics course is recommended.

PHAR 3601. Basic Human Physiology for the Health Professions.

(3.0 cr.; A-F only; prereq Medical terminology and anatomy; summer, offered periodically)
For pre-health professional students to prepare for more in depth courses. Normal functions (physiology) for the major human organ systems and diseases (pathophysiology) in those systems.

PHAR 3700. Fundamentals of Pharmacotherapy.

(3.0 cr.; A-F only; =[PHAR 5700]; prereq Medical terminology; spring, every year)
Drug therapy. Emphasizes recognition of brand/generic drug names, their therapeutic classes and common uses. Use of drug information resources.

PHAR 4200. Drugs and the U.S. Health Care System.

(3.0 cr.; A-F only; fall, spring, every year)
Online course. How to be informed/responsible user of medications. Medication development, regulation, distribution. Business, political, and legal/ethical issues. Weekly writing assignments, self-reflections, final paper.

PHAR 4293. Directed Research I for Undergraduates.

(1.0-5.0 cr. ; prereq undergrad, instructor consent; fall, spring, summer, every year)
Students work with College of Pharmacy faculty.

PHAR 4294. Directed Study I for Undergraduates.

(1.0-6.0 cr. ; prereq undergrad, instructor consent; fall, spring, summer, every year)

Individualized study. Students work with faculty on special projects.

PHAR 5101. Pharmacology for Pharmacy Students I. (3.0 cr.; A-F only; prereq Registered 2nd yr pharmacy student or instructor consent, credit will not be granted if already received for Phcl 5101; fall, every year) Action/fate of drugs. Lectures, lab.

PHAR 5102. Pharmacology for Pharmacy Students. (2.0 cr.; A-F only; prereq 5101 or instructor consent, credit will not be granted if already received for Phcl 5102; spring, every year) Action/fate of drugs.

PHAR 5200. Drugs and the United States Health Care System. (3.0 cr.; A-F only; prereq grad or professional student; fall, spring, every year) Online course. Medication development, regulation, and distribution in the United States. Business, political, and legal/ethical issues. Weekly reading/writing assignments. Exams, final paper.

PHAR 5201. Applied Health Science Terminology. (2.0 cr.; prereq Basic knowledge of human anatomy/physiology.; fall, spring, every year) Self-study course. Medical terms, how to apply them when documenting/reporting patient care procedures.

PHAR 5205. Obesity: More Than Just a Prescription. (2.0 cr.; A-F only; spring, every year) Etiology of obesity, its contributing mechanisms, and considerations for its treatment and prevention throughout the life cycle. Role of pharmacy in curtailing this epidemic.

PHAR 5206. Applied Health Literacy and Communication. (3.0 cr.; A-F only; =[PHAR 3206]; spring, every year) Health literacy issues. Misunderstandings in health-related communication. Ways in which health literacy impacts public health. Ways in which health literacy can be improved/ steps individual health-care professionals can take to ensure that patients have a better understanding of their health-related issues.

PHAR 5207. Applied Leadership in Health Care. (3.0 cr.; A-F only; =[PHAR 3207]; prereq advanced undergraduates, professional health care students or graduate student; fall, spring, summer, every year) Leadership skills/theories to create positive change in health care settings.

PHAR 5220. Regulatory Issues in Drug Research. (1.0-2.0 cr. ; prereq Pharm D. professional student and instructor consent; spring, every year) Regulatory issues encountered in conducting drug research trails. Performing different aspects of clinical trails. Lectures, readings, small group discussions, homework assignments.

PHAR 5270. Therapeutics of Herbal and Other Natural Medicinals. (2.0 cr.; A-F only;

prereq Organic chemistry, pathophysiology of disease states, 3rd or 4th yr pharmacy student; spring, every year) Herbal products/supplements. Pharmacology, clinical indications, and drug interactions of most commonly used products in nontraditional complementary health care. Historical significance and evidenced-based role of these products in health care. Case studies of clinical applications.

PHAR 5620. Drug Metabolism and Disposition. (3.0 cr.; A-F or Audit; spring, every year) Oxidative/conjugative enzymes systems involved in human drug metabolism/disposition. Various in vitro models used to evaluate drug metabolism or chemical entity, pros/cons of each. Factors involved in conducting in vivo studies.

PHAR 5700. Applied Fundamentals of Pharmacotherapy. (3.0 cr.; A-F only; =[PHAR 3700]; prereq Medical Terminology and admission to a graduate program or instructor consent; fall, spring, every year) Online course. Recognition of brand/generic drug names, their therapeutic classes, common uses. Use of drug information resources.

PHAR 6061. Physiological Systems as Targets for Drug Action. (5.0 cr.; A-F only; prereq [Biochemistry, human anatomy] recommended; First-year pharmacy student; fall, every year) Survey of general physiology, neurophysiology, endocrine, circulatory, respiratory, digestive, energy metabolism, and renal physiology at molecular, cellular, and organ level. Emphasizes homeostasis and basic regulatory aspects of physiological processes of organ systems.

PHAR 6111. The Practice of Pharmaceutical Care I. (3.0 cr.; A-F only; prereq First yr pharmacy student, concurrent registration in 6171; fall, every year) The practice of pharmaceutical care, the pharmacy profession, drug information retrieval, professional communications, problem-solving skills, introductory clerkship.

PHAR 6112. The Practice of Pharmaceutical Care II. (3.0 cr.; A-F only; prereq First yr pharmacy student, 6111, concurrent registration in 6172; spring, every year) Comprehensive pharmaceutical care, health belief model, legal issues, prescription processing, clerkship continued and introduction to pharmacotherapy issues

PHAR 6121. Pharmacotherapy I: Patient - Centered Pathophysiologic Approach. (5.0 cr.; A-F only; prereq 6111, 6112, concurrent registration in 5101, 6163, 6154 and 6173; fall, every year) Pathophysiology/pharmacotherapy of common fluid-electrolyte, renal, acid-base, immunologic, and hematologic disorders.

PHAR 6122. Pharmacotherapy II: Patient-Centered Pathophysiologic Approach. (5.0 cr.; A-F only; prereq 6121, concurrent 5101, 5102, 6131, 6154, 6163, 6173; spring, every year)

Pathophysiology/pharmacotherapy of common cardiovascular, endocrine, and gastrointestinal disorders.

PHAR 6123. Pharmacotherapy III: Patient-Centered Pathophysiologic Approach. (5.0 cr.; A-F only; prereq 5101, 5102, 6122, 6153, 6163, concurrent registration in 6175; fall, every year) Pathophysiology/pharmacotherapy of common neurologic, psychiatric, pulmonary, and geriatric disorders.

PHAR 6124. Pharmacotherapy IV: Patient-Centered Pathophysiologic Approach. (5.0 cr.; A-F only; prereq 6121, 6122, 6123, 6155, 6163; spring, every year) Pathophysiology and pharmacotherapy of common infectious diseases, oncologic and toxicologic disorders.

PHAR 6131. Pharmacy and the Health Care System. (3.0 cr.; A-F only; prereq Second year pharmacy student; spring, every year) Delivery of pharmaceuticals and pharmacy services in the U.S. health care system, issues in hospital and community practice, characteristics of the pharmaceutical industry, economic and financial issues in delivering pharmaceutical services.

PHAR 6132. Biostatistics and Drug Literature Evaluation. (2.0 cr.; A-F only; prereq 6111, concurrent registration in 6173; fall, every year) Biostatistical methods for data analysis and principles of study design for clinical research. Use of small computers to analyze and present data. Methods of searching for and evaluating drug-related information.

PHAR 6133. Pharmacy Practice Management. (3.0 cr.; A-F only; prereq Third year pharmacy student; spring, every year) Principles of pharmacy management, including inventory control, purchasing, pricing, financial analysis, and personnel management.

PHAR 6135. Pharmacy Outcomes. (2.0 cr.; A-F only; prereq 6123, 6175; spring, every year) How to integrate knowledge of basic sciences, pharmacotherapy, pharmacy practice management, pharmaceutical care, written communication, literature evaluation, drug information retrieval, law/ethics, and pharmacoconomics to manage patients with multiple medical conditions.

PHAR 6136. Pharmacy Law. (1.0 cr.; A-F only; prereq Pharmacy student 3rd year; spring, every year) Federal regulation of medications, regulation of controlled substances, federal/state regulation of pharmacy practice. Minnesota Pharmacy Practice Act, relevant federal regulations pertaining to pharmacy.

PHAR 6137. Ethics in Pharmacy Practice. (1.0 cr.; A-F only; prereq Pharmacy student 3rd yr; spring, every year) Theories of ethics, ethical analysis of practical ethical issues experienced by pharmacists. Relationship of ethical reasoning to public policy and law. Readings from peer-reviewed publications and popular media. Case studies.

PHAR 6141. Medical Microbiology and Immunizations. (1.0 cr.; A-F only; fall, every year)

Background knowledge in medical microbiology. Evaluating information on emerging infectious diseases, recommending immunization schedules for childhood/adult vaccines.

PHAR 6150. CoP Honors: Medicinal Chemistry Seminar. (1.0 cr. [max 2.0 cr.]; S-N only; prereq instructor consent; fall, spring, every year)
Current topics in medicinal chemistry.

PHAR 6151. Biochemistry of Medicinals I. (3.0 cr.; A-F only; prereq 1st year pharmacy student, 6171 (concurrent registration is allowed); fall, every year)
Biochemistry topics required for understanding pharmacodynamic action and therapeutic use of medicinal agents.

PHAR 6152. Biochemistry of Medicinals II. (3.0 cr.; A-F only; prereq 6151, concurrent registration in 6172; spring, every year)
Intermediary metabolism of carbohydrates, lipids, amino acids and nucleic acids and how these pathways are affected by therapeutic agents. Introduction to bioenergetics and drug metabolism.

PHAR 6154. Medicinal Agents I. (3.0 cr.; A-F only; prereq 6152, concurrent registration in 5101; fall, every year)

Basic principles of drug design, metabolism of action, and receptor interaction. Chemical/biological properties and therapeutic uses of autonomic, antihistaminic, renal, and cardiovascular drugs.

PHAR 6155. Medicinal Agents II. (2.0 cr.; A-F only; prereq 6154, concurrent registration in 5102 and 6174; spring, every year)
Chemical/biological properties and therapeutic uses of drugs affecting central nervous, endocrine, and intermediary metabolism systems.

PHAR 6156. Medicinal Agents III. (4.0 cr.; A-F only; prereq 6141, 6151, 6153; fall, every year)
Therapeutic properties and uses of antiviral, anti-infective and antineoplastic agents.

PHAR 6157. Human Nutrition and Drug Therapy. (3.0 cr.; A-F only; prereq 6152; spring, every year)
Basic concepts of human nutrition and clinical application.

PHAR 6158. Recombinant DNA-Derived Drugs. (1.0 cr.; A-F only; prereq 6151; spring, every year)
Biotechnology as it related to basic/clinical pharmaceutical sciences. Emphasizes recombinant DNA techniques and preparation/use of biotechnology-derived agents in diagnosing/treating disease.

PHAR 6159. Pharmaceutical Immunology and Biotechnology. (3.0 cr.; A-F only; prereq 6151; spring, every year)
Basic biological mechanisms of immune system. Emphasizes drug allergies, immunosuppressives, monoclonal antibodies,

and preparation/use of immunologic derived agents in diagnosing/treating disease. Biotechnology as it relates to basic/clinical pharmaceutical sciences. Emphasizes recombinant DNA techniques and preparation/use of biotechnology-derived agents in diagnosing/treating disease.

PHAR 6160. CoP Honors: Experimental and Clinical Pharmacology Seminar. (1.0 cr.; A-F only; prereq instructor consent; fall, spring, every year)
Selected topics in experimental and clinical pharmacology.

PHAR 6161. Drug Delivery I. (3.0 cr.; A-F only; prereq concurrent registration in 6171; fall, every year)
Mathematics associated with drug dispensing; technology of common pharmaceutical dosage forms. Phenomenological and theoretical basis of equilibrium and steady-state processes controlling drugs and dosage forms.

PHAR 6162. Drug Delivery II. (3.0 cr.; A-F only; prereq 6161, concurrent registration in 6172; spring, every year)
Phenomenological and theoretical basis of kinetic and dynamic processes controlling drugs and dosage forms.

PHAR 6163. Pharmacokinetics. (3.0 cr.; A-F only; prereq Calculus II (quarter) Calculus I (semester) or equiv, 6162; fall, every year)
Physiological basis for drug absorption, distribution, metabolism and excretion; use of mathematical principles and equations to describe these processes as well as design dosage regimens for individual patients.

PHAR 6164. Biopharmaceutics. (3.0 cr.; A-F only; prereq 6161, 6162, 6163; fall, every year)
Applied theory of dosage form design for optimal drug activity and bioavailability for all routes of drug administration.

PHAR 6165. Pharmaceutical Calculations. (1.0 cr.; A-F only; prereq First yr pharmacy student; spring, every year)
Performing pharmaceutical calculations for patient care in all pharmacy practice environments.

PHAR 6171. Pharmaceutical Care Skills I. (2.0 cr.; A-F only; prereq Concurrent registration is required (or allowed) in 6151, 6111, 6161; fall, every year)
Integrating basic and clinical science curriculum in a lab setting.

PHAR 6172. Pharmaceutical Care Skills III. (2.0 cr.; A-F only; prereq 6171, concurrent 6112; spring, every year)
Basic/clinical science curriculum in lab setting. Longitudinal care in lab setting.

PHAR 6173. Pharmaceutical Care Skills III. (2.0 cr.; A-F only; prereq Concurrent registration is required (or allowed) in 6121, 6132; fall, every year)
Integrating basic/clinical science curriculum in a lab setting.

PHAR 6174. Pharmaceutical Care Skills IV. (2.0 cr.; A-F only; prereq 6122; spring, every year)

Basic/clinical science curriculum in lab setting. Longitudinal care in lab setting.

PHAR 6175. Pharmaceutical Care Skills V. (2.0 cr.; A-F only; prereq 6111, 6112, 6171, 6172, 6173, 6174 or instructor consent; fall, every year)
Integrating basic and clinical science curriculum in a lab setting.

PHAR 6177. Patient Assessment. (1.0 cr.; A-F only; prereq first yr pharmacy student; spring, every year)
How to obtain accurate health histories and perform systemic physical assessments of adult patients in pharmacy practice.

PHAR 6181. Pharm.D. Paper & Seminar. (1.0 cr.; A-F only; prereq Third year pharmacy student; fall, every year)
How to write a research paper. Students present research project plan. Professional behavior, patient confidentiality, universal precautions.

PHAR 6182. Pharm.D. IV Seminar. (1.0 cr.; S-N only; prereq 4th yr pharmacy student, 6181; spring, every year)
Students present thesis topics to peers and faculty evaluators.

PHAR 6183. Pharm.D. IV Paper. (2.0 cr.; S-N only; prereq 4th yr pharmacy student, 6181; fall, every year)
Final paper describing a hypothesis-driven research project, patient-care oriented project, management project, drug-usage evaluation, or extensive literature review.

PHAR 6200. Drugs and the United States Health Care System. (2.0 cr.; A-F only; prereq Pharmacy student; fall, spring, every year)
Controversial issues surrounding medications and U.S. health care system. Students develop written statements to communicate ideas, persuade others, and defend viewpoints.

PHAR 6204. College of Pharmacy Community Outreach. (1.0-3.0 cr.; A-F or Audit; prereq Current student pharmacist in College of Pharmacy.; fall, every year)
Apply knowledge gained in classroom and teaching laboratories to community-based patient care activities.

PHAR 6206. Directed Study: Introduction to Pharmacy Research. (1.0 cr.; S-N only; prereq PharmD Student; spring, every year)
This course will provide an overview of principles to research in particular research topic areas. It will also provide a forum for scientists involved in research in particular topic areas to discuss their research, environment and careers with students.

PHAR 6208. Community-based Immunization Delivery. (1.0 cr.; S-N only; prereq 6175, CPR certification, bloodborne pathogen training, enrolled Pharmacy student; fall, every year)
Students will learn about, plan, and implement influenza immunization clinics.

PHAR 6211. Non-Prescription Drug Therapy: Focus on Patient Self-Care. (2.0

cr.; A-F or Audit; prereq 6112; spring, every year)

Expands on over-the-counter medications presented in 6112. Diagnostic and durable medical equipment available in community pharmacies as well as the use of alternative medications is discussed.

PHAR 6212. Dermatology. (1.0 cr.; A-F only; prereq 2nd or 3rd yr pharmacy student; fall, every year)

Pathophysiology and pharmacotherapy of dermatologic disorders.

PHAR 6215. Applied Pharmacokinetics. (2.0 cr.; A-F only; prereq 6163; spring, every year) Applying clinical pharmacokinetics and assay methodologies to patient care. Assessing drug therapy outcomes.

PHAR 6217. Advanced Pharmaceutical Care Clinic. (1.0-2.0 cr. ; prereq 2nd or 3rd yr pharmacy student; spring, every year)

Expanded, direct patient care opportunities. Students conduct comprehensive pharmaceutical care assessments in presence of practitioners. Weekly student case presentations/discussions.

PHAR 6219. Building a Pharmaceutical Practice. (2.0 cr.; A-F only; prereq 6111, 6112; spring, every year)

Initiating a pharmaceutical care practice. Building a personal practice plan.

PHAR 6220. Pediatric Drug Therapy. (2.0 cr.; A-F or Audit; prereq 3rd or 4th yr pharmacy student; spring, every year)

Pathophysiology/therapeutics of disease states. Common issues encountered in providing pharmaceutical care to pediatric patients.

PHAR 6221. Geriatric Pharmacotherapy.

(2.0 cr.; A-F or Audit; prereq 3rd or 4th yr pharmacy student; spring, every year) Pharmacokinetic/pharmacodynamic changes and their implications in elders. Effects of drug-drug/drug-disease interactions. Drug adherence barriers to provide optimum pharmacotherapy to elderly persons.

PHAR 6222. Advanced Pharmaceutical Compounding. (2.0 cr.; A-F only; prereq 2nd or 3rd yr pharmacy student; fall, spring, every year)

Expands compounding skills beyond those gained in pharmaceutical care lab.

PHAR 6223. Pharmacokinetics Research Seminar. (1.0 cr.; A-F only; prereq 6163 with a grade of "B" or better.; fall, spring, every year)

Students critically evaluate literature in pharmacokinetics, pharmacodynamics, and drug metabolism.

PHAR 6224. Pharmacogenomics: Genetic Basis for Variability in Drug Response. (2.0 cr.; A-F only; prereq 2nd or later healthcare or related education program or equivalent experience, or instructor consent.; spring, every year)

Theory/practice of pharmacogenomics.

Principles of human genetics/genomics.

Applications to scientific education, problems in drug therapy optimization, and patient care.

PHAR 6225. Diabetes Experience. (1.0 cr.; A-F only; prereq 2nd or 3rd yr Pharm student; spring, every year)

Diabetes mellitus. Student presentations, hands-on learning.

PHAR 6226. Interprofessional Diabetes Experience. (2.0 cr.; A-F only; prereq 2nd year or later pharmacy student; spring, every year)

Diabetes mellitus through active, hands-on learning in interprofessional environment. Participate in week-long experience of living with diabetes. Online learning activities.

PHAR 6227. Leading Adaptive Change. (2.0 cr.; S-N only; prereq Phar 6237 and Phar 6238 Students must have submitted a declaration to complete the Leadership Emphasis Area prior to taking this course.; fall, every year)

Hands-on experience leading a change initiative. Students create a vision for change, plan an approach, implement their plan, and evaluate outcomes. Project focuses on area of pharmacy practice or education.

PHAR 6228. Leading Change Portfolio. (2.0 cr.; S-N only; prereq 6237 or 6238; fall, spring, every year)

Supports completion of Leadership Emphasis Designation. Documentation/self-reflection of leadership learning experiences pursued inside/outside of classroom.

PHAR 6230. Ambulatory PC Clinic. (2.0 cr.; prereq Enrolled pharmacy student; spring, every year)

How to conduct pharmaceutical care assessments, for patients with actual drug-related needs, in a controlled clinic setting.

PHAR 6231. Community Pharmacy Management. (2.0 cr.; A-F only; prereq 6133; spring, every year)

Management techniques needed in community pharmacy practice, with emphasis on marketing and service.

PHAR 6232. Health System Pharmacy Management. (2.0 cr.; A-F only; prereq 2nd or 3rd year pharmacy student; spring, every year) Management techniques needed in various institutional pharmacy settings. Integrating distributive and clinical components of institutional practice

PHAR 6233. Drug Use Review and Management. (2.0 cr.; A-F only; prereq 3rd yr pharmacy student; fall, every year)

Principles of drug use review in various health care settings. Optimizing quality, minimizing cost.

PHAR 6235. Pharmaceutical Industry: Business and Policy. (2.0 cr.; A-F or Audit; =[PHAR 6235]; spring, every year)

Developing, manufacturing, distributing, economically evaluating, purchasing, managing, and ordering pharmaceuticals in health sector. Unique market characteristics, complex regulatory processes, rapid technological change, high expense growth, public policy issues.

PHAR 6236. Clinical and Pharmacy Management in Modern U.S. Health Care

and Regulatory Landscape. (2.0 cr.; A-F only; fall, spring, every year)

U.S. Food and Drug (FDA) law, civil liability of malpractice, duty of pharmacy professionals, implications of intellectual property rights of others. Business law topics ranging from contracts to non-compete agreements.

PHAR 6237. Leading Change in Pharmacy I. (2.0 cr.; S-N only; prereq 2nd or 3rd yr. Pharmacy student; fall, spring, every year)

Mini-curriculum. Focuses on leadership development and its relation to advancing the profession of pharmacy.

PHAR 6238. Leading Change in Pharm II. (2.0 cr.; S-N only; spring, every year) Mini-curriculum. Focuses on leadership development and its relation to advancing the profession of pharmacy.

PHAR 6248. Drugs of Abuse. (2.0 cr.; S-N only; prereq Organic chemistry I/II or [organic chemistry I, biochemistry]; spring, odd years) Basic medicinal chemistry of substances of abuse, associated paraphernalia.

PHAR 6249. Addiction Medicine, Substance Abuse, and Chemical Dependency. (2.0 cr.; A-F or Audit; fall, every year)

Addiction, chemical abuse, and chemical dependency. How pharmacists can impact those affected.

PHAR 6250. CoP Honors: Social and Administrative Pharmacy Seminar. (1.0 cr. [max 2.0 cr.]; A-F only; prereq instructor consent; fall, spring, every year) Current topics in hospital pharmacy

PHAR 6257. Leadership Best Sellers for Pharmacists. (2.0 cr.; A-F only; fall, spring, every year)

Part of the leadership track in pharmacy.

PHAR 6260. CoP Honors: Pharmaceutics Seminar. (1.0 cr.; A-F or Audit; prereq instructor consent; fall, spring, every year) Contemporary topics in pharmaceutics research.

PHAR 6270. CoP Honors: Critical Care Seminar. (2.0 cr.; A-F only; prereq instructor consent; fall, every year)

Research/topics of importance to experimental/clinical pharmacology.

PHAR 6293. Directed Research I. (1.0-5.0 cr. [max 10.0 cr.]; prereq instructor consent; fall, spring, summer, every year)

Directed research in pharmacy practice, pharmaceutics, medicinal chemistry, or experimental and clinical pharmacology.

PHAR 6294. Directed Study I. (1.0-5.0 cr. ; S-N only; prereq Instructor consent; fall, spring, summer, every year)

Directed studies in pharmacy practice, pharmaceutics, medicinal chemistry, and experimental or clinical pharmacology.

PHAR 6301. Veterinary Pharmacotherapy. (2.0 cr.; A-F only; prereq 3rd year pharmacy student; spring, every year)

For students to gain knowledge concerning pharmacotherapy of common medical conditions of small animals.

PHAR 6393. Directed Research II. (1.0-5.0 cr. [max 10.0 cr.]; prereq instructor consent; fall, spring, summer, every year)
Directed research in pharmacy practice, pharmaceuticals, medicinal chemistry, or experimental and clinical pharmacology.

PHAR 6394. Directed Study II. (1.0-5.0 cr. ; A-F only; prereq instructor consent; fall, spring, summer, every year)
Directed studies in pharmacy practice, pharmaceuticals, medicinal chemistry, and experimental or clinical pharmacology.

PHAR 6493. Directed Research III. (1.0-5.0 cr. ; prereq instructor consent; fall, spring, summer, every year)
Directed research in pharmacy practice, pharmaceuticals, medicinal chemistry, or experimental and clinical pharmacology.

PHAR 6494. Directed Study III. (1.0-5.0 cr. [max 10.0 cr.]; prereq Instructor consent; fall, spring, summer, every year)
Directed studies in pharmacy, pharmaceuticals, medicinal chemistry, and experimental or clinical pharmacology.

PHAR 6501. Ethics in Pharmacy Practice. (2.0 cr.; A-F only; prereq 3rd yr. Pharmacy student, instructor consent; fall, every year)
Ethical principles, selected schools of ethical thought. Students discuss/debate ethical dilemmas in pharmacy practice and health care.

PHAR 6610. Spiders, Scorpions, and Snakes Clinical Toxinology. (2.0 cr.; A-F only; prereq At least 2nd year health care or related education program or equivalent experience or instructor consent.; spring, every year)
In this course, you will learn about the significance of these creatures in nature, their venoms and how they are delivered, the toxins in their venoms and their pharmacological actions, the consequences of envenomation, and the relevance of toxin uses in clinical medicine and biomedical research. The clinical toxinology relating to envenomation by these species will also be reviewed. Students interested in science with an edge will find that this course is not only a novel extension of the more basic scientific disciplines, but is complementary to them.

PHAR 6612. Survey of Pediatric Metabolic, Genetic, and Oncologic Disease. (2.0 cr.; A-F only; prereq At least 2nd year health care or related education program or equivalent experience or instructor consent.; fall, spring, every year)
Major metabolic and genetic disorders and oncologic diseases of childhood. Disease state epidemiology and pertinent background, pharmacotherapy, monitoring, and practical application.

PHAR 6700. Becoming a Pharmacist. (2.0 cr.; S-N only; fall, every year)
This course provides an introduction to the knowledge, skills and attitudes necessary for success in the professional pharmacy curriculum and in the practice of pharmacy, and will serve as a foundation for future learning

throughout your career as a pharmacist. In this class, you will prepare for becoming a student for life. You will be introduced to the tools necessary to thrive in the university student environment, as well as to the essential PharmD curriculum components, referred to as domain competencies, to grow as a professional in a global environment focusing on patient centered care.

PHAR 6702. Integrated Biochemical Sciences. (4.5 cr.; A-F only; prereq Successful completion of Becoming a Pharmacist (BaP); fall, every year)
This course is designed to provide students with a strong foundation in the structure and function of medicinals which is a prerequisite for advanced studies in pharmacy. The basic goals are to familiarize the students to the structural and physical properties of proteins, nucleic acids, lipids and carbohydrates, as well as ligands/drugs that bind to these macromolecules in an effort to understand the functional role each plays in the biochemistry of medicinals and the normal and abnormal functioning of a cell. A particular emphasis is placed on the basic concepts that are central to structure-function relationships of therapeutics. Macromolecular classes are presented progressively from basic monomeric structural composition and structural diversity to macromolecular assemblies and associated intrinsic function to macromolecular involvement in cellular architecture and cellular processes to molecular pathology with specific examples.

PHAR 6704. Foundations of Social and Administrative Pharmacy. (2.5 cr.; A-F only; prereq Successful completion of Becoming a Pharmacist (BaP); fall, every year)
Foundations of Social and Administrative Pharmacy (SAPh) provides the foundation for how one should think about rational use of drugs in a system of care. Content and skills learned in this course will be applied in subsequent courses continuing through the 4th year of the curriculum and lifelong into practice. Additionally, this course includes a module focused on Drug Literature Evaluation(DLE).

PHAR 6706. Foundations of Pharmaceutical Care. (1.5 cr.; A-F only; prereq Successful completion of Becoming a Pharmacist (BaP); fall, every year)
Foundations of Pharmaceutical Care lays the groundwork for how a pharmacist should think about the rational use of drugs in caring for patients. Content and skills learned in this course will be applied in and provide a framework for all subsequent courses continuing through the 4th year of the curriculum and lifelong into practice.

PHAR 6708. Drug Delivery I. (2.5 cr.; A-F only; prereq Successful completion of Becoming a Pharmacist (BaP); fall, every year)
In this course, a systematic approach establishes the fundamental physicochemical principles applicable to dosage forms. The foundational scientific principles (continued in DDII) are illuminated with key examples of solution drug dosage forms. These concepts are relevant to current as well as future dosage

forms as drugs must be dissolved in a solution before they can be absorbed into the systemic circulation and eventually the site of action.

PHAR 6710. Pharmaceutical Care Skills I. (2.0 cr.; A-F only; prereq Successful completion of Becoming a Pharmacist (BaP); fall, every year)
This course is designed for first year pharmacy students to provide an introduction to the profession and begin building the skills necessary to become a competent, caring pharmaceutical care practitioner. The course consists of two components: a laboratory section and a lecture.

PHAR 6715. Professional Development and Assessment Sequence I . (1.0 cr.; S-N only; prereq Successful completion of Becoming a Pharmacist; spring, every year)
During the first year of the Professional Development and Assessment Sequence, the emphasis will be on knowledge acquisition and student success in both the curriculum and profession. The class will include work in career and professional development.

PHAR 6716. Applied Pharmaceutical Care. (3.2 cr.; A-F only; prereq Successful completion of Becoming a Pharmacist; spring, every year)
Evidence-based patient-centered pharmaceutical care involves assessing patients' drug-related needs, identifying, resolving, and preventing drug therapy problems, developing a care plan for follow up, and communicating with a patient and the health care team. These concepts will be applied to patient and population scenarios featuring common medical conditions and medications students are likely to encounter during their introductory pharmacy practice experiences (IPPEs).

PHAR 6718. Drug Delivery II. (2.4 cr.; A-F only; prereq Successful completion of Drug Delivery I; spring, every year)
Building on Drug Delivery I, this course covers other dosage forms (mostly solid and dispersed dosage forms) as well as to differentiate between them. New areas covered include chemical kinetics, chemical stability, buffer systems, polymers & proteins, and rheology. The course will introduce students to the physicochemical principles that are relevant to design, preparation, storage, use, efficacy, and evaluation of pharmaceutical dosage forms.

PHAR 6720. Pharmaceutical Care Skills Lab II. (2.0 cr.; A-F only; prereq Successful completion of Pharmaceutical Care Skills Lab I; spring, every year)
This course is part of the pharmaceutical care learning center curriculum spanning six semesters. These courses provide an introduction to the profession and begin building the skills necessary to become a competent and caring pharmaceutical care practitioner.

PHAR 6722. Principles of Medicinal Chemistry. (2.1 cr.; A-F only; prereq Successful completion of Integrated Biochemical Sciences; spring, every year)
This is an introductory course that will familiarize students with the discipline of

medicinal chemistry, the principles of drug design and drug metabolism.

PHAR 6724. Introduction to the Immune System and Infectious Disease. (3.1 cr.; A-F only; prereq Successful completion of Integrated Biochemical Sciences; spring, every year)

This course focuses on the immunological, epidemiological, and pathogenic basis of viral, bacterial, protozoal, fungal and helminthic disease; the biological composition of vaccines and the immunologic response to live attenuated pathogens and microbial extracts; the chemical, cellular, and biological principles of the immune system; the biological and molecular response to allergens and hypersensitivity; and an introduction to cellular and molecular aspects of inflammation.

PHAR 6726. Principles of Pharmacology. (2.3 cr.; A-F only; prereq Successful completion of Foundations of SAPH; spring, every year) This is an introductory course that builds on information in basic science courses offered in the first semester of the PharmD program. It provides foundational content necessary for comprehension and application of all subsequent pharmacotherapy modules that require application of pharmacological concepts and knowledge.

PHAR 6728. Pharmaceutical Calculations. (0.7 cr.; A-F only; prereq Successful Completion of Drug Delivery I; spring, every year)

Accurately performing pharmaceutical calculations is a critical component of patient care in every pharmacy practice environment. Calculations contribute just as much to good patient outcomes as the newest methods and guidelines for diagnosis, treatment, and prevention. The challenge of pharmacy calculations lies not in the cutting edge of science or their mathematical complexity, but in the need for consistent accuracy to prevent patient harm and possible fatality. To obtain this level of accuracy, an understanding of methods and deliberate, undivided attention to detail is required. Students must understand and master the basic concepts of pharmaceutical calculations with organization, consistency and accuracy in order to provide optimal care to their future patients every day.

PHAR 7001. Early Pharmacy Practice Experience I. (1.0 cr.; A-F only; prereq Criminal bkgr chk, BLS CPR cert for infants/ chld/adults, [proof of negative Mantoux test or explanation of positive test], proof of chicken pox immunity; fall, every year) First in a series of four courses. Focuses on patient's perspective in managing and living with chronic conditions and chronic medication use. Includes community-based instruction, mentor program

PHAR 7002. Early Pharmacy Practice Experience II. (1.0 cr.; A-F only; prereq 7001 or instructor consent, criminal background check, BLS CPR cert, proof of negative Mantoux test or explanation of positive test, proof of chicken pox immunity; spring, every year)

Second in a series of four courses. Focuses on patient's perspective in managing and living with chronic conditions and chronic medication use. Includes community-based instruction, mentor program.

PHAR 7003. Early Pharmacy Practice Experience III. (0.5 cr.; A-F only; prereq 7002 or instructor consent, criminal bkgr chk, BLS CPR cert for infants/chld/adults, [proof of negative Mantoux test or explanation of positive test], proof of chicken pox immunity; fall, every year) Third in a series of four courses. Focusing on patient's perspective in managing and living with chronic conditions and chronic medication use. Includes community-based instruction. Emphasizes mentoring.

PHAR 7004. Early Pharmacy Practice Experience IV. (0.5 cr.; A-F only; prereq 7003 or instructor consent, criminal background check, BLS CPR certification, proof of negative Mantoux test or explanation of positive test, proof of chicken pox immunity; spring, every year) Fourth in a series of four courses. Focuses on patient's perspective in managing and living with chronic conditions and chronic medication use. Includes community-based instruction. Emphasizes mentoring. Upcoming patient care opportunities.

PHAR 7005. Introductory Community-Practice Pharmacy Experience. (2.5 cr.; S-N only; prereq 6111, 6171, 7001, 1st-yr pharm student; spring, every year) Experience in patient care at community practice setting. Three weeks, 40 hrs/week.

PHAR 7006. Introductory Institutional-Pharmacy Practice Experience. (2.5 cr.; S-N only; prereq College of Pharmacy student completed PHAR 6121, 6122, 6131, 6132, 6173, 6174, 7003 and 7004 with a passing grade and is registered with the Minnesota Board of Pharmacy as an intern.; spring, every year) Experience in patient care in hospital setting. Three-week, 40 hours/week.

PHAR 7010. APPE Continuing Professional Development Portfolio. (1.5 cr. [max 4.5 cr.]; S-N only; prereq 3rd year Pharmacy student; spring, every year) The International Pharmaceutical Federation has defined Continuing Professional Development (CPD), as the responsibility of individual pharmacists for systematic maintenance, development and broadening of knowledge, skills and attitudes, to ensure continuing competence as a professional, throughout their careers. Pharmacists must self-assess their performance and associated learning needs, followed by planning of learning, acting on those plans, and evaluating progress. Documentation of this process allows for peer review and support, along with regulatory review.

PHAR 7120. Community Practice Experience. (4.0 cr.; A-F only; prereq Pharm.D. IV, MN Board of Pharmacy intern, criminal background check, BLS CPR certification, proof of negative Mantoux test [or

explanation of positive test], proof of chicken pox immunity; fall, spring, summer, every year) Students assigned to participating community pharmacies and involved in community practice activities full-time for five weeks.

PHAR 7122. Acute Patient Care Practice Experience I. (4.0 cr.; A-F only; prereq Pharm.D. I-III, MN Board of Pharmacy intern, criminal background check, BLS CPR certification, proof of negative Mantoux test [or explanation of positive test], proof of chicken pox immunity; fall, spring, summer, every year) Experience in an inpatient setting. Students are responsible for all drug-related needs of individual patients. Full-time for five weeks.

PHAR 7123. Ambulatory Patient Care Practice Experience. (4.0 cr.; A-F only; prereq Pharm.D. IV, MN Board of Pharmacy intern, criminal background check, BLS CPR certification, proof of negative Mantoux test [or explanation of positive test], proof of chicken pox immunity; fall, spring, summer, every year) Experience in an ambulatory setting. Students responsible for drug-related needs of individual patients. Full-time for five weeks.

PHAR 7126. Patient Care Practice Experience. (4.0 cr.; A-F only; prereq Pharm.D. I-III, MN Board of Pharmacy intern, criminal background check, BLS CPR certification, proof of negative Mantoux test [or explanation of positive test], proof of chicken pox immunity; fall, spring, summer, every year) Patient care experience in any setting. Students responsible for drug-related needs of individual patients. Full-time for five weeks.

PHAR 7128. Acute Patient Care Practice Experience II. (4.0 cr.; A-F only; prereq Pharm.D. I-III, MN Board of Pharmacy intern, criminal background check, BLS CPR certification, proof of negative Mantoux test [or explanation of positive test], proof of chicken pox immunity; fall, spring, summer, every year) Experience in an inpatient setting. Students are responsible for all drug-related needs of individual patients. Full-time for five weeks.

PHAR 7211. Elective Practice Experience I. (4.0 cr.; A-F only; prereq Pharm.D. I-III, MN Board of Pharmacy intern, criminal background check, BLS CPR certification, proof of negative Mantoux test [or explanation of positive test], proof of chicken pox immunity; fall, spring, summer, every year) Experience in inpatient or outpatient pharmacy practices where direct patient contact and care occurs for 5 weeks, -or- experience in a non-patient care setting, sites vary widely from governmental agencies to pharmacy associations to specialized practices for 5 weeks.

PHAR 7212. Elective Practice Experience II. (4.0 cr.; A-F only; prereq Pharm.D. I-III, MN Board of Pharmacy intern, criminal background check, BLS CPR certification, proof of negative Mantoux test [or explanation of positive test], proof of chicken pox immunity; fall, spring, summer, every year) Experience in inpatient or outpatient pharmacy practices where direct patient contact and care occurs for 5 weeks, -or- experience in

a non-patient care setting, sites vary widely from governmental agencies to pharmacy associations to specialized practices for 5 weeks.

PHAR 7213. Elective Practice Experience III. (4.0 cr.; A-F only; prereq Pharm.D. I-III, MN Board of Pharmacy intern, criminal background check, BLS CPR certification, proof of negative Mantoux test [or explanation of positive test], proof of chicken pox immunity; fall, spring, summer, every year)
Experience in inpatient or outpatient pharmacy practices where direct patient contact and care occurs for 5 weeks, -or- experience in a non-patient care setting, sites vary widely from governmental agencies to pharmacy associations to specialized practices for 5 weeks.

PHAR 7214. Elective Practice Experience IV. (4.0 cr.; A-F only; prereq Pharm.D. I-III, MN Board of Pharmacy intern, criminal background check, BLS CPR certification, proof of negative Mantoux test [or explanation of positive test], proof of chicken pox immunity; fall, spring, every year)
Experience in inpatient or outpatient pharmacy practices where direct patient contact and care occurs for 5 weeks, -or- experience in a non-patient care setting, sites vary widely from governmental agencies to pharmacy associations to specialized practices for 5 weeks.

PHAR 7217. Elective Practice Experience V. (4.0 cr.; A-F or Audit; prereq Pharm.D. I-III, MN Board of Pharmacy Intern, criminal bkgr chk, BLS CPR certification, proof of negative Mantoux test [or explanation of positive test], proof of chicken pox immunity; fall, spring, summer, every year)
Experience in inpatient or outpatient pharmacy practices where direct patient contact and care occurs for 5 weeks, -or- experience in a non-patient care setting, sites vary widely from governmental agencies to pharmacy associations to specialized practices for 5 weeks.

PHAR 7310. Introduction to Community Health, Community Engagement and Leadership I. (1.0 cr.; A-F only; prereq Successful completion of Becoming a Pharmacist (BaP); fall, every year)
EPPE is a series of interconnected learning activities spanning across the first two years of the professional program. Each semester builds on learning from the previous semester, and informs learning experiences in other courses during. The first semester focuses on two specific learning programs: 1. EPPE I: Introduction to Community Health. Students will gain an improved understanding of community and population health, professionalism, teamwork, and leadership. 2. FIPCC (Foundations of Interprofessional Communication and Collaboration): FIPCC is an interprofessional program requirement for all AHC schools and is credited as part of EPPE.

PHAR 7320. Early Pharmacy Practice Experience II: Planning and Implementing a Community Health Project. (1.0 cr.; A-F

only; prereq Successful completion of EPPE I; spring, every year)
Early Pharmacy Practice Experience (EPPE) is not a single isolated class in a given semester. It is actually a series of interconnected active learning activities spanning across the first two years of the professional program. Each semester builds on learning from the previous semester, and informs learning experiences in other courses during that semester. In other words, the students will be able to practice what they are learning in the classrooms. This course is an extension of EPPE I (in the previous semester) and will continue into EPPE III (in the following semester).

Philosophy (PHIL)

College of Liberal Arts

PHIL 1001. Introduction to Philosophy. (HUMANITIES; LE CAT7; 3.0 cr.; A-F or Audit; =[PHIL 1101]; fall, spring, summer, every year)
Introduction to philosophical heritage through examination of several classic philosophical problems such as the existence of God, nature of knowledge, free will versus determinism, and the relation of mind to body.

PHIL 1003. Ethics and Society. (HUMANITIES; LE CAT8; CDIVERSITY; LEIP CAT08; 3.0 cr.; A-F or Audit; prereq credit will not be granted if already received for CLA 1101; fall, spring, every year)
Classic theories addressing questions of whether morality is subjective or objective, cultural relativism versus universal rules, how right and wrong should be determined. Moral issues such as euthanasia, the environment, population and birth control, nuclear deterrence, alternative life styles, and capital punishment in their international dimension.

PHIL 1005. Philosophy through Dialogue and Debate. (COMM & LAN; 3.0 cr.; A-F or Audit; spring, every year)
Oral communication has always been an essential part of Philosophy, both in the development of philosophical positions and in their rigorous evaluation and revision. This course will prepare students to communicate effectively in the oral communication methods most frequently used in Philosophy: dialogue, debate, presentation with question-and-answer, panel forum and open discussion. We will engage with foundational issues in the philosophical tradition, including: the nature and ethical aspects of communication and persuasion, questions of personal identity, arguments for and against the existence of God, among others.

PHIL 1007. Philosophy and World Religions. (HUMANITIES; LE CAT7; GLOBAL PER; LEIP CAT07; 3.0 cr.; A-F or Audit; fall, spring, every year)
Comparative philosophical examination of teachings and practices of several major world religions selected from ancient polytheism, Christianity, Judaism, Islam, Taoism, Buddhism, Hinduism, and various Native American and African religions.

PHIL 1008. Critical Thinking. (LOGIC & QR; LE CAT2; 4.0 cr.; A-F or Audit; fall, spring, every year)
Patterns of reasoning encountered in everyday life, including advertising, editorials, and politics. Use of language in formulating arguments; differences between deductive and inductive arguments; how to detect and avoid mistakes in reasoning.

PHIL 1018. Logic. (LOGIC & QR; LE CAT2; 4.0 cr.; A-F or Audit; =[PHIL 1118]; fall, spring, every year)
Introduction to symbolic logic. Nature of language, species of arguments, informal versus formal arguments, techniques of translation, methods of sentential logic, and methods of predicate logic.

PHIL 1021. Classical Mythology. (HUMANITIES; LE CAT9; 3.0 cr.; A-F or Audit; fall, spring, offered periodically)
Readings in Greek and Roman myths, especially in those that have influenced Western culture.

PHIL 1025. Introduction to Cognitive Science. (3.0 cr.; A-F or Audit; fall, every year)
The Cognitive Sciences investigate the mind from an interdisciplinary perspective using resources from such diverse disciplines as psychology, philosophy, computer science, and neuroscience. This class provides a general introduction to prominent theories/themes from Cognitive Sciences as well as a more detailed investigation of various select topics.

PHIL 1101. Honors: Introduction to Philosophy. (HUMANITIES; LE CAT7; 3.0 cr.; A-F only; =[PHIL 1001]; prereq Honors student; fall, spring, every year)
Honors introduction to philosophical heritage through examination of several classic philosophical problems such as the existence of God, nature of knowledge, free will versus determinism, and the relation of mind to body.

PHIL 1118. Freshman Seminar: Honors: Logic. (LE CAT2; 4.0 cr.; A-F or Audit; =[PHIL 1018]; prereq Freshman, fewer than 30 credits, honors student; fall, spring, offered periodically)
Honors introduction to symbolic logic. Formal systems, deductive validity, proofs and translation in sentence and predicate logics. Introduction to met-theory and extensions of logic.

PHIL 2001. Existential Literature. (HUMANITIES; 3.0 cr.; A-F or Audit; prereq WRIT 1120, 30 cr or instructor consent; spring, offered periodically)
Themes of love, death, boredom, and alienation through plays and novels of such 19th- and 20th-century authors as Kafka, Dostoyevsky, Barth, Sartre, Camus, Murdoch, and Fowles.

PHIL 2011. Philosophy of Language. (SOC SCI; LE CAT3; 3.0 cr.; A-F or Audit; prereq Course in logic or literary analysis or human communication or CS or math or instructor consent; fall, spring, offered periodically)
Introduction to theories of meaning and truth and the structure of language. Relation of language to thought and the world; semantics

and syntax; speech acts and performative utterances; descriptions and reference; and structuralism and the possibility of objective knowledge.

PHIL 2021. Science and Pseudo-Science: Thinking about Weird Things. (HUMANITIES; LE CAT8; 3.0 cr.; A-F or Audit; fall, spring, offered periodically)

A critical introduction to the nature of knowledge and belief by focusing on contemporary issues, such as UFOs, ESP, mysticism, creationism and evolution, and near-death experiences, which explains the differences between rational beliefs and articles of faith and between science and pseudo-science.

PHIL 3025. Philosophy of Race and Racism. (4.0 cr.; A-F or Audit; prereq minimum 30 credits or instructor consent; spring, offered periodically)

This course will examine the origins, current causes, and consequences of racism but only after addressing these more fundamental questions: Is race a biological phenomenon? What is it if it is not biological? Is race nothing at all? Given the real facts about race, how should we approach questions about racism? It will examine various metaphysical positions that have been offered to explain race - realist, constructivist, relativist, and nihilist - and the moral/political ramifications of each of these types of theories.

PHIL 3195. Special Topics: (Various Titles to be Assigned). (3.0-9.0 cr. ; A-F or Audit; prereq 1001 or instructor consent; fall, spring, offered periodically)

In-depth examination of a particular philosopher or problem in philosophy. Specific course announced in [Class Schedule].

PHIL 3222. Medical Ethics. (4.0 cr.; A-F or Audit; spring, offered periodically)
Values underlying the health care professions and ethical dilemmas in medical contexts. Patients' rights and autonomy, medical paternalism, confidentiality, truth-telling, euthanasia.

PHIL 3231. Law and Punishment. (4.0 cr.; A-F or Audit; prereq 1001 or SOC 1301 or CRIM 1301; spring, every year)

Nature of law, natural law theory, and legal positivism and their relationship to traditional and contemporary theories of punishment; deterrence, reform, retribution, rehabilitation, social defense, restitution.

PHIL 3242. Values and Technology. (HUMANITIES; LE CAT8; 3.0 cr.; A-F or Audit; prereq 60 cr or instructor consent; fall, spring, every year)

Problems related to science and technology. Application of moral theory to issues raised by technology, such as distribution of power, effects on environment, labor and social life, privacy, intellectual property rights, product liability, and professional codes of ethics.

PHIL 3245. Aesthetics. (3.0 cr.; A-F or Audit; prereq Min 45 cr or instructor consent, credit will not be granted if already received for 5245; spring, even years)

Possibility of definition of art or of the aesthetic experience examined through survey of classic aestheticians; philosophy of art criticism.

PHIL 3252. Philosophy of Science. (3.0 cr.; A-F only; prereq 1001 or 45 cr; fall, spring, offered periodically)

Introduction to the central issues in philosophy of science, such as the nature of scientific explanation, laws of nature, induction, prediction, evidence, confirmation, intertheoretic reduction, empiricism, and scientific realism.

PHIL 3281. Ethical Theory. (4.0 cr.; A-F or Audit; prereq 1001 or 1003 or instructor consent; credit will not be granted if already received for CLA 1101; fall, even years)

Characteristics and criteria of value statements; justification of moral standards; some 20th-century ethical theories.

PHIL 3291. Current Social Political Philosophy. (4.0 cr.; A-F or Audit; prereq 1001 or 1003 or instructor consent; fall, spring, offered periodically)

Detailed philosophical analysis of recent writings about social and political concepts such as freedom, democracy, socialism, communism, fascism, and anarchy.

PHIL 3301. Greek Philosophy. (4.0 cr.; A-F or Audit; prereq 30 cr or instructor consent; fall, every year)

Greek philosophy from the pre-Socratic era through Socrates, Plato, and Aristotle to Neoplatonism and the rediscovery of Aristotle. Philosophy of nature, theories of persons, possibility of human knowledge, happiness, and the good life.

PHIL 3303. The Birth of Modern Philosophy. (4.0 cr.; A-F or Audit; prereq 30 cr, course in phil, hist, pol sci or lit or instructor consent; fall, spring, every year)

Impact of science and secularity on the rationalism of Descartes, Spinoza, Leibniz and the empiricism of Locke, Berkeley, and Hume.

PHIL 3319. 19th Century Philosophy. (4.0 cr.; A-F or Audit; prereq Min 30 cr or instructor consent; fall, spring, offered periodically)
Survey of the main issues and philosophers of the 19th century.

PHIL 3320. 20th Century Philosophy. (4.0 cr.; A-F or Audit; prereq Min 30 cr or instructor consent; fall, spring, offered periodically)
Survey of the main issues and philosophers of the 20th century.

PHIL 3325. Environmental Ethics. (HUMANITIES; SUSTAIN; 4.0 cr.; A-F or Audit; prereq 30 cr or instructor consent; fall, spring, offered periodically)

Moral dimension of relationship between humans and earth's natural environment. Pollution, energy policy, economics, law, and environment; endangered species; rights of nonhumans; preservation and conservation; obligations toward future generations; ethical theory and environment.

PHIL 3570. Philosophy of Psychology. (4.0 cr.; A-F or Audit; prereq 1001 or Psy 1003, 60

cr or instructor consent; fall, spring, offered periodically)

Current philosophical issues surrounding psychology: behaviorism, dualism, mind/brain identity theories, computer models of cognition, and functionalism.

PHIL 3655. Theory of Knowledge. (4.0 cr.; A-F or Audit; prereq (Min 45 cr or instructor consent), 1001, 1003, 1007, 1008, 1018, (1101 or 1118), credit will not be granted if already received for PHIL 4655; spring, odd years)

Introduction to theory of knowledge interpreted broadly to encompass perceptual, deductive, inductive, and other modes of knowledge. Beginning with standard conception of knowledge as warranted true belief, explores strengths and weaknesses of alternative accounts.

PHIL 3900. Colloquium for Majors. (1.0 cr.; S-N or Audit; prereq Phil major/minor, department consent ; attendance at 12 dept-approved lectures/discussions over 4-yr period; regis only during semester of 10th lect; fall, spring, every year)

Lectures and discussion groups on variety of philosophical topics; required reading; places and topics to be announced.

PHIL 4900. Seminar in Philosophy. (4.0 cr. [max 12.0 cr.]; A-F or Audit; prereq 12 cr Phil or instructor consent; no grad credit; fall, every year)

Detailed examination of major topics or philosophical works. See department for details.

PHIL 5991. Independent Study. (1.0-3.0 cr. [max 10.0 cr.]; A-F or Audit; prereq instructor consent, cannot be used to satisfy requirements for phil major or minor; fall, spring, summer, every year)

Work in problems of special interest to student arranged with instructor before registration. Written work required. May be taken in conjunction with another philosophy course.

PHIL 5997. Intern Teaching Assistantship. (2.0 cr. [max 4.0 cr.]; A-F or Audit; prereq instructor consent; fall, spring, summer, every year)

Practical experience in assisting teaching of philosophy. Application deadline one week before beginning of registration for the following semester.

Physical Education (PE)

College of Education and Human Service Professions

PE 1220. Technical Swimming. (PE; 1.0 cr.; fall, spring, every year)

This is an advanced competitive stroke class tailored to improve each student's technical swimming skills, fitness level, and kinesthetic knowledge. All competitive skills will be integrated into a weekly training schedule. An advanced skill level of swimming is recommended. The course is not intended for non-swimmers.

PE 1300. Ballroom Dance. (PE; 1.0 cr.; fall, spring, every year)

Development of the basic steps and patterns for ballroom dance. Development of technical and choreographic skill for personal expressive communication through movement.

PE 1304. Square Dance. (PE; 1.0 cr.; spring, every year)

Development of the basic steps and patterns of square dance. Development of technical and choreographic skill for personal expressive communication through movement.

PE 1402. Tennis. (PE; 1.0 cr.; fall, spring, every year)

Development of personal skills in tennis. Understanding of strategies and concepts for participation in the game.

PE 1410. Golf. (PE; 1.0 cr.; fall, every year)

Development of personal golf skills and understandings for participation in the sport.

PE 1414. Bowling. (PE; 1.0 cr.; fall, spring, every year)

Development of personal skills in bowling. Understanding of concepts and strategies for participation in the game.

PE 1500. Cross-Country Skiing. (PE; 1.0 cr.; spring, every year)

Development of personal skills in cross country skiing. Understanding of the techniques and concepts for participation in the sport.

PE 1502. Alpine Skiing. (PE; 1.0 cr.; A-F or Audit; spring, every year)

Development of personal skills in alpine skiing. Understanding of the techniques and concepts for participation in the sport.

PE 1507. Introduction to River Kayaking. (PE; 1.0 cr.; fall, spring, every year)

River kayaking techniques. History, safety, kayak design, basic braces, paddle strokes, and maneuvering for river conditions.

PE 1508. Flatwater Canoeing. (PE; 1.0 cr.; fall, every year)

Basic skills and terminology relevant for safe canoeing on flatwater and slow-stream conditions.

PE 1510. Whitewater Kayaking. (PE; 2.0 cr.; prereq 1507, instructor consent; spring, every year)

Whitewater kayaking on Lake Superior and the St. Louis River to learn about: cold water paddling equipment, reading rapids, maneuvering, basic rescues, bracing, rolling, surfing on waves and in holes, includes leadership skill development related to trip-prep, communication and river safety.

PE 1511. Sea Kayaking. (1.0 cr.; A-F or Audit; fall, every year)

Sea kayaking techniques; history, safety, kayak design, basic braces, paddle strokes, and maneuvering in large water conditions.

PE 1512. Fishing Skills. (PE; 1.0 cr.; fall, every year)

Development of personal skills in fishing. Acquisition of understanding, techniques, and patterns for participation in the activity.

PE 1530. Rock Climbing. (PE; 1.0 cr.; fall, spring, every year)

History, techniques and safety, equipment, knots, basic belay systems, route finding, face and crack climbing, identification of environmental hazards.

PE 1531. Intermediate Rock Climbing. (1.0 cr.; prereq 1530 or instructor consent; spring, offered periodically)

Intermediate rock climbing skills and knowledge including use of and placement of anchor systems, top rope set-up, introductory lead climbing and climb site risk management. This course builds upon basic rock climbing skills and techniques which are prerequisite for this course.

PE 1600. Physical Fitness. (PE; 1.0 cr.; fall, every year)

Development of personal skills related to physical fitness. Understanding and application of factors and participation patterns contributing to enhanced physical fitness.

PE 1601. Aerobics. (PE; 1.0 cr.; fall, spring, every year)

Knowledge of cardiovascular fitness, including aerobic exercise and hydro-aerobics. Physical development through cardiovascular training, muscle strengthening, and stretching.

PE 1612. Karate. (PE; 1.0 cr.; fall, every year)

Development of personal skills in karate. Understanding history, cultural background, patterns, and strategies for participation in karate.

PE 1613. Karate: Advanced Belts. (1.0 cr. [max 4.0 cr.]; A-F or Audit; prereq 1612 or equivalent or instructor consent; spring, every year)

An advanced course for the experienced student who has achieved the basic competencies in karate.

PE 1614. Self Defense. (PE; 1.0 cr.; spring, every year)

Development of personal skills related to self defense. Understanding of concepts, strategies, and skills for developing a personal system of self defense.

PE 1615. Jujutsu. (1.0 cr. [max 3.0 cr.]; fall, spring, summer, every year)

Students will learn practical self-defense skills framed within traditional Japanese jujutsu. Jujutsu is a complete martial art, derived from the unarmed combat style of Japanese Samurai. It includes grappling, throwing, striking, and a mind-body relationship that develops confidence and perfection of character. Students will develop physical skills as well as an understanding and appreciation for the history and culture that produced jujutsu. Students will also learn how to teach kinesthetic skills to other students.

PE 1616. Weight Training. (PE; 1.0 cr.; fall, spring, every year)

Development of personal skills related to weight training. Understanding of principles, concepts, and conditioning regimens for participation in weight training.

PE 1706. Volleyball. (PE; 1.0 cr.; fall, every year)

Development of personal skills in volleyball. Understanding of strategies, concepts, and skills for participation in volleyball.

PE 1708. Basketball. (PE; 1.0 cr.; spring, every year)

Development of personal skills in basketball. Understanding of strategies, concepts, and skills for participation in the sport.

PE 1901. Varsity Football. (1.0 cr. [max 4.0 cr.]; S-N only; prereq instructor consent; fall, every year)

Participation in intercollegiate football competition.

PE 1903. Varsity Soccer. (1.0 cr. [max 4.0 cr.]; S-N only; prereq instructor consent; fall, every year)

Participation in intercollegiate soccer competition.

PE 1905. Varsity Basketball. (1.0 cr. [max 4.0 cr.]; S-N only; prereq instructor consent; fall, spring, every year)

Participation in intercollegiate basketball competition.

PE 1907. Varsity Ice Hockey. (1.0 cr. [max 4.0 cr.]; S-N only; prereq instructor consent; fall, spring, every year)

Participation in intercollegiate ice hockey competition.

PE 1913. Varsity Cross Country. (1.0 cr. [max 4.0 cr.]; S-N only; prereq instructor consent; fall, every year)

Participation in intercollegiate cross country competition.

PE 1917. Varsity Volleyball. (1.0 cr. [max 4.0 cr.]; S-N only; prereq instructor consent; fall, every year)

Participation in intercollegiate volleyball competition.

PE 1919. Varsity Track. (1.0 cr. [max 4.0 cr.]; S-N only; prereq instructor consent; spring, every year)

Participation in intercollegiate track competition.

PE 1921. Varsity Tennis. (1.0 cr. [max 4.0 cr.]; S-N only; prereq instructor consent; spring, offered periodically)

Participation in intercollegiate tennis competition.

PE 1925. Varsity Baseball. (1.0 cr. [max 4.0 cr.]; S-N only; prereq instructor consent; spring, every year)

Participation in intercollegiate baseball competition.

PE 1927. Varsity Softball. (1.0 cr. [max 4.0 cr.]; S-N only; prereq instructor consent; spring, every year)

Participation in intercollegiate softball competition.

PE 2001. Sport Ethics and Society. (LE CAT7; 3.0 cr.; A-F or Audit; spring, every year)

Explores ethical issues in sport to develop moral reasoning skills for a successful life.

PE 2240. Lifeguarding Today. (1.0 cr.; prereq Ability to swim 500 yards, instructor consent; fall, spring, every year)

Provides knowledge and skills necessary to qualify as a non-surf lifeguard. Meets current American Red Cross standards. Includes CPR and first aid instruction.

PE 2244. Water Safety Instructor. (2.0 cr.; A-F or Audit; prereq 1240, 17 yrs old, knowledge and skill based on Emergency Water Safety Standard; fall, spring, every year)
Knowledge, skills, and strategies to teach American Red Cross swimming and water safety courses.

PE 2500. Advanced Nordic Ski: Telemark and Backcountry Ski Techniques. (2.0 cr.; A-F or Audit; prereq 1500 or instructor consent; spring, offered periodically)
Traditional Nordic Techniques of telemark skiing will be presented. Background on the history of Nordic skiing will set the foundation for this active physical skill development course. Students will develop skills for Telemark and back country skiing such as safety, body position, weighting, use of the fall line, and pole planting. Contemporary telemark/back-country gear will be used and reviewed.

Physical Education Teacher Education (PETE)

College of Education and Human Service Professions

PETE 1000. Introduction and Foundations of Physical Education. (4.0 cr.; A-F or Audit; prereq Pre-PE major or instructor consent; fall, every year)

Introduction on the profession of teaching physical education. Presents professional standards for practitioners and outcomes for K-12 physical education programs. Addresses the history, philosophy, and psychol-social basis of physical education with additional context focuses upon the scientific foundations supporting the discipline.

PETE 1001. Teaching Games and Activities. (2.0 cr.; A-F or Audit; prereq Pre or PE major; fall, every year)

Addresses basic skill progressions, teaching strategies, skill development and analysis for teaching manipulative skills, games and activities. In addition, emphasis will also be placed upon student development of personal competence in the activity.

PETE 1002. Teaching Team Sport Activities. (2.0 cr.; A-F or Audit; prereq Pre PE; fall, every year)

Addresses basic skill progressions, teaching strategies, skill development activities, and skill analysis for teaching team sport activities. Emphasis placed upon student development of personal competence in the activity.

PETE 1003. Teaching Outdoor Activities in Physical Education. (2.0 cr.; A-F or Audit; prereq Pre-Physical Education Major; spring, every year)

Focus is on teaching physical educators how to implement outdoor activities as part of the K-12 physical education curriculum. Included are such activities as hiking, backpacking, climbing, skiing, primitive camping, canoeing, snowshoeing, and biking. Emphasis is on

risk management and common pedagogical knowledge and skills which cut across activities. Students participate in the scope and sequence for skill development in two outdoor activities, and plan for a third outdoor activity.

PETE 1004. Teaching Recreational and Lifetime Activities. (2.0 cr.; A-F or Audit; prereq Pre-Physical Education major; spring, every year)

Basic skill progression, teaching strategies, skill development activities, and skill analysis for teaching recreational and lifetime activities; emphasis placed upon student development of personal competence in the activity.

PETE 1005. Teaching Physical Fitness Activities. (2.0 cr.; A-F or Audit; prereq Pre PE major; spring, every year)

Basic skill professional, teaching strategies, skill development activities, and skill analysis for teaching physical fitness activities. Emphasis placed upon student development of personal competence in the activity.

PETE 1006. Teaching Aquatic Activities. (2.0 cr.; A-F or Audit; prereq Pre-Physical Education, HLTH 1700; credit will not be granted if already received for both PE 2240 and 2244.; fall, every year)

Basic skill progressions, teaching strategies, skill development activities, and skill analysis for teaching aquatics. Emphasis placed upon student development of personal competence in aquatics.

PETE 1007. Teaching Dance Activities. (2.0 cr.; A-F or Audit; prereq Pre PE major; spring, every year)

Basic skill progressions, teaching strategies, skill development activities, and skill analysis for teaching dance activities. Emphasis placed upon student development of personal competence in the activity.

PETE 1008. Teaching Rhythmic Activities. (2.0 cr.; A-F or Audit; prereq Pre PE major; fall, every year)

Addresses basic skill progressions, teaching strategies, skill development and analysis for teaching rhythmic activities. Emphasis will be placed upon student development of personal competence in the activity.

PETE 2000. Foundations of Physical Education. (3.0 cr.; A-F or Audit; prereq Pre PE major or instructor consent; spring, every year)

Historical, philosophical, sociological, and scientific foundations within physical education and its subdisciplines.

PETE 3100. Curricular Approaches in Physical Education. (3.0 cr.; A-F or Audit; prereq Pre-Physical Education; fall, every year)

Exploration of a variety of curricular models and their applications in a physical education setting. Content includes the scope and sequence of educational programming, national and state standards, and a review and comparison of a variety of currently used curricular approaches.

PETE 3400. Adapted Physical Education. (3.0 cr.; A-F or Audit; prereq PE major or candidate or instructor consent; fall, every year)

Developmental/adapted physical education for children with disabilities.

PETE 3500. Student Assessment in Physical Education. (3.0 cr.; A-F or Audit; prereq PE Major or Candidate or instructor consent; fall, every year)

Key components of student assessment for physical education teacher education candidates.

PETE 3501. Teaching Cross-Country Skiing. (1.0 cr.; A-F or Audit; prereq PE or rec major or instructor consent; credit will not be granted if already received for 1500; spring, every year)
Basic skills, teaching strategies, practice, drills, and skill analysis for teaching cross-country skiing.

PETE 3505. Teaching Outdoor Skills I. (2.0 cr.; A-F or Audit; prereq REC 1201/1203, 1202/1204, PE 1508, REC major or minor or instructor consent; Wilderness First Responder Certificate preferred.; fall, every year)
Fall course in basic skills, teaching strategies, practice, drills, and skill analysis for teaching outdoor recreation skills with an emphasis on teaching canoeing; includes canoe skills, camp craft, back country travel, and safety. Field trips and skill development experiences are required beyond scheduled class hours.

PETE 3507. Teaching Outdoor Skills II. (2.0 cr.; prereq PE or REC major, (Rec 1201 or Rec 1203), (Rec 1202 or Rec 1204), Rec 2300 or instructor consent; credit will not be granted if already received for 1507; spring, every year)
Spring course in basic skills, teaching strategies, practice, drills, and skill analysis for teaching outdoor recreation skills; includes navigation, camp craft, backpacking, back country travel, and safety.

PETE 3508. Teaching Rock Climbing. (1.0 cr.; prereq Exer Sci or PE or REC major, PE 1530 or instructor consent; credit will not be granted if already received for 1508; spring, offered periodically)
Basic skills, teaching strategies, practice, drills, and skill analysis for teaching rock climbing.

PETE 3509. Teaching Canoeing. (1.0 cr.; prereq Exer Sci or PE or REC major, PE 1508 or instructor consent; credit will not be granted if already received for 1509; fall, every year)
Basic skills, teaching strategies, practice, drills, and skill analysis for teaching canoeing. Successful completion results in American Canoe Association instructor certification.

PETE 4100. Elementary Physical Education Methods. (4.0 cr.; A-F or Audit; prereq 3400, 3500, Secondary Teacher Education Program (STEP), instructor consent; PETE 4125 (concurrent registration allowed); spring, every year)
Methods, instructional techniques and strategies, classroom management, lesson planning, developmental levels, elementary curriculum and standards.

PETE 4125. Apprenticeship: Elementary. (2.0 cr.; A-F or Audit; prereq Secondary Teacher Education Program (STEP), pre or coreq PETE 4100 and instructor consent; no grad credit; spring, every year)

Supervised clinical teaching experience with responsibilities that include planning, managing, and implementing instructional experiences for elementary school children.

PETE 4200. Secondary Physical Education Methods. (4.0 cr.; A-F only; prereq 1006, 4100, concurrent registration 4225, Secondary Teacher Education Program (STEP) or instructor consent; fall, every year)

Methods, instructional techniques and strategies, classroom management, lesson planning, developmental levels, secondary curriculum and standards.

PETE 4225. Apprenticeship: Secondary. (2.0 cr.; A-F only; prereq 1006, 4100, 4200 concurrent registration, Secondary Education Teacher Program (STEP) or instructor consent; no grad credit; fall, every year)

Supervised teaching experience with responsibilities that include planning, managing, and implementing instructional experiences for secondary school children.

PETE 4250. Supervised Teaching College I: Planning for Instruction. (1.0 cr. [max 2.0 cr.]; A-F only; prereq 4100 or 4200, Secondary Teacher Education Program (STEP), instructor consent; no grad credit; fall, spring, every year) Physical education teacher education majors plan and prepare materials to teach a college level physical education activity class. Implementation of this planned instruction occurs during PETE 4255 Supervised Teaching College II: Implementation and Management

PETE 4255. Supervised Teaching College II: Implementation and Class Management. (1.0 cr.; A-F or Audit; prereq 4250 and instructor consent; no grad credit; fall, spring, every year)

Faculty supervised teaching experience in a collegiate setting. Physical education teacher education majors teach and manage a college level physical education activity class under the daily supervision of a departmental faculty member. Implementation of planned instruction completed during PETE 4250 Supervised Teaching College I Planning for Instruction.

PETE 4600. Seminar in Physical Education. (1.0 cr.; A-F or Audit; prereq Physical Education candidate; no grad credit; fall, spring, every year)

Professional development seminar for physical education teacher education candidates. Course will address decision making, reflective teaching, and professional and specific concerns of student teachers. Candidates will finalize development of a professional portfolio.

PETE 4991. Independent Study. (1.0-4.0 cr. [max 8.0 cr.]; A-F or Audit; prereq PE or Exer Sci major and instructor consent; no grad credit; fall, spring, every year) Research or study in selected noncurricular area of exercise science or physical education.

PETE 4992. Directed Readings. (1.0-3.0 cr. [max 6.0 cr.]; A-F or Audit; prereq instructor consent; no grad credit; fall, spring, every year) Study of varying topics by reading specific books, journal articles, etc. Topics selected based on student interests or academic preparation.

PETE 4997. Practicum. (1.0-5.0 cr.; A-F or Audit; prereq PE or Exer Sci major; no grad credit; fall, spring, every year) Supervised practical experience related to physical education teaching or exercise science professional experiences.

Physics (PHYS) Swenson College of Science and Engineering

PHYS 1001. Introduction to Physics I. (NAT SCI; LE CAT4; 5.0 cr.; A-F or Audit; prereq Algebra, trig; fall, spring, every year) Noncalculus general physics course primarily for certain preprofessional fields. Topics in mechanics, heat, and sound.

PHYS 1002. Introduction to Physics II. (5.0 cr.; A-F or Audit; prereq 1001; fall, spring, every year) Noncalculus general physics course primarily for certain preprofessional fields. Topics in light, electricity, magnetism, and modern physics.

PHYS 1011. Conceptual Physics. (NAT SCI; LE CAT5; 3.0 cr.; A-F or Audit; prereq Will not satisfy major or minor requirements in phys; fall, spring, offered periodically) Descriptive, nonmathematical survey of basic concepts in physics from Newton to present. Instructor has considerable latitude regarding content. Primarily for liberal arts students; not for preprofessional preparation.

PHYS 1021. Exploring Current Topics in Physics. (1.0 cr.; A-F or Audit; fall, every year) Introduction to current topics in the field of physics, with emphasis on recent research developments and local research activities.

PHYS 1033. Cosmology, String Theory and the Death of the Universe. (NAT SCI; LE CAT5; 3.0 cr.; A-F or Audit; spring, every year) A qualitative introduction to cosmology and string theory; the structure, evolution, and death of the universe, and of the galaxies, stars and planets it contains; fundamental theories for the structure, including extra dimensions, supersymmetry, and string dualities; extinction-level events ranging in scale from planetary to universal.

PHYS 1035. Energy. (NAT SCI; SUSTAIN; 3.0 cr.; A-F only; spring, offered periodically) Energy as a fundamental topic for understanding both the natural and man made world. Will discuss concepts of human production, transmission, storage, and utilization of energy, as well as how these processes interact with natural pathways of energy such as the carbon cycle.

PHYS 2013. General Physics I. (NAT SCI; LE CAT5; 4.0 cr.; A-F or Audit; prereq previous or concurrent registration in 2014, Math 1290 or 1296 or 1596; credit will not be granted if already received for PHYS 1201 or 2011.; fall, spring, summer, every year) Calculus-based introduction to Newtonian Mechanics, fluid mechanics, and heat. The companion laboratory, PHYS 2014 should be taken concurrently. The combination of PHYS 2013 and 2014 meets liberal education category 4.

PHYS 2014. General Physics Lab I. (NAT SCI; 1.0 cr.; A-F or Audit; prereq previous or concurrent enrollment in PHYS 2013; fall, spring, summer, every year) Calculus-based introduction to Newtonian Mechanics, fluid mechanics, and heat exemplified by laboratory study. This laboratory accompanies lecture PHYS 2013 and should be taken concurrently. The combination of PHYS 2013 and 2014 meets liberal education category 4.

PHYS 2015. General Physics II. (4.0 cr.; A-F or Audit; prereq previous or concurrent registration in 2016, 2011 or 2013 and 2014, Math 1297 or 1597; credit will not be granted if already received for PHYS 1202, 1204 or 2012.; fall, spring, every year) Calculus-based introduction to electricity, magnetism and optics. The companion laboratory, PHYS 2016, should be taken concurrently.

PHYS 2016. General Physics Lab II. (1.0 cr.; A-F or Audit; prereq Previous or concurrently enrollment in PHYS 2015.; fall, spring, every year) Calculus-based introduction to electricity, magnetism and optics exemplified by laboratory study. This laboratory accompanies lecture PHYS 2015 and should be taken concurrently.

PHYS 2017. Honors:General Physics I. (NAT SCI; 4.0 cr.; A-F or Audit; prereq Concurrent registration in PHYS 2014; B+ or higher in Math 1290 or 1296 or 1596 or concurrent registration in Math 1296 or 1596 if ACT 28 or higher or physics major or instructor permission. Credit will not be granted if already received for PHYS 1201 or PHYS 2011 or PHYS 2013; fall, every year) Advanced coverage of General Physics topics that include Newtonian Mechanics, fluid mechanics, and heat. Mathematically and conceptually demanding problem solving techniques. The companion laboratory, PHYS 2014, should be taken concurrently. The combination of PHYS 2014 and PHYS 2017 meets liberal education natural science with lab.

PHYS 2021. Relativity and Quantum Physics. (4.0 cr.; A-F or Audit; prereq 1202 or 1204 or 2012 or (2015 and 2016); spring, every year) Descriptive course; relativity, quantum mechanics, hydrogen atom, multielectron atoms, molecular structure, quantum statistics, thermal radiation, solid state physics, nuclear physics.

PHYS 2022. Classical Physics. (4.0 cr.; A-F or Audit; prereq 2012 or 2015 and 2016; credit will not be granted if already received for 1203 or 1205 or 2001; spring, every year) Survey of various topics in classical physics: vector angular momentum, AC circuits, oscillatory motion, waves, physical optics.

PHYS 2033. Classical and Quantum Physics Lab. (2.0 cr.; A-F or Audit; =[PHYS 2031]; prereq 2021 and 2022 (concurrent registration is allowed); spring, every year)

Experiments and computer simulations selected to provide experience with both concepts and techniques in classical and quantum physics.

PHYS 2199. Physics Tutoring. (1.0-2.0 cr. [max 4.0 cr.]; S-N or Audit; prereq 2012 or 2015 and 2016, department consent; fall, spring, every year)
Tutoring students in 1xxx- and 2xxx-level physics courses.

PHYS 3033. Analytical Methods in Physics. (3.0 cr.; A-F or Audit; prereq 2021, 2022, Math 3280 and 3298; fall, odd years)
A survey of analytical methods for the solution of fundamental equations of physics, such as those of Newton, Schrodinger, and Maxwell, and of the underlying mathematics, including complex variables, linear algebra, vector analysis, and ordinary and partial differential equations.

PHYS 3061. Instrumentation. (3.0 cr.; A-F or Audit; prereq 2022 or 1203 or 1205, 1 sem programming; fall, even years)
Introduction to electronics for scientific applications. DC and AC circuits, linear and nonlinear devices, integrated circuits. Analog electronics. Transducers. Digital electronics. Applications of microcomputers to lab data acquisition.

PHYS 3091. Independent Study. (1.0-3.0 cr. [max 6.0 cr.]; A-F or Audit; prereq department consent; fall, spring, every year)
Directed individual study.

PHYS 3094. Physics Research. (1.0-6.0 cr. ; S-N or Audit; prereq department consent; fall, spring, summer, every year)
Supervised research.

PHYS 3561. Astrophysics. (3.0 cr.; A-F or Audit; =[PHYS 5561]; prereq 2021; spring, even years)
The application of physical laws and processes to the understanding of astrophysical objects: celestial mechanics, energy transport, stellar structure and evolution, the interstellar medium, stellar remnants, galactic structure and dynamics, large scale structure and cosmology.

PHYS 4001. Classical Mechanics. (4.0 cr.; A-F or Audit; prereq 2022 or 2001, Math 3280; fall, odd years)
Theoretical mechanics, including Lagrangian and Hamiltonian functions, symmetries, and conservation laws.

PHYS 4011. Electromagnetic Theory. (4.0 cr.; A-F or Audit; prereq 3033; spring, odd years)
Electric and magnetic fields, Maxwell's equations and applications, radiation.

PHYS 4021. Quantum Physics II. (4.0 cr.; A-F or Audit; prereq 3033; spring, even years)
Quantum wave mechanics with applications; Schrodinger equation, angular momentum, hydrogen atom, symmetries, identical particles.

PHYS 4031. Thermal and Statistical Physics. (4.0 cr.; A-F or Audit; prereq 2021; fall, even years)

Elements of thermodynamics; principles of statistical physics applied to equilibrium properties of classical and quantum systems.

PHYS 4110. Physics for Science Teachers. (2.0 cr.; A-F or Audit; prereq 1002 or 2012 of 2015 and 2016, no grad credit; spring, every year)
Preparation for teaching physics at the high school level. Review of physics concepts important at the high school level. Methods for effective presentation, including problem solving, discussions, demonstrations and lab experiments.

PHYS 5041. Optics. (3.0 cr.; A-F or Audit; prereq 2022 or 2001; spring, odd years)
Fundamentals of physical optics.

PHYS 5043. Environmental Optics. (3.0 cr.; A-F or Audit; prereq 2012 or 2015 and 2016 or course containing elementary optics; fall, odd years)
Application of optics in environmental measurements of irradiance and radiance, optical remote sensing using ship-borne and satellite platforms, diffuse spectra, single vs. multiple scattering, object visibility, inherent vs. apparent optical properties, scattering in Beer's law, optical algorithms.

PHYS 5052. Computational Methods in Physics. (3.0 cr.; A-F or Audit; prereq 2021, 1 sem programming, Math 3280; fall, odd years)
Applications of numerical methods to problems in classical and quantum physics, emphasizing ordinary and partial differential equations. Computer modeling of physical systems and experimentation with simulations of physical systems.

PHYS 5053. Data Analysis Methods in Physics. (3.0 cr.; A-F or Audit; prereq 2012 or 2015 and 2016, 1 sem programming, lab or field experience beyond 2012/2015 and 2016; fall, even years)
Problems of data analysis in the context of dynamical models. Emphasis will be placed on large datasets that arise in astrophysics, particle dynamics, physical oceanography and meteorology. (2 hr lect & 2 hr lab)

PHYS 5061. Experimental Methods. (3.0 cr.; A-F or Audit; prereq 2033 or 2031, 3061; spring, even years)
Instruction and practice in methods of experimental physics; microcomputer-based data acquisition; vacuum techniques.

PHYS 5090. Physics Seminar. (1.0 cr. [max 2.0 cr.]; A-F or Audit; prereq Sr or grad student; spring, every year)
Preparation and presentation of oral reports on approved physics topics, research projects, and journal articles.

PHYS 5501. Advanced Classical Mechanics. (3.0 cr.; A-F or Audit; prereq 4001; fall, odd years)
Hamiltonian and Lagrangian formulations for discrete systems, canonical transformations, nonlinear dynamics, and chaos theory.

PHYS 5511. Electrodynamics. (3.0 cr.; A-F or Audit; prereq 4011; spring, even years)
Maxwell's equations, relativity and electrodynamics, radiation and scattering of

electromagnetic waves, relativistic particles in electromagnetic fields, and radiation reaction.

PHYS 5521. Quantum Mechanics I. (3.0 cr.; A-F or Audit; prereq 4021; fall, even years)
Schr[od]inger equation, operator formulation, angular momentum, symmetries.

PHYS 5522. Quantum Mechanics II. (3.0 cr.; A-F or Audit; prereq 5521; spring, even years)
Identical particles, perturbation theory, scattering, interaction with electromagnetic field.

PHYS 5531. Introduction to Solid State Physics. (3.0 cr.; A-F or Audit; prereq 4021, 4031; spring, odd years)
Solid structure, thermal, and electronic properties of solids and solid surfaces.

PHYS 5541. Fluid Dynamics. (3.0 cr.; A-F or Audit; prereq 2022 or 2001, Math 3280; spring, even years)
Analytic and numeric treatment of dynamics of fluids. Rotating, stratified fluids, with applications in limnology, oceanography, and meteorology.

PHYS 5561. Astrophysics. (3.0 cr.; A-F or Audit; =[PHYS 3561]; prereq 2021 and 2022, Math 3280; spring, even years)
The application of physical laws and processes to the understanding of astrophysical objects: celestial mechanics, energy transport, stellar structure and evolution, the interstellar medium, stellar remnants, galactic structure and dynamics, large scale structure and cosmology.

PHYS 5591. Independent Study. (1.0-3.0 cr. [max 6.0 cr.]; S-N or Audit; prereq Consent of director of graduate studies, instructor consent; fall, spring, every year)
Special studies, useful in individual graduate programs, not available in regular course offerings.

PHYS 5594. Physics Research. (1.0-3.0 cr. [max 6.0 cr.]; S-N or Audit; prereq instructor consent; fall, spring, summer, every year)
Physics Research

PHYS 8333. FTE: Master's. (1.0 cr.; No Grade Associated; prereq Master's student, adviser and DGS consent; fall, spring, summer, every year)
(No description)

PHYS 8777. Thesis Credits: Master's. (1.0-18.0 cr. [max 50.0 cr.]; No Grade Associated; prereq Max 18 cr per semester or summer; 10 cr total required (Plan A only); fall, spring, every year)
(No description)

Political Science (POL)

College of Liberal Arts

POL 1011. American Government and Politics. (SOC SCI; LE CAT6; 3.0 cr.; A-F or Audit; fall, spring, every year)
Principles of American national government. Survey of American governmental system, structure, operations, and services; constitutionalism, federalism, civil liberties, parties, pressure groups, and elections.

POL 1015. Introduction to Political Science.

(3.0 cr.; A-F or Audit; prereq 1011, Pol Sci majors and minors or instructor consent; spring, every year)
An introduction to the history, development, scope, and methods of political science as a scholarly discipline.

POL 1050. International Relations. (GLOBAL PER; LE CAT8; LEIP CAT08; 3.0 cr.; A-F or Audit; fall, spring, every year)

Introduction to contemporary international politics: levels of analysis; the international system; nation-state behavior; foreign policy decision making; economic and defense policy issues.

POL 1500. Introduction to Comparative Politics. (GLOBAL PER; LE CAT6; LEIP CAT06; 3.0 cr.; A-F or Audit; fall, spring, every year)

Survey of the politics of countries selected to reflect alternative styles of politics and forms of government; examples of Western liberal democratic, Communist and post-Communist, and Third World systems.

POL 1610. Introduction to Political Theory. (HUMANITIES; LE CAT7; 3.0 cr.; A-F or Audit; fall, spring, every year)

Introduction to the history of political thought from a thematic perspective such as freedom and citizenship, democracy and its critics, political obligation and justice, diversity and inequality. Close attention to method of interpretation and argument.

POL 1800. Mock Trial. (3.0 cr. [max 6.0 cr.]; A-F or Audit; prereq Students may take this course twice for a maximum of 6 credits. Political Science majors and minors may only apply one attempt towards the major or minor. Political Science majors and minor may only take the course once.; fall, spring, every year)
Mock trial covers the procedures, evidentiary rules, and functioning of the judiciary at the trial court level. Students apply their classroom training as attorneys and witnesses in American Mock Trial association sanctioned tournaments. The course increases student skills in critical thinking, analysis, and oral and written expression and argument. (One attempt applicable in the Pol Sci major or minor.)

POL 2700. Methodology and Analysis. (4.0 cr.; A-F or Audit; fall, every year)

Theory and methods of conducting political research: theory construction, concept formulation, survey research and sampling design, basic statistical analysis, and measurement of relationships.

POL 3001. American Public Policy. (3.0 cr.; A-F or Audit; prereq 1011, min 45 cr or instructor consent; fall, even years)

Approaches to policy study, context of policy process, and discussion of policy issues.

POL 3015. State and Local Government.

(4.0 cr.; A-F or Audit; prereq 1011, 45 cr or instructor consent; credit will not be granted if already received for 3020; fall, spring, summer, offered periodically)
State and local governments in the United States; governmental institutions and

processes; intergovernmental relations. Special reference to Minnesota

POL 3025. Popular Culture and Politics.

(4.0 cr.; A-F or Audit; prereq 45 cr incl 6 cr soc sci or instructor consent; summer, offered periodically)
Evaluation of the presentation of American political institutions, officials, and policy issues in mass entertainment. How accurate are the portrayals? How influential is Hollywood's view of American government? How do Americans know what they think they know about politics?

POL 3040. Women and Politics. (3.0 cr.; A-F or Audit; prereq 45 cr or instructor consent; spring, odd years)

Women's political status; implications of women's role in political process; women as political actors; feminist critique and vision of politics.

POL 3080. Environment and Politics.

(3.0 cr.; A-F or Audit; prereq 1011, 45 cr or instructor consent; fall, every year)
American natural resource problems with special attention to conservation activities on national, state, and local levels; development of conservation agencies in Minnesota.

POL 3097. Government Internship. (1.0-12.0 cr. ; S-N or Audit; prereq 60 cr; 4 cr max from 3097, 3197, 3297 may be applied toward advanced Pol major requirements; instructor consent; fall, spring, summer, every year)

Scheduled work assignments with direct supervision in performance of governmental functions; full- or part-time employment.

POL 3120. Congress and the Presidency.

(4.0 cr.; A-F or Audit; prereq 1011, 45 cr or instructor consent; fall, spring, offered periodically)
Functioning and structure of the United States Congress and Presidency. Members of Congress and the Presidency: their characteristics, their selection, roles they play, how they interact with each other as well as with others in the policy-making process.

POL 3131. Judicial Politics and Policy Making. (3.0 cr.; A-F or Audit; spring, even years)

An examination of the characteristics and behavior of judicial institutions, emphasizing the interaction with other policy-makers and social and political problems. Investigates the policy roles of state and lower federal courts and the U.S. Supreme Court.

POL 3141. American Political Parties. (3.0 cr.; A-F only; prereq 1011 or equivalent, 45 cr; spring, even years)

History of political parties in the U.S.; the role of parties in the executive, legislative, and judicial branches of government and their effect on public policy; party organization; parties at the state and local level; party competition and third parties.

POL 3142. Voting, Campaigning, and Elections. (3.0 cr.; A-F only; prereq 1011, 45 cr; fall, every year)

Covers theories of voting, including how they explain who votes and vote choice. Examines how campaign money, policy issues, the

media, and campaign advertising play a role in presidential and congressional elections

POL 3143. Political Psychology. (3.0 cr.; A-F or Audit; prereq minimum 45 credits; spring, odd years)

How political opinion formation and behavior of citizens and political elites is shaped by psychological factors, including personality, attitudes, values, and emotions. Study opinion formation, mass media, identify, and culture.

POL 3150. American Constitutional Law I.

(4.0 cr.; A-F or Audit; prereq 1011, 45 cr or instructor consent; fall, every year)
Institutional powers and civil rights: judicial review; authority of Congress and President; powers in war and foreign affairs; power of national and state governments; property rights; civil rights and equal protection (race, gender, and other groups); anti-discrimination; affirmative action.

POL 3151. American Constitutional Law II.

(4.0 cr.; A-F or Audit; prereq 1011, 45 cr or instructor consent; spring, every year)
Civil liberties: incorporation of the Bill of Rights; Due Process clause; freedom of religion; freedom of speech; freedom of press; privacy rights; rights of the accused; search and seizure; rights before the Courts; cruel and unusual punishment.

POL 3170. Political Interest Groups and Individuals. (3.0 cr.; A-F or Audit; prereq 1011, 45 cr or instructor consent; spring, odd years)

Role of interest groups and individuals who lobby government to influence public policy. Internal dynamics of groups; strategies of lobbying and its regulation.

POL 3195. Special Topics: (Various Titles to Be Assigned). (1.0-4.0 cr. [max 8.0 cr.]; A-F or Audit; prereq 45 credits including 6 credits in social sciences or instructor consent; fall, spring, summer, every year)

Detailed examination of contemporary topics in political science. Specific course announced in [Class Schedule].

POL 3197. Nongovernmental Internship.

(1.0-12.0 cr. ; S-N or Audit; prereq 60 cr; 4 cr max from 3097, 3197, 3297 may be applied toward advanced Pol major requirements; instructor consent; fall, spring, summer, every year)
Supervised, scheduled work assignments in performance of political functions in nongovernmental organizations; full- or part-time employment. Not all outside work is eligible; see department head for requirements.

POL 3311. Public Opinion and Polling Methods. (4.0 cr.; A-F only; prereq 1011 or equivalent, 45 cr; spring, every year)

Formation of public opinion; attitudes and nonattitudes; polls in the media; role of public opinion in democracy; measurement of opinion; survey methods; questionnaire construction; sampling techniques.

POL 3400. Contemporary Issues in World Politics. (4.0 cr. [max 8.0 cr.]; A-F or Audit; prereq 1050, 45 cr; 4 cr may be applied toward Pol major requirements; fall, even years)

Detailed examination and analysis of selected contemporary issues in world politics and international relations. Policy recommendations dealing with each issue.

POL 3403. American Foreign Policy. (3.0 cr.; A-F only; =[POL 3402]; prereq 1011 or 1050, min 45 cr; fall, odd years)

Various influences on the making of American foreign policy; understanding why particular foreign policy choices are made and the effects of a changing international environment on American foreign policy.

POL 3420. International Organization and Global Governance. (3.0 cr.; A-F or Audit; prereq 1050 and minimum 45 credits; spring, even years)

Explores the role of international organizations in world politics and the evolution of global governance systems. Includes examinations of state sovereignty, methods for achieving cooperation, and whether international organizations are effective means for achieving global collective goods.

POL 3430. Global Health Politics. (3.0 cr.; A-F or Audit; prereq 1050 or 1500 or instructor consent; spring, offered periodically)

Examination of the political effects of health and disease globally, how health influences relations among states, and the role of national and international actors in addressing global health concerns. Topics may include HIV/AIDS, financing for health programs, the role of trade and the military in facilitating the spread of diseases, noncommunicable diseases, and global health governance.

POL 3451. Theories of International Relations. (4.0 cr.; A-F or Audit; prereq 45 cr incl 8 cr soc sci or instructor consent; spring, even years)

Historical and contemporary theories of international relations. Views of contending theorists are analyzed and assessed.

POL 3456. International Security: War and More. (4.0 cr.; A-F or Audit; prereq Minimum 45 credits; spring, odd years)

Introduction to a variety of different aspects of International Security, including warfare, terrorism, human rights, environmental justice, and women and violence worldwide. Includes discussion of efforts to ensure and barriers to achieving international security in its various forms.

POL 3457. Understanding Terrorism and the Terrorist Threat to America. (4.0 cr.; A-F or Audit; prereq 30 credits including 6 credits social sciences or instructor consent; fall, spring, every year)

Introduces students to the major causes of terrorism in the Cold War and post-Cold War worlds and the threats terrorist groups pose to the United States and its interests around the world.

POL 3511. Politics of South Asia . (4.0 cr.; A-F or Audit; prereq 1500, 45 cr incl 8 cr soc sci or instructor consent; spring, even years) Comparative study of five South Asian countries (namely India, Pakistan, Bangladesh, Sri Lanka, and Nepal). It analyzes the history

and impact of colonialism in South Asia; state formations in South Asia; and controversies in recent South Asian politics over issues like globalization; democratization; religious fundamentalism; nuclearism; and gender. Policy solutions to these problems will be considered.

POL 3515. Theories of Comparative Politics. (4.0 cr.; A-F or Audit; prereq 1500, 45 cr incl 8 cr soc sci or instructor consent; fall, even years)

Introduces the theoretical, methodological, and substantive debates in the discipline of Comparative Politics.

POL 3517. Western European Political Systems. (4.0 cr.; A-F or Audit; prereq 45 cr incl 8 cr soc sci or instructor consent; fall, odd years)

Comparative analysis of development and operation of political-governmental institutions and processes in selected Western European countries; political and ideological patterns and trends; problems of democratic politics; policy issues in advanced industrial societies and the future of the "welfare state."

POL 3518. Transitional Politics of Asia. (3.0 cr.; A-F only; prereq 1500, 3570, or equivalent, 45 cr; spring, even years)

A comparative study of transitional societies in Asia (i.e., societies undergoing political, economic, technological, and socio-cultural changes--in varying degrees and forms--as part of their state building projects). Addresses the political economy of transitional states of Asia such as China, Japan, Korea, Taiwan, and India. Exploration, in the context of their historical experiences, of the rise of their state structures; ideologies; their transition from agrarian to industrialization; and how has this transition impacted their indigenous social cultures and identities.

POL 3525. African Politics. (3.0 cr.; A-F or Audit; prereq 1050 or 1500, 45 cr including 8 social science credits or instructor consent; fall, odd years)

A survey of politics in Africa, with an emphasis on sub-Saharan Africa. Includes discussions of pre-colonial history, colonialism and its effects, the politics of independence movements, contemporary political systems, and the forces influencing politics on the continent.

POL 3530. Comparative Constitutional Law and Judicial Politics. (3.0 cr.; A-F or Audit; prereq minimum 45 credits or permission of instructor; spring, even years)

A cross-national examination of the intersection of law and politics in the development of constitutional law, especially in newly emerging democracies. Includes an investigation of the relationship between globalization and constitutional development and the role that law plays in social control, dispute resolution, protection of minority rights, social change and economic development.

POL 3570. Politics of Developing Nations. (3.0 cr.; A-F or Audit; prereq 1050 or 1500 or 8 cr soc sci, 45 cr or instructor consent; fall, spring, even years)

Nature of political development; individual and institutional causes and consequences of development; political economy of Third World.

POL 3575. Latin American Politics and Development. (4.0 cr.; A-F or Audit; prereq Minimum 45 credits; spring, odd years)

A comparative examination of politics and development in the Latin American region. Topics of this course include transition to democracy, democratic consolidation, rule of law, human rights, the military and politics, women and politics, executive-legislative relations, civil society, and economic development.

POL 3580. Central American Politics. (4.0 cr.; A-F or Audit; prereq 1050, minimum 45 credits or instruction permission; spring, even years)

Explores the history, politics, culture, and modern problems in Central America. Includes examination of the differences and similarities in colonial history among Central American countries, the role the U.S. influence on Central American politics and the economy, and legacies of civil wars. Then, it focuses on modern problems of violence against women, gangs, violent crime, and governance, and how international and local organizations and individuals can (or cannot) contribute to alleviating these problems.

POL 3600. Political Concepts. (4.0 cr.; A-F or Audit; prereq 45 credits or instructor consent; fall, every year)

Fundamental political themes and concepts in political theory, including but not limited to justice, liberty, equality, power, democracy, political obligation, and community. Perspectives of diverse political philosophies and cultures may be addressed.

POL 3610. Political Economy: An Introduction. (4.0 cr.; A-F or Audit; prereq 45 credits including 6 credits social sciences or economics or business or instructor consent; spring, odd years)

Relationship between politics and economics and ways they affect each other, focusing on political and economic values/goals and their role in shaping public policy; policies and policy making in selected national systems; the international economy.

POL 3651. Classical Political Thought. (4.0 cr.; A-F or Audit; prereq 1610 or instructor consent; fall, every year)

Advanced survey of classical political thought from ancient Greece to the rise of medieval Christianity and Islam to early Renaissance Italy. Major themes include the tensions between individuality and community, morality and politics, utopia and reality, and politics and literature. Major thinkers include, Thucydides, Plato, Aristotle, Cicero, Augustine, al-Farabi, Aquinas and Machiavelli.

POL 3652. Modern Political Thought. (4.0 cr. [max 12.0 cr.]; A-F or Audit; prereq 1610 or instructor consent, course is repeatable with instructor consent only.; spring, every year) Advanced survey of political thought from Enlightenment to the present; course topic may include one or more of the following traditions

of political theorizing: English (e.g. Hobbes, Locke, Burke, Bentham, Mill, Wollstonecraft), German (e.g. Kant, Hegel, Marx, Nietzsche, Habermas) or French (e.g. Montesquieu, Rousseau, Tocqueville, Foucault, Derrida).

POL 4190. The Senior Seminar. (4.0 cr.; A-F or Audit; prereq 6 cr in relevant upper div pol courses, instructor consent; fall, spring, every year)

Supervised research and writing in current areas or issues of politics and political science, subject matter varying with instructor.

POL 4191. Independent Study. (1.0-4.0 cr. [max 6.0 cr.]; A-F or Audit; prereq 8 cr in pol, 6 cr in other soc sci, instructor consent; fall, spring, summer, every year)

Advanced study and research under supervision of a staff member; student must consult with instructor before registration.

POL 4195. Special Topics: (Various Titles to Be Assigned). (1.0-4.0 cr. [max 6.0 cr.]; A-F or Audit; prereq 45 credits including 8 credits in social sciences or instructor consent; fall, spring, offered periodically)

Detailed examination of contemporary topics in political science. Specific course content announced in Class Schedule.

POL 4910. Teaching Assistantship in Political Science. (1.0-2.0 cr. [max 3.0 cr.]; S-N or Audit; prereq 90 cr, Pol major, instructor consent; 3 cr max may be applied to upper div Pol major requirements and between Pol 3109 and 4910; no grad credit; fall, spring, every year)

Practical experience in teaching beginning courses in the department. Students serve as intern teachers assisting the instructor in administration of the course. Application deadline is one week before the beginning of registration for the following semester.

Psychology (PSY)

College of Education and Human Service Professions

PSY 1003. General Psychology. (SOC SCI; LE CAT6; 4.0 cr.; A-F or Audit; fall, spring, summer, every year)

Scientific study of behavior; current knowledge of biological, social, and cognitive areas of psychology. Assessment, research methods, human development, personality, mental disorders, and therapy.

PSY 2003. Psychology: Discipline and Profession. (1.0 cr.; A-F only; prereq Pre-psychology or psychology major; fall, spring, every year)

Orientation to psychology: the major, discipline, and professions available. Subfields of psychology, ethical issues, careers, preparation for graduate school, and opportunities for professional development. Introduction to research, available resources, and preparation for writing assignments required in upper-division psychology courses.

PSY 2020. Introduction to Statistics and Research Methods. (3.0 cr.; A-F or Audit; prereq 1003 and psy minors only or instructor consent; fall, spring, every year)

Scientific method and designs used in published psychological research including quasi-experimental and survey designs accompanied by inferential statistics used to test research questions (including correlation and analysis of variance).

PSY 2021. Developmental Psychology. (SOC SCI; LE CAT6; CDIVERSITY; LECD CAT06; 4.0 cr.; A-F or Audit; fall, spring, summer, every year)

Major processes in human development, conception through lifespan; biological and cultural influences on physical-motor, cognitive, social, and emotional development; effects of diverse cultural traditions and values; social policy implications.

PSY 2023. Marriages and Families Worldwide. (GLOBAL PER; LE CAT8; LEIP CAT08; 4.0 cr.; A-F or Audit; fall, spring, every year)

Family functions and structures worldwide; impact of expectations, gender roles, race, culture, and values on partner and parenting; love, sex, communication, power, abuse, stress, and satisfaction; small group experiences with focus on strengthening families.

PSY 2223. Gender in Society. (CDIVERSITY; LE CAT8; LECD CAT08; 4.0 cr.; A-F or Audit; fall, spring, every year)

Sociocultural, historical, and developmental formations of men's and women's roles and experiences in society. Effects on personality, interpersonal relationships, and life choices.

PSY 3010. Internship Preparation. (2.0 cr.; A-F only; prereq Psy major or instructor consent; fall, spring, every year)

For psychology majors preparing to complete an internship. Includes career development, site selection, exploration of community or business organizations and study of ethics.

PSY 3011. Internship in Psychology. (3.0 cr. [max 6.0 cr.]; A-F only; prereq 3010 or instructor consent; fall, spring, summer, every year)

Internship with a school, community agency or business. Nine hours supervised experience on site and one hour on campus per week. Students complete an internship contract, weekly log, relevant readings, and paper or presentation. Includes direct contact with clients and staff.

PSY 3020. Statistical Methods. (4.0 cr.; A-F or Audit; prereq Elem Algebra, Math placement test; fall, spring, every year)

Descriptive statistics; introduction to correlational analysis and regression; sampling techniques and statistical inference; applications of simple and factorial design analysis of variance and other parametric and nonparametric hypothesis-test statistics in the behavioral sciences.

PSY 3021. Experimental Design and Methodology. (4.0 cr.; A-F or Audit; prereq 3020, Psychology major; fall, spring, every year)

Introduction to problems and methods of experimentation in psychology; logical and

scientific basis of experimental psychology; problems and techniques of designing, conducting, and reporting experiments.

PSY 3022. Applied Methods and Measurement. (4.0 cr.; A-F or Audit; prereq psychology major, PSY 3020, 3021 or instructor consent; fall, spring, every year) Designing, conducting, and reporting experiments; constructing, choosing, and interpreting psychological instruments; experimental procedures and research findings from various areas within psychology.

PSY 3051. Cross-cultural Psychology. (3.0 cr.; A-F or Audit; prereq 1003 or instructor consent; spring, every year)

Role of culture on behavior. Universal versus culture-specific aspects of psychological principles. Definition of culture, methodology, development of self and others, cognition, attitudes, emotions, applications in organizations, therapy, well-being.

PSY 3061. Physiological Psychology. (4.0 cr.; A-F or Audit; prereq 1003 or instructor consent; fall, spring, every year)

Physiological basis of behavior, including central and peripheral nervous systems, sensory processes as they relate to perception, cognition, emotion, motivation, intelligence, and learning.

PSY 3081. History and Systems of Psychology. (3.0 cr.; A-F or Audit; prereq 1003 or instructor consent; fall, spring, summer, every year)

Survey of historical development and current status of contemporary systems and theories in psychology.

PSY 3111. Theories of Personality. (3.0 cr.; A-F or Audit; prereq 1003 or instructor consent; fall, spring, summer, every year)

Basic concepts, issues, and methods involved in study of human personality; introduction to selected theories on motives, dynamics, development, and description of human nature.

PSY 3112. Psychology of Religion. (3.0 cr.; A-F or Audit; prereq Upper div standing, strong interest in scientific study of religious experience and behavior; fall, spring, summer, offered periodically)

Religious beliefs and their functional value in human life. Varieties of religious experience and behavior.

PSY 3121. Abnormal Psychology. (4.0 cr.; A-F or Audit; prereq 1003 or instructor consent; fall, spring, summer, every year) Mental disorders, including DSM-IV classification system, etiology, and treatment.

PSY 3122. Child and Adolescent Abnormal Psychology. (3.0 cr.; A-F only; prereq 1003, 2021; spring, every year)

Overview of psychological disorders common among children and adolescents, including theoretical approaches, diagnostic criteria, developmental trajectory and framework, etiology, risk and protective factors, and treatment. Ethical considerations, research methodology, and diversity considerations in child clinical psychology will also be covered.

PSY 3201. Social Psychology. (3.0 cr.; A-F or Audit; prereq 1003 or instructor consent; fall, spring, summer, every year)
How thoughts, feelings, and behavior of individuals are affected by others. Social influence and interaction. Attitude measurement and change, conformity, impression formation, attribution theory, aggression, and prosocial behavior.

PSY 3211. Group Dynamics. (3.0 cr.; A-F or Audit; prereq 1003 or instructor consent; fall, spring, every year)
Principles and processes of interaction in groups; structure and functioning of groups; leadership, communication, decision making, social influence; aspects of sensitivity training.

PSY 3215. Topics in Human Sexuality. (3.0 cr.; A-F or Audit; =[PSY 3216]; prereq 1003 or instructor consent; fall, spring, every year)
Biological and psychosocial factors relating to human sexuality, sexual functioning, gender, and related issues. Group discussion of societal factors, values, and attitudes and their impact on behavior.

PSY 3231. Psychology of Drug Use. (3.0 cr.; A-F or Audit; prereq 1003 or instructor consent; fall, spring, summer, every year)
Basic understanding of drug effects: tolerance and withdrawal; commonality among drugs of abuse; how antischizophrenic, antimanic, antianxiety, and antidepressant drugs are thought to work; reward centers in brain.

PSY 3371. Child and Adolescent Psychology. (3.0 cr.; A-F or Audit; prereq 1003; fall, spring, summer, every year)
Growth of individual and social forms of human behavior. Interaction of heredity and environment on physical, intellectual, social, and emotional changes from conception to adulthood.

PSY 3381. Adult Development and Aging. (3.0 cr.; A-F or Audit; prereq 1003; fall, spring, summer, every year)
Change and continuity in physiological, psychological, and sociocultural development in early, middle, and late adulthood; theories and research on effects of demographics, cohort, race, ethnicity, gender, culture, family, friends, work, health, education, housing, public policies; dying, grief, bereavement.

PSY 3445. Transpersonal Psychology. (3.0 cr.; A-F or Audit; prereq 1003 or instructor consent; fall, spring, summer, every year)
Branch of psychology that studies spiritual and transcendental experiences. Concerned with the whole of being, it recognizes potential for a variety of states of consciousness; it acknowledges developmental psychology and draws further insights from the spiritual dimensions of human beings. Lab fee.

PSY 3520. Introduction to Industrial/Organizational Psychology. (4.0 cr.; A-F or Audit; prereq 1003 or instructor consent; fall, spring, summer, every year)
Introduction to the field of industrial/organizational psychology. Major content areas within the field will be covered, including selection, training, performance evaluation,

motivation, work stress, organizational culture, teams, and leadership.

PSY 3524. Basic Helping Skills. (4.0 cr.; A-F or Audit; fall, spring, every year)
Rationale for and practice of basic skills needed for effective interpersonal helping.

PSY 3525. Behavior Analysis in the Workplace. (3.0 cr.; A-F or Audit; prereq 1003; fall, spring, summer, offered periodically)
Introduction to performance management in the context of understanding workplace behavior using a non-traditional approach to management based on principles derived from the field of behavior analysis. Major content areas within the field will be covered, including measurement of performance and results of performance, analysis, of performance data and environments in which performance occurs, and the design, implementation, and evaluation of practical solutions to produce positive, effective workplace performance change.

PSY 3540. Psychology of Food Abuse. (3.0 cr.; A-F or Audit; prereq 1003 or instructor consent; fall, spring, summer, every year)
Basic understanding of eating disorders: obesity, binge eating, anorexia, bulimia, and social, psychological, and physical influences on normal and abnormal eating. Social evaluation of obesity.

PSY 3601. Psychology of Personal Development. (3.0 cr.; A-F or Audit; prereq 1003 or instructor consent; fall, spring, every year)
Focuses on discovery of self and spiritual journey. Examines personal development by exploring ways to change, grow, and achieve creative potential. Individual and group counseling experiences required to increase self-awareness and self-knowledge.

PSY 3611. Learning and Behavior. (4.0 cr.; A-F or Audit; prereq 1003 or instructor consent; fall, spring, every year)
Study of basic learning and behavior processes including the evolution of behavior, pavlovian conditioning, instrumental learning, and elementary cognitive processes.

PSY 3613. Applied Behavior Analysis and Behavior Change. (4.0 cr.; A-F or Audit; prereq 1003; spring, summer, every year)
Overview of diverse topics and application of the principles of the science of behavior known as behavior analysis. The philosophical system known as behaviorism that underlies this area of study will be explored, as well as the application of behavioral principles to a number of areas of society, including interpersonal relationship, parenting, clinical applications and treatments for persons with intellectual and other disabilities, business and management, animal behavior, health, sustainability, and more. Students will learn techniques for utilizing the principles of behavior in their own lives, conducting functional behavior assessments, as well as the social benefits associated with the incorporation of behavioral principles into educational, rehabilitative, organizational, and other settings.

PSY 3621. Cognition. (4.0 cr.; A-F or Audit; prereq 1003 or instructor consent; spring, every year)
An overview of cognitive processes, using historical, philosophical, biological and experimental perspectives. Course topics include attention, perception, knowledge representation memory, language, thinking, reasoning, and decision-making.

PSY 3661. Psychology of Language. (3.0 cr.; A-F or Audit; prereq 1003 or instructor consent; fall, spring, every year)
Psychological processes underlying comprehension, production, and acquisition of language(s); cognitive, social, biological, and educational perspectives on language and their applications.

PSY 3697. Sensation and Perception. (4.0 cr.; A-F or Audit; fall, spring, every year)
Theories, methods, and findings in study of sensory and perceptual processes; psychophysics and psychophysiology of visual, auditory, gustatory, olfactory, cutaneous, kinesthetic, vestibular, and pain senses; analysis of perceptions of constancy, illusion, space, time, motion, and form.

PSY 3701. Personnel Psychology. (3.0 cr.; A-F or Audit; prereq 1003; fall, spring, summer, every year)
Introduction to personnel psychology. Testing, selection, performance appraisal, job analysis, job evaluation, validity issues in organizational settings, discrimination, and affirmative action programs.

PSY 3707. Organizational Psychology. (3.0 cr.; A-F or Audit; prereq 1003; fall, spring, every year)
Overview of organizational topics within industrial/organizational psychology. Leadership, job satisfaction, motivation theories, goal setting, organizational behavior, organizational development, and industrial relations.

PSY 3986. Honors Project. (1.0-6.0 cr. ; A-F or Audit; prereq Psychology major, 3.00 GPA overall; 3.25 GPA Psychology; fall, spring, summer, every year)
Advanced project demonstrating either the application of psychological principles or an empirical investigation proposed and conducted by the student. Project or empirical investigation must be based on theoretical and research foundations. A psychology faculty advisor and a written and/or oral report required.

PSY 3989. Directed Instruction. (1.0-4.0 cr. ; prereq instructor consent; fall, spring, every year)
Students work with department faculty in planning and helping teach an undergraduate course.

PSY 3990. Special Topics: (Various Titles to be Assigned). (1.0-3.0 cr. ; A-F or Audit; prereq 3 cr Psy or instructor consent; fall, spring, summer, offered periodically)
Developed by psychology faculty in their expertise areas to instruct on selected advanced and current topics.

PSY 3991. Projects in Psychology. (1.0-4.0 cr. ; S-N or Audit; prereq Psy major or minor, instructor consent; fall, spring, every year) Supervised practical experience in University or community activities to gain experience in application of psychological principles and techniques; written report required.

PSY 3994. Directed Research in Psychology. (1.0-8.0 cr. ; A-F or Audit; prereq Psy major or minor, instructor consent; fall, spring, summer, every year) Research problem in psychology chosen by either the instructor or the student; written research report required.

PSY 3995. Research in Psychology. (1.0-4.0 cr. ; A-F or Audit; prereq Psy major or minor, instructor consent; fall, spring, every year) Intensive independent empirical research on problem in psychology chosen by student; research report required.

PSY 3996. Pre-Professional Field Placement. (1.0-4.0 cr. ; S-N only; prereq 3010, 3011, instructor consent; fall, spring, summer, every year) Preprofessional field placement. For students wishing additional internship experience. Requires additional 3 hours per week of supervised experience on site for each credit. Must be taken with Psy 3011 Internship in Psychology.

PSY 4021. Research Methods I. (4.0 cr.; A-F or Audit; prereq 3020, instructor consent; no grad credit; spring, every year) Provides an overview of research methods in psychology; logical and scientific basis of experimental psychology; problems and techniques of designing, conducting and reporting experiments; selecting and constructing psychological instruments, a review of statistics and how to design a research project.

PSY 4022. Research Methods II. (4.0 cr.; A-F or Audit; prereq 4021, instructor consent; no grad credit; fall, every year) Discusses research methodology as it is applied within different areas of psychology. Reviews statistics and introduces the use of statistical software (e.g., SPSS). Provides an overview of testing and measurement and research ethics.

PSY 4023. Research Methods III. (3.0 cr.; A-F or Audit; prereq 4022, instructor consent; no grad credit; spring, every year) Emphasizes designing and conducting a study, analyzing data, and interpreting and reporting the results.

PSY 4121. Foundations of Clinical Psychology. (3.0 cr.; A-F or Audit; prereq 3121, no grad credit; spring, every year) An overview of clinical psychology as well as contemporary issues and trends within the field. Emphasizes areas in which clinical psychologists are principally involved, including assessment, treatment, and clinical research.

PSY 4500. Health Psychology. (3.0 cr.; A-F or Audit; prereq 1003, min 60 cr or instructor consent; fall, summer, every year)

Concepts, issues, and methods of health psychology; health maintenance and illness prevention integrating biological, psychological, and social factors; utilization of health psychological assessments; and interdisciplinary aspects of health psychology.

PSY 5021. Advanced Developmental Psychology. (3.0 cr.; A-F or Audit; prereq graduate student or instructor consent for advanced undergraduate; fall, every year) Course format involved reading and discussion of reviews and journal articles about theories, research methodology, and topics central to the scientific study of human development from conception through adulthood. The role of theory as a guide for research and practice, and classical as well as contemporary theories will be examined. Normative changes and individual differences will be examined. Theoretical frameworks in the domains of social, cognitive, language, and temperament/personality development will be examined.

PSY 5051. Research Methods and Measurement in Psychology. (3.0 cr.; A-F or Audit; prereq Grad student or instructor consent; fall, spring, summer, every year) Research methods and design for the behavioral sciences; principles and practices of needs assessment, program evaluation, and individual assessment techniques; ethical and legal considerations in research and assessment.

PSY 5052. Advanced Statistical Methods. (3.0 cr.; A-F or Audit; prereq 3020, 5051 or instructor consent; spring, summer, every year) Advanced parametric and nonparametric statistics; application of variance, covariance, and linear regression analyses to a variety of multilevel and factorial research designs; psychometric statistics; computer-based data management; ethical and legal considerations.

PSY 5061. Research Problems I. (1.0-2.0 cr. ; S-N or Audit; fall, every year) Application of principles and procedures of research methods, needs assessments, and program evaluations; integration of research concepts with counseling problems through guided study and practice; ethical and legal considerations. Partially fulfills Plan B requirement.

PSY 5062. Research Problems II. (1.0-2.0 cr. ; S-N or Audit; prereq 5061 or instructor consent; spring, every year) Advanced application of principles and procedures of research methods, needs assessment, program evaluation, and statistics; integration of research concepts with counseling problems; analysis, conclusions, and dissemination of research. Written report and oral exam required; completes fulfillment of Plan B requirement.

PSY 5120. Career and Lifestyle Development. (2.0 cr.; A-F or Audit; prereq Psychology graduate student or instructor consent.; fall, every year) Overview of career development and decision theories related to life planning and career choices. Methods and techniques involved in the career counseling process.

PSY 5121. Psychopathology Over the Lifespan. (3.0 cr.; A-F or Audit; prereq credit will not be granted if already received for 3121; instructor consent; fall, every year) Psychopathology from integrative biopsychosocial and developmental psychopathology perspectives; adult and child psychopathologies including symptomatology, prevalence, etiological evidence, typical course and prognosis, associated features, cultural and social considerations, comorbidity and differential diagnosis.

PSY 5123. Psychology of Addictive Behaviors. (3.0 cr.; A-F or Audit; prereq Sr or grad student or instructor consent; fall, spring, summer, every year) Examination of a wide spectrum of addictive behaviors, including drug addictions and process addictions, such as gambling, compulsive buying, and compulsive eating. Evaluation and treatment approaches.

PSY 5130. Evolutionary Psychology. (3.0 cr.; A-F or Audit; prereq 1003 or instructor consent; fall, spring, summer, every year) Evolution and the theory of natural selection as it applies to behavioral processes, e.g., survival, mating strategies, parenting and family, cooperation and conflict.

PSY 5131. Mind-Body Connection. (3.0 cr.; A-F or Audit; fall, spring, summer, every year) Examination of interface between biological and psychological development associated with risks for substance abuse, depression, and conduct disorders; potential commonality of mechanisms. Topics may include communication between brain and endocrine systems, evolution of the brain, homosexuality, psychoneuroimmunology, and psychopharmacology.

PSY 5155. Forensic Psychology. (3.0 cr.; A-F or Audit; prereq 1003 or instructor consent; spring, summer, every year) Examines the application of psychology to the judicial system in such diverse areas as criminal diversion and rehabilitation; expert testimony, jury selection; police training; divorce mediation; and custody evaluations.

PSY 5401. Advanced Social Psychology. (3.0 cr.; A-F or Audit; prereq Grad student or instructor consent; fall, spring, every year) Examination of core content areas and topics within experimental social psychology with a focus on application within both clinical and industrial/organizational psychology. Topics include attitude formation and attitude change, attribution theory, the self, conformity, prejudice, aggression, and prosocial behavior.

PSY 5621. Cognition and Emotion. (3.0 cr.; A-F or Audit; prereq graduate student or instructor consent; fall, every year) Students in this course will read and discuss scholarly reviews and journal articles on theories, research methodology, and topics central to the scientific study of human cognition, emotion and their applications. There will be discussions on the models of cognitive (perception, memory, language, thinking and reasoning) and emotional processes and

their interrelatedness. Consideration will be given to how these contemporary models are developed and evaluated through empirical studies. Finally, how these theoretical models can be applied to educational, clinical, legal and workplace settings will be examined.

PSY 5631. Biological Bases of Behavior. (3.0 cr.; A-F or Audit; prereq Grad student or instructor consent; fall, every year)
Understanding how communication within the body (neuronal, endocrinological, immunological) affects behavior and psychological processes, and how these systems interact to influence these processes. Examining how perturbations within these systems lead to mental illness and/or problematic behaviors. How psychoactive drugs affect these systems, with respect to clinical treatment and abuse. The neurological mechanisms of reward and drug dependence (withdraw, cravings) will be investigated.

PSY 5701. Advanced Personnel Psychology. (3.0 cr.; A-F or Audit; prereq graduate student or instructor consent; fall, spring, every year)
Students will apply theories and research finding to address issues of personnel recruitment, selection, and classification in the workplace.

PSY 5702. Advanced Organizational Psychology. (3.0 cr.; A-F or Audit; prereq graduate student or instructor permission; fall, spring, every year)
This course covers core contents in organizational psychology, with a focus on understanding of research findings to enhance organizational functioning and employee well-being. Topics include employee motivation, job attitudes, work stress, teams, leadership, and organizational justice and culture.

PSY 5993. Directed Study: Psychology and Counseling. (1.0-4.0 cr. [max 8.0 cr.]; prereq Grad student, instructor consent; fall, offered periodically)
Individual in-depth explorations of psychological and/or counseling theories and principles approved and guided by faculty.

PSY 5995. Special Topics: (Various Titles to be Assigned). (0.5-4.0 cr. [max 8.0 cr.]; A-F or Audit; prereq Sr or grad student or instructor consent; fall, spring, summer, offered periodically)
Analysis of selected advanced topics in psychology and/or counseling.

PSY 8021. Research Methods and Evaluation. (3.0 cr.; A-F or Audit; prereq Successful completion of an undergraduate research methods course in Psychology or another social science discipline, PSY 5020 or an equivalent graduate level statistics course in the social sciences.; spring, every year)
Examination of quasi-experimental and experimental designs within psychological science. The course will provide comprehensive coverage of the assessment of reliability and validity of measures, methods, and research designs to facilitate the development of a research proposal. A

wide variety of quantitative and qualitative research designs, measurement techniques, and methods will be described and evaluated in terms of internal, external, construct, and statistical conclusion validity.

PSY 8052. Advanced Statistics II. (3.0 cr.; A-F or Audit; prereq 5052 with a grade of C- or better; spring, every year)
Advanced statistics used for experimental and correlational research in psychology; analyze data using advanced univariate, basic multivariate, and meta-analytic techniques; assumptions of test; diagnosis of assumption violations; interpretation of results; use of common statistical software (e.g., SPSS or R).

PSY 8097. Clinical-Counseling Practicum. (2.0 cr.; A-F or Audit; prereq Psychology graduate student; spring, every year)
Supervised counseling practice experience within the University setting. Emphasis is on developing individual and group counseling skills.

PSY 8099. Research Project in Psychology. (3.0 cr. [max 6.0 cr.]; S-N or Audit; prereq Psychology grad student; fall, spring, every year)
This course provides a capstone experience for students to integrate all they have learned in order to produce scholarly work. Under the guidance of a faculty advisor, students will plan, design, conduct, and present an original project.

PSY 8103. Introduction to Graduate Studies. (0.0 cr.; S-N or Audit; prereq enrolled in graduate program in psychology; fall, every year)
This course will orient new students to key facets of graduate studies in the Master's in Psychological Science Program. Program expectations, requirements, and timelines will be clarified to enable students to make progress in formulating goals in their chosen tracks. This course will provide students with a basis for academic collaboration and professional development by facilitating student interactions with peers and the faculty in psychology.

PSY 8197. Clinical Counseling Internship . (2.0 cr. [max 4.0 cr.]; S-N or Audit; prereq 8097 and instructor consent; fall, spring, every year)
Supervised clinical work in a professional psychological services setting. Psychological assessment and clinical intervention are emphasized.

PSY 8221. Individual Adult and Group Therapy/Counseling. (3.0 cr.; A-F or Audit; prereq Psychology graduate student; spring, every year)
This course provides an overview of a variety of individual and group therapy models and techniques utilized with adults. Evidence-based techniques and empirically supported treatments will be emphasized along with their application to specific psychological diagnoses.

PSY 8223. Child, Adolescent, and Family Therapy. (3.0 cr.; A-F or Audit; prereq Psychology graduate student; fall, spring, every year)

Individual child and adolescent psychological intervention models and techniques as well as a variety of family therapy models and techniques will be reviewed, emphasizing those with demonstrated empirical effectiveness. Students will be introduced to the provision of effective youth and family counseling approaches in preparation for practicum experience.

PSY 8224. Clinical Treatment Planning. (3.0 cr.; A-F or Audit; prereq enrolled in graduate program in psychology; fall, spring, every year)
This course provides an overview of methods and strategies of evidence-based clinical treatment planning. Identification and evaluation of measurable process and outcome goals are emphasized. Treatment planning will target specific psychological diagnoses for adults and children, and various modalities, as well as crisis intervention/counseling.

PSY 8231. Assessment I: Foundations and Cognitive Assessment. (3.0 cr.; A-F or Audit; prereq enrolled in graduate program in psychology; fall, every year)
This course provides an overview of basic psychometric issues, test administration, and cognitive assessment. It covers fundamental issues in evidence-based assessment and the development of competent administration and interpretation skills of common cognitive assessments.

PSY 8232. Assessment II. (3.0 cr.; A-F or Audit; prereq 8231; spring, every year)
Building on content from Assessment I, this course applies concepts of psychological testing and measurement to the assessment of specific clinical syndromes and personality through objective personality tests, behavioral observations, symptom checklists, rating forms and structured diagnostic interviewing. Students will learn to appropriately use and interpret results from such measures in the course of clinical/counseling practice. Issue of clinical judgment and controversies concerning common assessment approaches will be covered.

PSY 8301. Multicultural Foundations in Clinical/Counseling Psychology. (3.0 cr.; A-F or Audit; prereq Graduate student in Clinical/Counseling Psychology; fall, summer, every year)
This course explores the complexities of culture in practice. The focus is on becoming culturally responsive counselors and therapists. Within evidence-based practice, this course provides guidelines for integrating cultural considerations into the theory and practice of assessment, diagnosis, and therapeutic interventions.

PSY 8302. Ethical and Legal Issues in Therapy and Counseling. (3.0 cr.; A-F or Audit; prereq Graduate student in clinical/counseling psychology program.; spring, every year)
This course covers approaches to ethical decision making of relevance to work as a psychologist. Codes of ethical conduct, as well as legal issues related to research and practice are foci. Students will learn about important

historical cases illustrating ethical and legal issues in the field.

PSY 8333. FTE: Master's. (1.0 cr.; No Grade Associated; prereq Master's student, adviser and DGS consent; fall, spring, offered periodically) (no description)

PSY 8701. Performance Evaluation and Management. (3.0 cr.; A-F or Audit; prereq Psychology graduate student; fall, spring, every year)

This course centers on the methods of evaluating performance and on actions taken with employees based upon such appraisals. Theoretical understanding and familiarity with research on interpersonal judgment and perception, criterion theory and development, rating scale construction and use, sources of information, and effective communication will help students in this course develop skills in designing performance appraisal and feedback systems which meet organizational needs while enhancing employee motivation.

PSY 8705. Organizational Systems & Development. (3.0 cr.; A-F or Audit; prereq Psychology graduate student; fall, spring, every year)

This course is designed to cover topics central to organizational systems and development, including classical and contemporary theories of organizations, organizational structure, organizational design, technology, and cross-cultural differences and issues. Students will learn how to integrate theory, research findings, and applied techniques to help organizations adapt within the ever-changing local and global environment.

PSY 8706. Personnel Training & Development. (3.0 cr.; A-F or Audit; prereq Psychology graduate student; fall, spring, every year)

This course is designed to cover topics central to personnel training and development. This course requires the integration of theories, tools, concepts, and techniques learned in the classroom with an application in a "real" organization. Students will learn how to analyze performance deficiencies in order to determine whether training is required and, if so, how to design and implement effective training to help fix performance problems. Basic phenomena of learning, various training and development approaches commonly used in business and industry, and design issues necessary for planning evaluation and improvement strategies will be covered.

Recreation (REC)

College of Education and Human Service Professions

REC 1201. Outdoor Skills I. (PE; 2.0 cr.; A-F or Audit; fall, every year)

Instruction and practice in skills of fall outdoor activities. Camping, canoeing, hunting, and climbing; equipment, shelters, and navigation.

REC 1202. Outdoor Skills II. (PE; 2.0 cr.; A-F or Audit; spring, every year)

Instruction and practice in skills of winter and spring outdoor activities. Camping, backpacking, dogsledding, and fishing; equipment and navigation.

REC 1203. Outdoor Skills I. (2.0 cr.; A-F or Audit; prereq Pre-rec, rec major or minor; fall, every year)

Instruction and practice in skills of fall outdoor activities. Camping, canoeing, fishing, hunting; and equipment, shelters, and navigation.

REC 1204. Outdoor Skills II. (2.0 cr.; A-F or Audit; prereq Pre rec, rec major or minor; spring, every year)

Instruction and practice in skills of winter and spring outdoor activities. Camping, backpacking, dogsledding, and fishing; equipment and navigation.

REC 3327. Large Event Management. (3.0 cr.; A-F or Audit; prereq 2300 or instructor consent; spring, every year)

Organization and administration of life fitness activities and nonformal instruction in recreational sport programs. Design, implementation, and evaluation of large-scale recreational sports events such as triathlons and tournaments.

REC 3330. Outdoor Recreation. (3.0 cr.; A-F or Audit; prereq 2300 or ENED 2300 or instructor consent; fall, spring, offered periodically)

Examination of outdoor recreation as a part of natural resource based agencies as well as in nature centers, commercial operations, and in municipal settings. This course will focus on outdoor recreation uses in Northeastern Minnesota.

REC 4320. GIS Management for Recreation Professionals. (3.0 cr.; prereq No grad credit; spring, every year)

Using G.I.S. mapping techniques for recreation and outdoor education professionals in resource management decisions. The use of Arcview and Landview software will be used to visualize and analyze landscapes. This course is specific to recreation and/or outdoor education professionals.

REC 4991. Independent Study. (1.0-4.0 cr.; A-F or Audit; prereq instructor consent; no grad credit; fall, spring, every year)

Independent project that would serve to further the student's knowledge base and/or professional competencies.

REC 4992. Readings in Recreation. (1.0-4.0 cr.; A-F or Audit; prereq instructor consent; no grad credit; fall, spring, every year)

Complementary readings and discussion in student's area of interest with faculty supervision.

REC 4997. Recreation Practicum. (3.0 cr.; S-N only; prereq ENED 4163, PETE 3508 and instructor consent; no grad credit; fall, spring, summer, every year)

Field-based experience through a selected recreation agency.

College of Liberal Arts

RUSS 1101. Beginning Russian I. (COMM & LAN; LE CAT3; 4.0 cr.; A-F or Audit; =[RUSS 1102, RUSS 1110]; prereq Little or no prior formal study of this language, or instructor consent; fall, every year)

Grammar, reading, and conversation for students with no previous knowledge of Russian.

RUSS 1102. Beginning Russian II. (COMM & LAN; LE CAT3; 4.0 cr.; A-F or Audit; =[RUSS 1110, RUSS 1101]; prereq 1101 or equiv or instructor consent; spring, every year)

Grammar, reading, and conversation. This five week program/course, allows students to develop basic proficiency in Russian, while providing cultural and historical understanding of Russian society. There are no prerequisites for this course, and no previous knowledge of Russian is required. All language skills are practiced and improved. This course takes place in St. Petersburg, Russia, where students apply their language skills by learning about the history of the city as well as aspects of contemporary Russian culture and politics.

This course is composed of in-class instruction, seminars, discussions, field trips, and small group projects.

RUSS 1210. Beginning Russian Language and Culture (Abroad). (COMM & LAN; 8.0 cr.; A-F or Audit; =[RUSS 1102, RUSS 1101]; prereq Consent from the UMD International Education Office.; summer, odd years)

This five week program/course improves students' proficiency in Russian, while providing cultural and historical understanding of Russian society. All language skills are practiced and improved, beginning at the intermediate level. This course takes place in St. Petersburg, Russia, where students apply their language skills by learning about the history of the city, as well as aspects of contemporary Russian culture and politics.

This course is composed of in-class instruction, seminars, discussions, field trips, and small group project. Taught in Russian.

RUSS 2316. 19th Century Russian Literature in Translation: Dostoevsky, Gogol and Turgenev. (HUMANITIES; LE CAT9; LEIP CAT09; 4.0 cr.; A-F or Audit; spring, offered periodically)

This course examines texts by celebrated Russian prose authors from the nineteenth century. The short stories and novels of authors such as Nikolai Gogol, Ivan Turgenev and Feodor Dostoevsky confront their readers with a set of concerns that still remain relevant today. Through close readings and literary analysis, their course will offer students an opportunity to develop their abilities as writers and critical thinkers. In their writing assignments students will develop their abilities to present extended analyses and coherent

Russian (RUSS)

argumentative strategies, while exploring some of the most significant developments in Russian literary culture. Taught in English.

RUSS 3402. 20th Cent Russian Literature in Translation: From Tumult & Utopian Vision to State and Dissident Art. (HUMANITIES; GLOBAL PER; 4.0 cr.; A-F or Audit; prereq Taught in English; fall, odd years)
This course examines texts by celebrated Russian authors from the twentieth century, including the short stories, novels and poems of authors such as Anton Chekhov, Andrei Belii, Anna Akhmatova, Lev Gumilev, Vladimir Maiakovskii, Evengeni Zamyatin, Mikhail Bulgakov, Boris Pasternak, Aleksandr Solzhenitsyn, and Victor Pelevin. Through close readings and literary analysis, this course helps students develop their abilities as writers and critical thinkers, while exploring the tumultuous developments of twentieth century Russian society. Assignments give students the opportunity to engage with the historical specificity and the changing role of artistic expression in Russian culture, while also helping students develop their abilities to present extended analyses and deploy coherent argumentative strategies. Taught in English.

RUSS 3405. Film and New Media in Russian Society. (FINE ARTS; GLOBAL PER; 4.0 cr.; A-F or Audit; spring, even years)
This course introduces students to the transformative role that film and new media have played in Russian society, from the early beginning of film as a new art form to the dynamic role film and new media have come to play in the post-Soviet era. In this course students learn to reflect on film as an artistic medium, while also using their experiences with the films of the twentieth century to learn about the history of Russian society. Students also produce their own short films, practicing what they have learned from discussions and film analysis. Students compose screenplays and create their own films that reflect on the history of Russian film and the changing role of film as a medium in the twentieth century. Taught in English

Safety (SAFE)

Swenson College of Science and Engineering

SAFE 6002. Regulatory Standards and Hazard Control. (4.0 cr.; A-F or Audit; prereq MEHS student or department approval and instructor consent; fall, every year)
Overview of OSHA and other health and safety standards, codes and regulations with an emphasis on the recognition and control of workplace hazards as defined by the standards, codes and regulations.

SAFE 6011. System Safety and Loss Control Techniques. (4.0 cr.; A-F or Audit; prereq MEHS student or department approval and instructor consent; fall, every year)
Analytical techniques of data collection, data analysis, and risk assessment in designing and implementing proactive system safety processes. Comprehensive approach to cost reduction and containment processes

and programs, which minimize financial and accidental losses. Lab arranged.

SAFE 6012. Risk Management and Workers' Compensation. (4.0 cr.; A-F or Audit; prereq MEHS student or department approval and instructor consent; spring, every year)
Comprehensive overview of risk management strategies and insurance system; essential elements of workers' compensation cost reduction and containment programs in industry. Workers' compensation and occupational safety in preventing corporate financial losses. Lab arranged.

SAFE 6051. Construction Safety. (3.0 cr.; A-F or Audit; prereq 6002 or department approval and instructor consent; spring, every year)
Code of Federal Regulations 1926 and other standards and regulations that affect construction industry. Emphasis on recognition, analysis, and corrective action. Principles of construction safety management, project implementation, and subcontractors management. Lab arranged.

SAFE 6101. Principles of Industrial Hygiene. (3.0 cr.; A-F or Audit; prereq MEHS student or department approval and instructor consent; fall, every year)
Effects of chemical, physical, and biological agents on the body and typical methods of control; lab use of monitoring and corrective devices. Lab arranged.

SAFE 6102. Advanced Industrial Hygiene and Health Physics. (3.0 cr.; A-F or Audit; prereq 6101 or department approval and instructor consent; spring, every year)
Recognition, evaluation, and control techniques necessary for prevention of occupationally related diseases. Introduction to health hazards of radiated energy such as ionizing nuclear radiation and x-rays; nonionizing radiation hazards from microwaves, lasers, and infrared and ultraviolet light. Lab arranged.

SAFE 6201. Fire Prevention and Emergency Preparedness. (3.0 cr.; A-F or Audit; prereq MEHS student or department approval and instructor consent; spring, even years)
Hazard analysis and risk assessment as related to prevention and control of undesired fires; analytical study of flammable materials and extinguishing systems found in industrial settings; organization and development of emergency preparedness programs.

SAFE 6211. Transportation Safety. (3.0 cr.; A-F or Audit; prereq MEHS student or department approval and instructor consent; spring, odd years)
Study of health and safety programs used in rail, road, air, and marine transportation, emphasizing fleet safety programs.

SAFE 6212. Noise Control Engineering. (3.0 cr.; A-F or Audit; prereq MEHS student or department approval and instructor consent; fall, even years)
A multi-disciplinary approach to a comprehensive introduction to the principles of noise and noise conservation (hygiene, safety, acoustics, audiology, occupational medicine, engineering, behavioral and legal). Emphasis

will be on noise control engineering protocols. Lab arranged.

SAFE 6213. Principles of Ventilation and Indoor Air Quality. (3.0 cr.; A-F or Audit; prereq MEHS student or department approval and instructor consent; fall, odd years)
Comprehensive introduction on design, maintenance, and evaluation of exhaust ventilation systems. Methodology for conducting indoor air quality investigations. Lab arranged.

SAFE 6291. Independent Study in Industrial Safety. (1.0-3.0 cr.; S-N or Audit; prereq 6002, instructor consent; fall, spring, every year)
Special projects, field studies, or research in industrial hygiene or safety topics

SAFE 6295. Special Topics: (Various Titles to be Assigned). (1.0-3.0 cr.; A-F or Audit; prereq MEHS student or department approval and instructor consent; fall, spring, offered periodically)
Selected topics in industrial safety or hygiene. Similar topics may not be repeated for credit.

SAFE 6301. Occupational Biomechanics and Work Physiology. (3.0 cr.; A-F or Audit; prereq 6302 or department approval and instructor consent; fall, even years)
Overview to study physical interaction of workers with their tools, machines, and materials so as to enhance workers' performance while minimizing risk of future musculoskeletal disorders. Lab arranged.

SAFE 6302. Occupational Ergonomics and Injury Management. (3.0 cr.; A-F or Audit; prereq MEHS student or department approval and instructor consent; spring, every year)
Overview of occupational ergonomics and related disciplines such as work physiology, biomechanics, human anatomy, engineering design, medical management. Hands-on approach, including ergonomic job analysis, risk factor quantification, and documentation for demanding tasks. Lab arranged.

SAFE 6401. Environmental Safety and Legal Implications. (3.0 cr.; A-F or Audit; prereq MEHS student or department approval and instructor consent; fall, odd years)
Federal, state, and local laws and judicial interpretations that have applications to environmental health and safety programs. Corporate responsibility regarding environment, employee, and product.

SAFE 6821. Organization and Administration of Safety Programs. (3.0 cr.; A-F or Audit; prereq 6012 or department approval and instructor consent; fall, every year)
Current administrative practices. Involvement in design and development of safety programs suitable for an industrial facility.

SAFE 6997. Internship in Environmental Health and Safety. (3.0 cr.; S-N or Audit; prereq MEHS student, department approval; fall, spring, summer, every year)
Cooperative internship in an industrial, governmental, or other organization that has an

established safety program or is in the process of implementing one. Requires a significant Plan B-type project for the firm.

Social Work (SW)

College of Education and Human Service Professions

SW 1000. Introduction to Social Welfare.

(SOC SCI; 3.0 cr.; A-F or Audit; spring, every year)

Contemporary social welfare problems and the historical development of social services programs designed to address them. Complex social problems, such as poverty, homelessness and child maltreatment examined, as well as the response of social institutions, social policies, and the professional of social work to these problems. Social justice issues and the role of citizen involvement to create change.

SW 1210. Global Issues. (SOC SCI; LE CAT8; GLOBAL PER; LEIP CAT08; 3.0 cr.; A-F or Audit; =[SW 1212, SW 1211]; fall, spring, every year)

Global problems of war, peace, national security; population, food, hunger; environmental concerns, global resources; economic and social development; human rights. Examines issues from a global problem-solving perspective. Value, race, class, gender differences.

SW 1212. Honors Seminar: Global Issues .

(SOC SCI; LE CAT8; GLOBAL PER; LEIP CAT08; 3.0 cr.; A-F or Audit; =[SW 1210, SW 1211]; prereq Honors student; spring, every year)

Focus on global problems of war, peace, and national security; population, food, and hunger; environmental concerns and global resources; economic and social development; human rights. Examination of issues from systems, problem solving, and futurist perspectives in honors seminar format.

SW 1619. Race, Class, and Gender in the United States. (SOC SCI; LE CAT8; CDIVERSITY; LECD CAT08; 3.0 cr.; A-F or Audit; fall, offered periodically)

Race, class, and gender as pivotal dimensions in American society. Similarities and differences between groups, dynamics of discrimination, and efforts to meet needs and achieve potential for all groups in America.

SW 4100. Anti-Oppressive Social Work Practice.

(3.0 cr.; A-F or Audit; prereq 1000 or instructor consent; no grad credit; spring, every year)

Examines societal issues generated by systemic discrimination and explores methods for reducing discrimination. Particular focus on advanced social work practice with diverse populations.

SW 4101. Human Behavior in Social Environment.

(3.0 cr.; A-F or Audit; prereq 1000 or instructor consent; no grad credit; fall, every year)

Overview of social psychological and social systems concepts. Applications of concepts to social work and human service issues.

Focus on individuals, human development, families, groups, organization, communities, and society/culture.

SW 4102. Introduction to Social Work Research.

(3.0 cr.; A-F or Audit; prereq 1000 or instructor consent; no grad credit; fall, every year)

Introduction to social science research and its applications to social work and social welfare. Cultural competence and relation of practice and research.

SW 4103. Senior Capstone Project. (2.0 cr.; S-N or Audit; prereq pre or co-req 4121; no grad credit; spring, every year)

This course will help students complete their ePortfolio which is the capstone project for the BSW program

SW 4111. Introduction to Individual, Family and Group Practice.

(3.0 cr.; A-F or Audit; prereq 1000 or instructor consent; no grad credit; fall, every year)

Introduction to generalist social work practice, social work ethics, the ecological perspective and the problem-solving model.

SW 4112. Organization and Community Practice.

(3.0 cr.; A-F or Audit; prereq 4111; no grad credit; fall, every year)

Development of knowledge and skills for beginning level macro social work practice. Topics include understanding human service organizations, promoting organizational change, using supervision, community advocacy, policy practice, ethics and cultural competence.

SW 4113. Introduction to Child Welfare Practice.

(3.0 cr.; A-F or Audit; prereq 1000 or instructor consent; no grad credit; spring, every year)

Introduction to social work child welfare practice, with a focus on practice in public sector country and tribal settings, and a special emphasis on child protection.

SW 4120. Community Volunteer Experience.

(1.0 cr.; S-N or Audit; prereq 1000 or instructor consent; no grad credit; fall, every year)

Community volunteer experience with emphasis on working with vulnerable populations. Beginning experience in a social service setting to acquire skills in relationships building and to develop understanding of social work ethics, values and roles in a diverse society. Focus of seminar meetings is the exploration of self in relationship to helping. Seminar will focus on student exploration of self in relationship to helping.

SW 4121. Field Placement. (4.0-8.0 cr. ; S-N or Audit; prereq 1000, 4120; no grad credit; fall, spring, every year)

Practicum experience with emphasis on developing knowledge and skill base for generalist practice in a community agency. Concurrent seminar assists students in integrating classroom theories and intervention methodologies with field experiences. Application to diverse populations.

SW 4190. American Indian Social Work Practice Issues.

(3.0 cr.; A-F or Audit; prereq

1000, 1619 or instructor consent; no grad credit; spring, every year)

Introduction to historical and contemporary social work practice issues with American Indians. Policy issues, cultural and sensitivity knowledge, and practice methods with American Indian clients and communities at micro and macro levels of intervention.

SW 4201. Social Welfare Policy. (3.0 cr.; A-F or Audit; prereq 1000 or instructor consent; no grad credit; fall, every year)

Overview of major social welfare policies in the United States. Policy analysis from a historical, social, economic and political perspective. Focus on policy practice roles for social workers as policy analysts and advocates for social justice.

SW 5032. Child Welfare and the Law. (2.0 cr.; A-F only; prereq MSW student or instructor consent; fall, spring, summer, every year)

Intensive advanced course in the federal, state, and tribal laws and court processes regulating child welfare practice. Includes laws and procedures and the role of the social worker in legal proceedings.

SW 5061. Computers in the Human Services.

(1.0-2.0 cr. ; prereq Jr or sr or grad student or instructor consent; fall, spring, summer, offered periodically)

Overview of computers in the human services, including word processing, spreadsheets, databases, communication, and internet.

SW 5091. Independent Study. (1.0-4.0 cr. [max 8.0 cr.]; prereq instructor consent; fall, spring, summer, every year)

Directed reading, research, or other experiences leading to presentation of a report.

SW 5095. Special Topics: (Various Titles to be Assigned). (1.0-4.0 cr. [max 12.0 cr.]; fall, spring, summer, offered periodically)

Proseminar on contemporary topics of concern to students and faculty. Topics announced in Class Schedule.

SW 5096. Special Project. (1.0-4.0 cr. [max 8.0 cr.]; S-N or Audit; prereq instructor consent; fall, spring, summer, every year)

Approval of faculty sponsor and field coordinator required to do a project in generalist or advanced generalist social work practice. Project may closely coordinate with another course or may be an independent area of interest.

SW 5101. Human Behavior in the Social Environment.

(3.0 cr.; A-F only; prereq MSW student or instructor consent; fall, every year)

Overview of social psychological and social systems concepts. Applications of concepts to social work and human service issues. Focus on individuals, human development, families, groups, organizations, communities, and society/culture.

SW 5111. Grant Writing in the Human Services.

(1.0-2.0 cr. ; A-F only; prereq Jr or sr or Grad or instructor consent; spring, summer, offered periodically)

Step-by-step development of grant planning and grant writing. Sources of grants: private foundations and public agencies. Needs

assessment methodologies, budgeting, and program evaluation.

SW 5120. Cross-Cultural Exploration Through Learning Circles. (1.0 cr.; S-N only; prereq Admission into MSW, 8100 or instructor consent; fall, spring, every year)

In a small group (learning circle) students will learn about diverse groups, cross-cultural interactions and explore the concepts of individual and organizational cultural competence through the use of interactive and experimental methods, and applying new knowledge to practice in social work

SW 5201. Social Welfare Policy. (3.0 cr.; A-F only; prereq MSW student or instructor consent; fall, every year)

Historical development of field of social welfare in the United States and emergence of social work profession. Social policy analysis techniques and ways to influence social policy and vulnerable/minority issues.

SW 5222. Intervention in Family Violence.

(1.0-2.0 cr. ; A-F only; prereq Jr or sr or grad student or instructor consent; fall, summer, offered periodically)

Current theory, research, and practice in field of family violence. Multidisciplinary assessment and intervention skills for working with families with diverse backgrounds.

SW 5271. Women and Social Policy. (2.0 cr.;

A-F only; prereq Jr or sr or Grad or instructor consent; fall, spring, offered periodically)

Policies affecting the well-being of women; strategies for better meeting women's needs. Focuses on policies that affect women's roles and statuses within the domestic unit and within larger economic and political spheres.

SW 5280. Addressing Alcohol Related Problems in Social Work Practice. (1.0-2.0

cr. ; prereq Jr or Sr or Grad or instructor consent; summer, every year)

A multi-level systems perspective in examining the effects of alcohol problems on individuals, families and other populations. Topics will include: epidemiology, etiology, screening, assessment, diagnosis, treatment options, specialized populations and various social work practice areas.

SW 5990. Pre-Field Work. (0.0 cr.; No Grade Associated; fall, summer, every year)

This 0 credit courses is designed to cover the expense of criminal background checks required of all MSW students before they can enroll in their initial field placement with our program (Field I for Standard Students and Field II for Advanced Students).

SW 8021. Methods of Clinical Social Work Practice. (1.0-2.0 cr. ; A-F only; prereq 8111

or admission to advanced standing MSW program; fall, spring, offered periodically) Advanced skill development in clinical assessment and intervention. Through an ecologically based framework, students learn how to address a wide variety of micro-level problems involving many different populations. Social work applications of the DSM-IV.

SW 8031. Advanced Practice in Child Welfare. (3.0 cr.; A-F only; prereq 5032, 8441;

spring, every year)

Advanced skill development in assessment, intervention, and evaluation in relationship to direct child welfare social work practice.

SW 8051. School Social Work. (1.0-2.0

cr. ; A-F only; prereq Soc work grad student or instructor consent; fall, spring, offered periodically)

Overview of social work practice in educational settings, roles and functions of social workers within a complex ecological system, and skills and knowledge needed by social workers in a school setting.

SW 8070. A Problem-based Approach to Clinical Assessment and Intervention. (3.0

cr.; A-F only; prereq 8441; spring, every year) Beginning with complex case situations, and having students draw on knowledge and skills that best address these situations, students will follow cases from initial assessment through intervention and termination. This nationally cutting-edge approach is based on the premise that one of the most effective ways of teaching advanced SW practice is to begin with a difficult "real-life" practice problem, and to have students somewhat autonomously draw on whatever information and skills they need to effectively address the problem.

SW 8100. Social Work with Diverse Populations. (3.0 cr.; A-F only; prereq MSW

students or instructor consent; fall, spring, every year)

Examines societal issues generated by systemic discrimination and explores methods for reducing discrimination. Particular focus on advanced social work practice with diverse populations.

SW 8101. Introduction to Research. (2.0 cr.;

A-F only; prereq SW Grad student or instructor consent; spring, every year)

Introduction to social science research and its applications to social work and social welfare.

SW 8102. Advanced Research. (3.0 cr.; A-

F only; prereq 8101 or admission to advanced standing MSW program; fall, summer, every year)

Application of social science knowledge and skills to evaluate practice and to conduct community-based research and program evaluation projects. Develop a research proposal.

SW 8104. Project Seminar II. (1.0 cr.; S-

N only; prereq 8103; fall, spring, offered periodically)

Application of research knowledge and skills to final stages of master's research project. Data collection and analysis procedures applied to the Plan B paper.

SW 8105. MSW Portfolio and Final Oral Seminar. (0.0 cr.; S-N or Audit; prereq 8102;

spring, summer, every year) Seminar provides support for completing MSW portfolio and final oral exam.

SW 8106. Child Welfare Practice with African American Families. (2.0 cr.; A-F or

Audit; prereq 8100 or instructor consent; fall, spring, every year)

Students will learn about African American family strengths, values and norms; and about

the social history and current status of the overrepresentation of African Americans in the child welfare system. They will also explore best practice in providing child welfare services to African American families.

SW 8111. Individual, Family and Group Practice I. (3.0 cr.; A-F only; prereq SW grad

student or instructor consent; fall, every year) Overview of generalist social work practice, ethics, ecological perspective, and problem-solving model. Application to individuals, families, and groups and to diverse populations. Development of counseling skills.

SW 8112. Organization and Community Practice I. (3.0 cr.; A-F only; prereq 8111;

spring, every year) Using a problem-solving model and the ecological and strengths perspectives, students develop assessment and interventions skills for effective practice with organizations and community. Topics include using supervision, facilitating meetings, advocacy, cultural competence, and promoting organizational and community change.

SW 8235. American Indians and Social Policy. (3.0 cr.; A-F or Audit; prereq 5201 or

advanced standing MSW program or instructor consent; credit will not be granted if already received for 5235.; fall, spring, summer, every year)

Informs human service providers of policies affecting American Indians, including relationships of tribal governments with the United States and Minnesota governments, the interface between Indian and non-Indian service delivery systems, and Indian culture and politics.

SW 8331. Organization and Community Practice II . (3.0 cr.; A-F only; prereq 5101,

8112 or Advanced Standing in MSW program; fall, every year)

Prepares students for advanced practice in organizations and communities. It provides a framework for assessing and intervening in organizational and communities using an asset-based and problem-solving approach. Specific strategies and tactics for strengthening organizations and communities are addressed.

SW 8332. Advanced Practice in Administration and Community Development. (2.0-3.0 cr. ; A-F only; prereq

8331; spring, every year)

This course focuses on application of advanced knowledge and skills essential for understanding macro practice. Analysis of organizations and communities is required. Emphasis will be on analysis of complex social problems and the development of organizational and community solutions.

SW 8333. FTE: Master's. (1.0 cr.; No Grade

Associated; prereq Master's student, adviser and DGS consent; fall, spring, every year) (No description)

SW 8441. Individual, Family and Group Practice II. (3.0 cr.; A-F only; prereq 5101,

8112 or advanced standing MSW student; fall, every year)

Examines a range of social work practice theories and their application to practice with

individuals, families, and groups. Advanced skills in assessment and intervention in addressing complex problems with a focus on micro practice. Application to diverse populations and settings.

SW 8442. Advanced Group Work. (1.0-2.0 cr. ; A-F only; prereq 8441; fall, spring, offered periodically)

Conceptual knowledge and applied experiences needed to lead groups in a variety of social work settings serving diverse populations. Treatment groups and task groups (on both the organizational and community levels). Builds on the advanced generalist framework.

SW 8443. Advanced Practice in Mental Health. (3.0 cr.; A-F only; prereq 8441 concurrent registration is required; spring, every year)

Advanced skill development in direct practice social work assessment, intervention, and evaluation in relationship to mental health issues.

SW 8544. Advanced Practice with Families. (2.0-3.0 cr. ; A-F only; prereq 8441; spring, offered periodically)

Advanced skill development in social work assessment, interventions, and evaluations in relationship to families at various stages across the life span.

SW 8771. Health in American Indian Communities. (2.0 cr.; A-F only; prereq 8235; spring, every year)

Introduction to historical and contemporary concepts of American Indian health. Policy issues, cultural and sensitivity knowledge, and practice methods with American Indian clients and communities at micro, mezzo, and macro levels of intervention.

SW 8801. Field Placement I. (3.0-6.0 cr. ; S-N only; prereq 8111, 8112; SW Grad student, instructor consent; fall, spring, summer, every year)

Practicum experience with emphasis on developing knowledge and skill base for "beginning generalist" practice in a community agency. Concurrent seminar assists students in integrating classroom theories and intervention methodologies with field experiences. Application to diverse populations.

SW 8802. Field Placement II. (3.0-8.0 cr. ; S-N only; prereq concurrent registration in 8031 or 8332 or 8443 or 8544, SW Grad Student and instructor consent; fall, spring, summer, every year)

Developing knowledge and skill base for "advanced generalist" practice in a community agency. Concurrent seminar focuses on integrating classroom theories and intervention methodologies with experiences with client systems at micro, mezzo, and macro levels of practice. Attention to vulnerable/minority issues.

SW 8881. Dynamics of American Indian Families. (2.0 cr.; A-F only; prereq 8235 or instructor consent; fall, spring, every year)

Introduction to traditional and contemporary concepts relating to American Indian families.

Public policy, social problems, cultural strengths, conflicts, and culturally competent social work practice.

SW 8991. Practice in the American Indian Community. (2.0-4.0 cr. ; S-N only; prereq Soc work grad student, 8771 or 8881, instructor consent; spring, summer, offered periodically) Gives MSW students supervised direct practice experience in the American Indian community. Application of cultural knowledge and culturally competent practice skills.

Sociology (SOC) College of Liberal Arts

SOC 1080. Development of Social Selves. (SOC SCI; LE CAT8; 3.0 cr.; A-F or Audit; fall, spring, offered periodically)

Examines how the self develops. The primary focus is the socialization process, a process which continues throughout the life course. Special attention will be given to childhood and adolescent socialization. How do we learn? How do we understand behavior? What are the consequences of inadequate socialization?

SOC 1101. Introduction to Sociology. (SOC SCI; LE CAT6; CDIVERSITY; LECD CAT06; 4.0 cr.; A-F or Audit; fall, spring, every year) Introduction to sociological concepts and their application.

SOC 1201. Sociology of the Family. (SOC SCI; LE CAT8; CDIVERSITY; LECD CAT08; 3.0 cr.; A-F or Audit; fall, spring, offered periodically)

The family as a basic social institution: similarities and variations in family systems, their interrelationships with other institutions, and patterns of continuity and change.

SOC 1400. Alcohol and College Life.

(1.0 cr.; A-F or Audit; prereq Freshman or Sophomore status; fall, spring, every year) Provides students with information about how alcohol and drugs affect college life, regardless of whether or not they choose to drink. Reinforces safety skills, emphasizes personal prevention strategies and responsible decision-making. Presents students with tips about how to navigate college life and be successful, including time management, getting involved on campus, and meeting new people. This class does not count toward sociology major or minor.

SOC 2155. Introduction to Research Methods and Analysis. (4.0 cr.; A-F or Audit; fall, spring, every year)

Principles/practice of research design, sampling, data collection including field observation/surveys. Data management, analysis, and reporting of quantitative/qualitative data. Ethics/administration in sociological research. Introduction to SPSS statistical software. Lab

SOC 3155. Quantitative Research Methods and Analysis. (4.0 cr.; A-F or Audit; prereq 2155, crim major or soc major or URS major, min 30 cr; fall, spring, every year) Descriptive statistics. Measures of central tendency, deviation, association. Inferential

statistics focusing on probability and hypothesis testing. T-tests, Chi-square tests, analysis of variance, measures of association, introduction to statistical control. Statistical software (SPSS) used to analyze sociological data. Lab.

SOC 3156. Qualitative Research Methods and Analysis. (4.0 cr.; A-F or Audit; prereq (2155 or anth major or urs major or cst minor), at least 60 cr or instructor consent; fall, every year)

Application of qualitative research methods to study of social structures. Emphasizes field techniques, secondary data analysis, and interpretation. Lab

SOC 3306. Deviance. (3.0 cr.; A-F or Audit; prereq 1101 or CRIM 1301, min 15 cr; fall, spring, offered periodically)

Behaviors, beliefs, and physical characteristics defined as deviant; legal and other formal and informal reactions to deviance; subjective and objective effects of being defined as deviant.

SOC 3330. The American Civil Rights Movement. (SOC SCI; CDIVERSITY; 3.0 cr.; A-F or Audit; fall, every year)

Examination of theories and research relating to the American civil rights movement, including precursors and influence on subsequent social movements. Role of organization, resources, leadership, recruitment, ideology and consciousness, gender, social control, and counter-movements.

SOC 3595. Special Topics: (Various Titles to be Assigned). (1.0-3.0 cr. [max 6.0 cr.]; A-F or Audit; prereq Minimum 30 credits or instructor consent; fall, spring, offered periodically) Contemporary topics in sociology.

SOC 3701. Social Psychology. (SOC SCI; 3.0 cr.; A-F or Audit; prereq Min 30 cr or instructor consent; fall, spring, offered periodically)

Theory and research issues regarding relation of individual to society. Socialization, effects of social organization and disorganization, and interpersonal interaction.

SOC 3821. Sociology of Community. (3.0 cr.; A-F or Audit; prereq 1101, 30 cr; fall, spring, offered periodically)

Theoretical orientations and empirical investigations of community structure, processes, conflict, and change. Community components and types; community development strategies reviewed and applied.

SOC 3831. Organizations and Society. (4.0 cr.; A-F or Audit; prereq 60 cr or instructor consent; fall, spring, offered periodically)

Sociological examination of structure and processes of public and private formal organizations and patterns of adaptation to external social environments. Role of voluntary organizations in society.

SOC 3841. Urban Justice Field Experience. (2.0 cr.; S-N or Audit; prereq Min 60 cr or grad student or instructor consent; summer, offered periodically)

Guided tour of metropolitan neighborhoods and courts, emphasizing race, class, justice, and change.

SOC 3901. Social Change and Social Policy. (3.0 cr.; A-F or Audit; prereq 30 cr or instructor consent; fall, spring, offered periodically)
Social change and maintenance forces as they affect social life. Emphasis on social theory and research along with formation and implementation of social policy leading to both change and maintenance.

SOC 3945. Social Stratification. (3.0 cr.; A-F or Audit; prereq 1101 or CRIM 1301 or CSt 1101 or Anth 1604, min 30 cr or instructor consent; fall, spring, every year)
Theories and research about the effects of economic inequality in people's lives. Social class formation and the effects of institutionalized power structures. Intersection of social class, gender and race/ethnicity. Primary focus on the United States but with international comparisons.

SOC 4111. Sociological Theory. (4.0 cr.; A-F or Audit; prereq 1101, 30 cr, no grad credit; credit will not be granted if already received for SOC 2111.; fall, spring, every year)
Analysis of classical and contemporary sociological theory. Major theorists, including Durkheim, Weber, and Marx; major paradigms and their importance to sociological thought.

SOC 4370. Sociology of Mental Health and Illness. (3.0 cr.; A-F or Audit; prereq 60 credits or instructor consent; no grad credit; fall, spring, offered periodically)
Examines mental health and illness from multiple sociological perspectives; particular emphasis placed on contemporary United States. Topics include theories and alternative understandings, differences in cultural perspectives, social determinants, deterrents, response to and consequences of mental illness and institutional contexts of mental illness and criminal justice.

SOC 4587. Internship Preparation. (1.0 cr.; A-F only; prereq CRIM majors - CRIM 1301, 2311, SOC 2155; SOC majors - SOC 1101, 2155; min 60 cr, no grad credit; fall, spring, every year)
Introduction to internship by learning about internship expectations, developing internship objectives, exploring internship opportunities, and identifying potential internship sites. After successfully completing SOC 4587, a student must wait at least one semester before registering for SOC 4597.

SOC 4597. Internship. (6.0-8.0 cr. ; S-N only; prereq Internship coordinator consent, soc or crim major, 4587, WRIT 31xx; no grad credit; fall, spring, summer, every year)
Supervised internship of at least 300 hours in a setting related to academic preparation and career interests.

SOC 4860. Environmental Sociology. (SUSTAIN; 3.0 cr.; A-F or Audit; prereq 90 cr or grad student or instructor consent; spring, even years)
Examines the relationship between humans and the natural environment, including the role of science, technology, economics, religion, and culture. Emphasis on the social justice implications of environmental issues, and

contemporary topics such as global warming and sustainable agriculture and energy. Considers the diverse positions and actions of environmental movements, and possible solutions to environmental problems.

SOC 4910. Teaching Assistantship in Sociology. (1.0-3.0 cr. ; A-F only; prereq 60 cr, instructor consent; no grad credit; maximum 3 credits allowed between SOC 4910, 4997 and CRIM 4397, 4910; fall, spring, every year)
Practical experience in teaching-related activities in sociology courses.

SOC 4925. Sociology of Rape. (3.0 cr.; A-F or Audit; prereq 1101 or CRIM 1301 or CSt 1101 or Anth 1604 or WS 1000, 60 cr, or instructor consent; spring, summer, every year)
Social, moral, and legal definitions and implications of rape.

SOC 4935. Peace, Conflict, and Violence. (3.0 cr.; A-F or Audit; prereq 60 cr or grad student or instructor consent; fall, spring, offered periodically)
Understanding the causes of violence as well as peaceful responses to conflict at all levels--from the interpersonal to the international. Considers how language, beliefs, economics, ethnicity, religion, and gender influence violent behavior. Analysis of criminal justice and other societal responses to conflict, and how structural inequalities are implicated in forms of violence. Explores theories and practices of peacemaking, conflict resolution, and nonviolence.

SOC 4947. Sociology of Gender Identities and Systems. (3.0 cr.; A-F or Audit; prereq 1101 or CRIM 1301 or CSt 1101 or Anth 1604 or WS 1000, min 60 cr, or grad student or instructor consent; fall, spring, offered periodically)
Status and experiences in society through the exploration of gender identities, systems and social structures. Topics include politics, discrimination, family, education, workplace, popular culture, and changing definitions of gender. Emphasis on the expectations and performance of masculinity/femininity, and the intersection of gender, race, and class. Some consideration given to global explorations and international comparisons.

SOC 4949. Race and Ethnic Relations. (3.0 cr.; A-F or Audit; prereq 1101 or CRIM 1301 or CSt 1101 or Anth 1604, 60 cr, or instructor consent; fall, spring, offered periodically)
Overview of race and ethnic relations in America; conditions of major racial and ethnic minorities; formation of racial/ethnic identities, sources of prejudice, discrimination; intergroup conflict; assimilation, persistence of ethnicity; intergroup diversity; major racial and ethnic groups; the new immigrants.

SOC 4960. Graveyard Culture. (4.0 cr.; A-F or Audit; prereq Min 30 cr or instructor consent; summer, offered periodically)
Structure and cultural traditions surrounding resting places of the departed with emphasis on stratification, discrimination, cultural identity, identity tags, community integration as well as preservation issues, community

history, and the business end of cemeteries. Further emphasis on cemeteries in Duluth and surrounding areas within the context of broader movements. Exploring Duluth history becomes an essential part of the course.

SOC 4981. Social Movements, Protest and Change. (4.0 cr.; A-F or Audit; prereq 60 cr or grad student or instructor consent; spring, every year)
This course provides a study of collective behavior and social movements. The course includes a survey of theories and phenomenon making up the "collective behavior" paradigm from which early studies of social movement were conducted. Here, the focus is on: fads, crazes, panics, riots, rumors, and mass hysterias. The bulk of the course is dedicated to the study of the emergence, structure, and dynamics of contemporary social movements and political protest. The range of their investigation extends from research on the dynamics of recruitment within social movements to the study of protest tactics to the policing of protests and counter-insurgency.

SOC 4982. Political Sociology and the Global Economy. (4.0 cr.; A-F or Audit; prereq 60 credits or instructor consent or grad student; fall, every year)
Explores the field of power and economics, understanding the major theoretical debates and issues both past and present. Examines the nature of the state and economy, while also examining how class, race, and gender shape both the political and economic process. Focuses on how power is constructed, legitimated, and delegitimated concentrating on state formation, expansion, rebellion, and revolution.

SOC 4985. Critical Animal Studies. (4.0 cr.; A-F or Audit; =[CST 4985]; prereq minimum 90 credits or instructor consent; no grad credit; fall, spring, offered periodically)
This course explores the ways in which animal lives intersect with human lives, including the evolution of social, cultural, scientific, and religious attitudes toward animals. We will examine the dynamics of power and visualization in the ways animals are culturally framed and constructed. Students will also learn to critically analyze a variety of ethical debates about animals in society, such as the eating of animals, animal experimentation, zoos, hunting, ownership, and legal status.

SOC 4991. Independent Study in Sociology. (1.0-6.0 cr. ; A-F or Audit; prereq instructor consent; maximum 6 credits allowed between SOC 4991 and CRIM 4391; fall, spring, summer, every year)
Directed reading, research, or involvement in social action leading to preparation of a paper or other product.

SOC 4999. Honors Project Sociology. (1.0-4.0 cr. [max 8.0 cr.]; A-F or Audit; prereq 90 cr, approval by dept honors program director; no grad credit; maximum 8 credits allowed between SOC 4999 and CRIM 4399; fall, spring, summer, every year)
Advanced individual project in any area of sociology, demonstrating sound theoretical and

research foundations and resulting in a written report.

Spanish (SPAN) College of Liberal Arts

SPAN 1101. Beginning Spanish I. (COMM & LAN; LE CAT3; 4.0 cr.; A-F or Audit; prereq Little or no prior formal study of this language, or instructor consent; fall, every year)
Conversation and communicative course for students with little or no previous study of Spanish. Emphasis on oral and aural skills; some grammar. Taught primarily in Spanish, with some English.

SPAN 1102. Beginning Spanish II. (COMM & LAN; LE CAT3; 4.0 cr.; A-F or Audit; prereq 1-2 yrs high school Span or 1101 or instructor consent; spring, every year)
Conversation and communicative course for students with limited previous study of Spanish. Emphasis on oral and aural skills; some grammar. Taught primarily in Spanish, with some English.

SPAN 1201. Intermediate Spanish I. (COMM & LAN; LE CAT3; 4.0 cr.; A-F or Audit; prereq 3-4 yrs high school Span or 1102 or instructor consent; fall, every year)
Consolidation and enrichment of previously acquired abilities in speaking and understanding Spanish, set within introduction to written Spanish and survey of contemporary culture of Spanish-speaking societies. Emphasis on oral, aural, and reading skills; vocabulary building; some writing. Taught in Spanish.

SPAN 1202. Intermediate Spanish II. (COMM & LAN; LE CAT3; LEIP CAT03; 4.0 cr.; A-F or Audit; prereq 4 yrs high school Span or 1201 or instructor consent; spring, every year)
Consolidation and enrichment of previously acquired abilities in speaking and understanding Spanish, set within introduction to written Spanish and survey of contemporary culture of Spanish-speaking societies. Emphasis on oral, aural, and reading skills; vocabulary building; some writing. Taught in Spanish.

SPAN 2093. Spanish Historical Film and Fiction in Translation. (HUMANITIES; LE CAT7; GLOBAL PER; 4.0 cr.; A-F or Audit; fall, offered periodically)
Study of select contemporary literary, cultural and filmic works that reflect political tensions as well as social, personal and, especially, historical realities preceding, including and following the Spanish Civil War (1936-1939). Taught in English.

SPAN 2301. Advanced Spanish. (COMM & LAN; LE CAT3; LEIP CAT03; 4.0 cr.; A-F or Audit; prereq 5 yrs high school Span or 1202 or instructor consent; fall, every year)
Development of Spanish literacy within a culturally authentic contemporary context. Emphasis on practical writing and formal oral and aural communication skills; vocabulary building; enhancement of reading skills; review of key grammar. Taught in Spanish.

SPAN 2540. Latino Literatures and Cultures. (HUMANITIES; LE CAT8; CDIVERSITY; LECD CAT08; 4.0 cr.; A-F or Audit; fall, spring, offered periodically)

Literatures and cultures of Latinos in the United States, with attention to their particular issues. Some readings in Spanish for the occasional Spanish major/minor student. Taught in English (unless entire class composed of students of Spanish).

SPAN 2550. Globalization and Sustainability in Latin America. (SUSTAIN; 4.0 cr.; A-F or Audit; spring, summer, even years)

The study of the origins and recent trends in globalization in Latin America. Special focus on practices that promote environmental, economic, political, social and cultural sustainability. The course may focus on Central America, the Caribbean, and Andes, the Southern Cone, the Amazon or any other geocultural region in Latin America. The course is open to all majors and will be taught in English.

SPAN 3031. Spanish Language Study Abroad I. (1.0-5.0 cr. [max 10.0 cr.]; prereq department approval; fall, spring, summer, offered periodically)
Advanced language study abroad.

SPAN 3032. Spanish Language Study Abroad II. (1.0-5.0 cr. [max 10.0 cr.]; prereq department approval; fall, spring, summer, offered periodically)
Advanced language study abroad.

SPAN 3042. Hispanic American Civilization and Culture. (HUMANITIES; GLOBAL PER; 4.0 cr.; A-F or Audit; prereq 2301 with C or better or instructor consent; offered alternate years; spring, every year)
Survey of important aspects of Hispanic American civilization and culture, pre- and post-Encounter. Taught in Spanish.

SPAN 3044. Spanish Civilization and Culture. (HUMANITIES; GLOBAL PER; 4.0 cr.; A-F or Audit; prereq 2301 with C or better or instructor consent; offered alternate years; spring, every year)
Historical survey. Taught in Spanish.

SPAN 3045. Spanish Culture and Civilization Study Abroad I. (1.0-5.0 cr. [max 10.0 cr.]; prereq department approval; fall, spring, summer, offered periodically)
Study abroad of Spanish or Hispanic American culture.

SPAN 3046. Spanish Culture and Civilization Study Abroad II. (1.0-5.0 cr. [max 10.0 cr.]; prereq department approval; fall, spring, summer, offered periodically)
Study abroad of Spanish or Hispanic American culture.

SPAN 3047. Spanish Culture and Civilization Study Abroad III. (1.0-5.0 cr. [max 10.0 cr.]; prereq department approval; fall, spring, summer, offered periodically)
Study abroad of Spanish or Hispanic American culture.

SPAN 3048. Spanish Culture and Civilization Study Abroad IV. (1.0-5.0 cr.

[max 10.0 cr.]; prereq department approval; fall, spring, summer, offered periodically)
Study abroad of Spanish or Hispanic American culture.

SPAN 4004. Spanish Conversation. (1.0-4.0 cr. [max 8.0 cr.]; prereq 2301; use of 4 credits only toward degree; summer, every year)
Practice in oral conversation skills.

SPAN 4011. Hispanic American Prose. (HUMANITIES; 4.0 cr.; A-F or Audit; prereq 2301 with C or better or instructor consent; no grad credit; offered every third yr; fall, spring, offered periodically)
Prose fiction with emphasis on 20th and 21st centuries. Attention also to cultural background. Taught in Spanish.

SPAN 4013. Hispanic American Poetry and Drama. (HUMANITIES; 4.0 cr.; A-F or Audit; prereq 2301 with C or better or instructor consent; no grad credit; offered every third yr; fall, spring, offered periodically)
Emphasis on 20th and 21st centuries. Attention also to cultural background. Taught in Spanish.

SPAN 4017. Hispanic American Cinema and Culture. (FINE ARTS; 4.0 cr.; A-F or Audit; prereq 2301 with C or better or instructor consent, no grad credit; fall, odd years)
Analysis of and insight into contemporary Hispanic American cinema and culture. Taught in Spanish.

SPAN 4018. Hispanic America From Within. (HUMANITIES; 4.0 cr.; A-F or Audit; prereq 2301 with C or better or instructor consent; no grad credit; spring, every year)
Study of selected Hispanic American countries; historical, political, cultural, and other defining moments, and literary expressions of those moments, with goal of seeing the country from within. Taught in Spanish.

SPAN 4019. Seminar: Hispanic America in the 21st Century. (HUMANITIES; 4.0 cr.; A-F only; prereq 2301 with C or better or instructor consent, this course taught in Spanish, no grad credit; fall, even years)
Designed for more advanced students to delve into longer, newer, or less studied (but yet important) literary works, as well as the relative cultural background as on the Web, in scholarly texts and journals, and in films and music.

SPAN 4022. Medieval to Early Modern Spain. (HUMANITIES; 4.0 cr.; A-F or Audit; prereq 2301 with C or better or instructor consent, no grad credit; spring, odd years)
Survey of Spanish culture from the Middle Ages to Early Modernity. Relies on written tradition but will also delve into other types of cultural production (pictorial, sculptural, architectural, etc.). Also reviews current renditions (textual and filmic) of some of the texts. Taught in Spanish.

SPAN 4027. Modern Spanish Literature and Culture. (HUMANITIES; 4.0 cr.; A-F or Audit; prereq 2301 with C or better or instructor consent; no grad credit; fall, spring, offered periodically)
The study of Spanish peninsular literature and culture during the twentieth century up to the

death of Francisco Franco, 1975. Taught in Spanish.

SPAN 4028. Literature and Culture of Spain from the 19th Century to the Present.

(HUMANITIES; 4.0 cr.; A-F or Audit; prereq 2301 with C or better or instructor consent, no grad credit; spring, odd years)
Literature and culture (art, film, music, architecture, popular culture) of Spanish romanticism to the present. Works will be studied within their historical, political and social context and will shed light on the author/composer/art's ideology vis-a-vis dominant philosophical and political climates. Taught in Spanish.

SPAN 4030. Cinema and Culture of Spain.

(FINE ARTS; 4.0 cr.; A-F or Audit; prereq 2301 with C or better or instructor consent, no grad credit; spring, even years)
Overview of Spanish cinema from the 1950s to the present. Examines a variety of filmic genres, from fascist dramas of the Francoist period to the trash-aesthetics comedies of the "New Spanish Cinema" and beyond. Spanish national identity will be the main axis of our inquiry. Taught in Spanish.

SPAN 4090. Aspects of the Hispanic World.

(HUMANITIES; 4.0 cr.; A-F or Audit; prereq 2301 with C or better or instructor consent; no grad credit; fall, spring, offered periodically)
Sociopolitical, historical, literary, and cultural events of major importance in Hispanic America, Spain, or among Latinos in the United States. Taught in Spanish.

SPAN 4091. Independent Study. (1.0-4.0 cr.

[max 8.0 cr.]; A-F only; prereq 2301 with C or better, instructor consent; no grad credit; fall, spring, summer, every year)
Students devise programs of reading and research in consultation with instructor to expand upon a topic related to one studied in regular coursework. Taught in Spanish.

SPAN 4095. Special Topics: (Various Titles to be Assigned). (1.0-4.0 cr. [max 12.0 cr.];

A-F or Audit; prereq 2301 with C or better or instructor consent; no grad credit; fall, spring, summer, offered periodically)
Literature and/or culture of Spanish-speaking populations: Spaniards, Hispanic Americans, or Latinos in the United States. Taught in Spanish.

Special Education (SPED)

College of Education and Human Service Professions

SPED 1357. Individuals with Disabilities in Society. (CDIVERSITY; LE CAT8; LECD CAT08; 3.0 cr.; A-F or Audit; spring, every year)

Major types of disabilities and giftedness, including definitions, causes, characteristics, and educational implications. Disability perspectives. Social, legal, and educational considerations of disability issues.

SPED 3103. Infants and Toddlers with Special Needs. (4.0 cr.; A-F or Audit; =[SPED 5103]; prereq UECh major or instructor consent; spring, every year)

Causation and development of disabling conditions in infants and toddlers. Effective intervention techniques in a variety of settings involving interagency collaboration and family involvement. Practicum.

SPED 3105. Young Children with Special Needs: Ages Three-Eight. (4.0 cr.; A-F or Audit; =[SPED 5105]; prereq instructor consent; fall, every year)

Identification, assessment, and classification of young children with special needs. Effective intervention techniques for use in a variety of settings, emphasizing integration and teaming strategies. Practicum.

SPED 3106. Working with Young Children with Low Incidence Disabilities. (4.0 cr.;

A-F or Audit; prereq Admission to the UECh program; fall, offered periodically)
Skills and information useful in the provision of quality services for young children with low incidence disabilities. Class sessions and field-based experiences will address supports young children with low incidence disabilities.

SPED 3109. Working with Challenging Behavior in Young Children. (3.0 cr.; A-F or Audit; prereq Admission to the UECh program; fall, offered periodically)

Provides information needed to evaluate and implement behavior change programs that are appropriate for young children who exhibit challenging behaviors. A key element will be functional behavioral assessment procedures and a range of preventative behavioral interventions.

SPED 3205. Assessment in Early Childhood Special Education. (4.0 cr.; A-F or Audit;

=[SPED 5205]; prereq 3103, 3105, instructor consent; fall, spring, every year)
Measurement theory, assessment practices, familiarization with selected instruments, legal and ethical precautions for assessing preschool and primary age children with disabilities. Practicum.

SPED 3310. Introduction to Special Education for Elementary Education. (1.0 cr.; A-F or Audit; prereq EIEd major; fall, spring, every year)

Introductory course for elementary education majors, emphasizing attitudes and language towards students with disabilities, focusing on abilities and on understanding differences in learners, social, legal and educational issues, collaboration and individual education planning mandates.

SPED 3415. Special Education in the Secondary School. (3.0 cr.; A-F only; fall, spring, every year)

Exploration of topics in exceptionality for pre-service secondary education majors. Topics include universal design, instructional strategies, characteristics of students, special education law, and differentiated instruction.

SPED 4204. Assessment in the General and Special Education Classroom. (4.0 cr.; A-F or Audit; =[SPED 5204]; prereq 4433, IESE

candidate, SPED post bac, no grad credit; fall, spring, every year)
Exploration of topics in responsive and responsible assessment of student learning.

Candidates will be introduced to use of assessment strategies and making decisions about exceptionality, eligibility, and educational programming. Topics include types of assessment strategies, large-scale and high stakes testing, rubrics, checklists and other evaluative tools and techniques. This course has a 30-hour practicum.

SPED 4210. Special Education for Secondary Educators. (3.0 cr.; A-F or Audit; prereq No grad credit; fall, spring, offered periodically)

Educator's role and responsibilities in meeting the diverse needs of students with disabilities in the general education setting. Current laws and legislation, characteristics of students with disabilities, informal assessment, and research-based strategies and methods for instruction in the areas of reading, math, and written language.

SPED 4250. Foundations of Autism Spectrum Disorders. (4.0 cr.; A-F or Audit; =[SPED 5250]; prereq No Grad cr; summer, offered periodically)

Includes history, definitions, assessment, characteristics, legal aspects, varying perspectives, and etiology of the Autism Spectrum Disorders.

SPED 4260. Language and Social Skills for Children and Youth with Autism Spectrum Disorders. (4.0 cr.; A-F or Audit; =[SPED

5260]; prereq 4250 or 5250 and 4270 or 5270; no grad credit; spring, offered periodically)
Specialized instruction in the foundation of language development, social stories, augmented and alternative communication systems, theory of mind, social skill development and play.

SPED 4270. Methods for Teaching Children and Youth with Autism Spectrum Disorders. (4.0 cr.; A-F or Audit; =[SPED 5270]; prereq

4250 or 5250 or instructor consent, no grad credit; fall, offered periodically)
Indepth assessment, environmental factors, curricular options, instructional strategies, behavioral programming, material for teaching, sensory integration strategies, IEP/IIIP development and implementation, and technology on the continuum of placements for children and youth with ASD.

SPED 4280. Assessment of Students with Autism Spectrum Disorders. (2.0 cr.; A-F or Audit; prereq 4250, 4260 and 4270; no grad credit; fall, even years)

This course will focus on assessment procedures used by practitioners in the field of special education - specifically in Autism. Students will learn a variety of standardized and informal assessment procedures, referral, evaluation, planning, and programming. Students will also learn to interpret and integrate evaluation results in the planning and programming process in working with students with Autism.

SPED 4310. Response to Intervention in the General Education Classroom. (4.0 cr.; A-F or Audit; prereq IESE candidate, post bac special education; credit will not be granted if

already received for 5310; fall, spring, every year)

Understanding the use of the response to intervention (RtI) procedure to identify students with learning disabilities. Use of formal and informal assessment processes for monitoring progress to make decisions about changes in instruction or goals and apply child response data to important educational decisions. Students will identify valid research-based interventions and their application in educational settings.

SPED 4351. Foundations and Characteristics of Learning Disabilities. (4.0 cr.; A-F or Audit; =[SPED 5351]; prereq 4433, postbac or instructor consent; no grad credit; spring, summer, offered periodically) Characteristics of learning disabilities, emphasizing language and processing deficits and how they interfere with academic achievement and social relationships; assessment and intervention approaches for students with learning disabilities. Practicum.

SPED 4381. Classroom and Behavior Management . (4.0 cr.; A-F or Audit; =[SPED 5381]; prereq 4433, IESE or postbac sped; no grad credit; fall, spring, every year) Classroom management and behavior change for P-12 students; identification and assessment of problem behaviors; proactive and reactive strategies for managing disruptive behavior; application of applied behavior analysis to modifying behaviors; legal and ethical issues in behavior change. Concurrent with 5381. Practicum

SPED 4382. Advanced Theory and Practice in Emotional, Behavioral Disorders. (4.0 cr.; A-F or Audit; =[SPED 5382]; prereq 4433, 4381, postbac or instructor consent, no grad credit; spring, offered periodically) Behavioral and emotional disorders of school-aged children and youth; assessment approaches, models of instruction, curricula, advanced application of skills to change behaviors, crisis intervention skills, knowledge of community resources and services. Practicum.

SPED 4433. Foundations in Special Education. (4.0 cr.; A-F or Audit; =[SPED 5433]; prereq Min 45 cr, postbac grad or sped minor, no grad credit; fall, spring, summer, every year) Overview of children with disabilities. Special emphasis will be placed on characteristics of exceptional children; the legal aspects of educating students with disabilities; and assessment, instructional, and collaborative strategies. Practicum.

SPED 4435. Parent and Professional Communication and Collaboration. (4.0 cr.; A-F or Audit; =[SPED 5435]; prereq 4433, 45 cr, postbac or sped minor or instructor consent, no grad credit; fall, spring, offered periodically) Group process, problem solving, decision-making, collaboration, and teamwork applied to the special education process. Techniques for working with parents, professionals, paraprofessionals, and community agencies when planning and implementing Individualized Education Plans.

SPED 4452. Academic Interventions for Students with Disabilities. (4.0 cr.; A-F or Audit; =[SPED 5452]; prereq 4433, postbac or instructor consent; fall, spring, every year) Understanding various models for teaching students with reading, writing, or math difficulties; development of intervention plan based on assessment and observation. Practicum.

SPED 4455. Transitional Planning for Adolescents with Disabilities. (4.0 cr.; A-F or Audit; =[SPED 5455]; prereq 4433, postbac or instructor consent, no grad credit; fall, summer, offered periodically) Assessment procedures, planning and instructional methods to help students with disabilities make the transition from school to postsecondary training, education, and employment. Practicum.

SPED 4585. Individual Education Plans: Development and Implementation. (3.0 cr.; A-F or Audit; =[SPED 5585]; prereq 4433 and 4204, no grad credit; fall, offered periodically) Historical perspective of the Individual Education Plan (IEP), its professional significance in education and the impact of the IEP on students and teachers in special education. Explores procedural guidelines, develop an IEP based on best practice.

SPED 4600. Student Teaching. (1.0-12.0 cr. ; S-N or Audit; prereq Postbac or instructor consent, no grad credit; fall, spring, summer, every year) Observational, evaluative, and instructional experience with students with disabilities in K-12 settings.

SPED 4610. Professional Issues. (1.0 cr.; S-N or Audit; prereq No grad credit; spring, every year) Reflections on current issues and ethical dilemmas in the field of early childhood special education, birth through age eight.

SPED 4850. Foundations of Fetal Alcohol Spectrum Disorder. (4.0 cr.; A-F or Audit; prereq Junior or senior or instructor consent; credit will not be given if already granted for 5850; summer, every year) Overview of Fetal Alcohol Spectrum Disorder, including prevention development, range of severity, historically and current perspectives, legal issues, current research, diagnosis, primary and secondary disabilities, impact on development, and impact on family and community.

SPED 4860. Social and Communication Skills for Individuals with Fetal Alcohol Spectrum Disorder. (4.0 cr.; A-F or Audit; prereq 4850 or instructor consent; fall, every year) Overview of impairments of social receptive and expressive communication skills associated with Fetal Alcohol Spectrum Disorder and the impact these deficits have on social development, education, and participation in society. Current research and trends as well as strategies for supporting individuals with this diagnosis for improved social and communication function. This course

will incorporate observation and/or case studies of individuals with FASD into course instruction.

SPED 4870. Professional Methods for Working with Individuals with Fetal Alcohol Spectrum. (4.0 cr.; A-F or Audit; prereq 4850 or instructor consent; spring, every year) Exploration of the continuum of placements of living, education, and vocational settings for individuals with FASD. Advocacy issues, in-dept assessment, environmental factors, curricular options, IEP/IIIP development and implementation and programming of the lifespan of individuals with FASD.

SPED 5103. Infants and Toddlers with Special Needs. (3.0 cr.; A-F only; =[SPED 3103]; prereq Bachelors degree in a related area of study (early childhood educ, elem educ, comm sci disorders, social work); summer, odd years) Addresses the many causes of disabling conditions in infants and toddlers. Effective intervention techniques and appropriate environments for young children with special needs will be discussed. Family involvement and community support for children with special needs will also be addressed.

SPED 5105. Young Children with Special Needs: Ages Three to Eight. (4.0 cr.; A-F or Audit; =[SPED 3105]; prereq Sped post bac or instructor consent; summer, even years) Identification, assessment, and classification of young children with special needs. Effective intervention techniques for use in a variety of settings, emphasizing integration and teaming strategies. Practicum.

SPED 5106. Working with Children with Low Incidence Disabilities. (3.0 cr.; A-F only; prereq Completion of undergraduate degree; summer, every year) Addresses skills and information useful in the provision of quality services for young children with low incidence disabilities. Class sessions and field-based experiences will address supports for young children with low incidence disabilities.

SPED 5109. Working with Challenging Behavior in Young Children. (3.0 cr.; A-F only; prereq Min 120 cr; summer, even years) Provides information needed to evaluate and implement behavior change programs that are appropriate for young children who exhibit challenging behaviors. A key element will be functional behavioral assessment procedures and a range of preventative behavioral interventions.

SPED 5204. Assessment in the General and Special Education Classroom. (4.0 cr.; A-F or Audit; =[SPED 4204]; prereq sped post-bac; fall, spring, every year) Exploration of topics in responsive and responsible assessment of student learning. Candidates will be introduced to use of assessment strategies and making decisions about exceptionality, eligibility, and educational programming. Topics include types of assessment strategies, large-scale and high stakes testing, rubrics, checklists and other evaluative tools and techniques. This course has a 30-hour practicum.

SPED 5250. Foundations of Autism Spectrum Disorders. (4.0 cr.; A-F or Audit; =[SPED 4250]; fall, offered periodically) Includes history, definitions, assessment, characteristics, legal aspects, varying perspectives, and etiology of the Autism Spectrum Disorders.

SPED 5260. Language and Social Skills for Children and Youth with Autism Spectrum Disorders. (4.0 cr.; A-F or Audit; =[SPED 4260]; prereq 4250 or 5250 and 4270 or 5270; spring, summer, offered periodically) Specialized instruction in the foundation of language development, social stories, augmented and alternative communication systems, theory of mind, social skill development and play.

SPED 5270. Methods for Teaching Children and Youth with Autism Spectrum Disorders. (4.0 cr.; A-F or Audit; =[SPED 4270]; prereq 4250 or 5250 or instructor consent; spring, summer, offered periodically) In-depth assessment, environmental factors, curricular options, instructional strategies, behavioral programming, material for teaching, sensory integration strategies, IEP/IIIP development and implementation, and technology on the continuum of placements for children and youth with ASD.

SPED 5280. Assessment of Students with Autism Spectrum Disorders. (2.0 cr.; A-F or Audit; prereq 4250, instructor consent; fall, even years) This course will focus on assessment procedures used by practitioners in the field of special education - specifically in Autism. Students will learn a variety of standardized and informal assessment procedures, referral, evaluation, planning, and programming. Students will also learn to interpret and integrate evaluation results in the planning and programming process in working with students with Autism.

SPED 5351. Learning Disabilities Characteristics and Interventions. (4.0 cr.; A-F or Audit; =[SPED 4351]; prereq 4433 or 5433, postbac or instructor consent; fall, summer, offered periodically) Characteristics of learning disabilities, emphasizing language and processing deficits and how they interfere with academic achievement and social relationships; assessment and intervention approaches for students with learning disabilities. Practicum.

SPED 5381. Classroom and Behavior Management. (4.0 cr.; A-F or Audit; =[SPED 4381]; prereq 4433, postbac grad; fall, spring, every year) Classroom management and behavior change for P-12 students; identification and assessment of problem behaviors; proactive and reactive strategies for managing disruptive behavior; application of applied behavior analysis to modifying behaviors; legal and ethical issues in behavior change. Concurrent with 4381; requires an additional paper, research project or field based practicum (option for post baccalaureate students at the 5000 level).

SPED 5382. Advanced Theory and Practice in Emotional/Behavioral Disorders. (4.0 cr.; A-F or Audit; =[SPED 4382]; prereq 4433 or 5433 or instructor consent; spring, offered periodically) Behavioral and emotional disorders of school-aged children and youth; assessment approaches, models of instruction, curricula, advanced application of skills to change behaviors, crisis intervention skills, knowledge of community resources and services. Practicum.

SPED 5433. Foundations in Special Education. (4.0 cr.; =[SPED 4433]; prereq Postbac grad student; fall, spring, summer, every year) History, philosophy, theories, and issues of special education. Overview of special education rules and processes. Survey of exceptionalities, including disability perspectives. Because this course is taught concurrently with 4433, it will require one or more of the following: paper, project, or field based practicum.

SPED 5435. Parent and Professional Communication and Collaboration. (4.0 cr.; =[SPED 4435]; prereq 4433 or 5433, postbac grad or instructor consent; fall, offered periodically) Group process, problem solving, decision making, collaboration, and teamwork applied to the special education process. Techniques for working with parents, professionals, paraprofessionals, and community agencies when planning and implementing Individualized Educational Plans. Because this course is taught concurrently with 4435, it will require one or more of the following: paper or project.

SPED 5452. Academic Interventions for Students with Disabilities. (4.0 cr.; A-F or Audit; =[SPED 4452]; prereq 4433 or 5433, postbac grad or instructor consent; spring, every year) Understanding various models for teaching students with reading, writing, or math difficulties; development of intervention plan based on assessment and observation. Practicum.

SPED 5455. Transitional Planning for Adolescents With Disabilities. (4.0 cr.; A-F or Audit; =[SPED 4455]; prereq 5433 or 4433, postbac grad or instructor consent; spring, summer, offered periodically) Assessment procedures, planning and instructional methods to help students with disabilities make the transition from school to postsecondary training, education, and employment. Practicum.

SPED 5585. Individual Education Plans: Development and Implementation. (3.0 cr.; A-F or Audit; =[SPED 4585]; fall, summer, every year) Historical perspective of the Individual Education Plan (IEP), its professional significance in education and the impact of the IEP on students and teachers in special education. Explores procedural guidelines, develop an IEP based on best practice and develop lesson and unit plans.

SPED 5600. Student Teaching. (1.0-12.0 cr.; S-N or Audit; prereq instructor consent; fall, spring, summer, every year) Observational, evaluative, and instructional experience with students with disabilities in K-12 settings. Seminar included.

SPED 5795. Special Topics: (Various Titles to be Assigned). (0.5-4.0 cr. [max 8.0 cr.]; A-F or Audit; summer, every year) Current issues in Special Education to meet needs and interests of various groups, particularly practicing professionals.

SPED 5850. Foundations of Fetal Alcohol Spectrum Disorder. (4.0 cr.; A-F or Audit; prereq Grad student; credit will not be granted if already received for 4850; summer, every year) Overview of Fetal Alcohol Spectrum Disorder, including prevention, development, range of severity, historical and current perspectives, legal issues, current research, diagnosis, primary and secondary disabilities, impact on development, and impact on family and community.

SPED 5860. Social and Communication Skills for Individuals with Fetal Alcohol Spectrum Disorder. (4.0 cr.; A-F or Audit; prereq 5850 or instructor consent; spring, every year) Overview of impairments of social receptive and expressive communication skills associated with Fetal Alcohol Spectrum Disorder and the impact these deficits have on social development, education, and participation in society. Current research and trends as well as strategies for supporting individuals with this diagnosis for improved social and communication function. This course will incorporate observation and/or case studies of individuals with FASD into course instruction.

SPED 5870. Professional Methods for Working with Fetal Alcohol Spectrum. (4.0 cr.; A-F or Audit; prereq 5850 or instructor consent; credit will not be granted if already received for 4870; fall, every year) Exploration of the continuum of placements of living, education, and vocational settings for individuals with FASD. Advocacy issues, in-depth assessment, environmental factors, curricular options, IEP/IIIP development and implementation and programming of the lifespan of individuals with FASD.

SPED 5991. Independent Study. (1.0-6.0 cr.; A-F or Audit; prereq Department approval; fall, spring, summer, every year) Directed independent study, readings, or projects of interest to student.

SPED 5993. Special Area Project. (1.0-4.0 cr.; A-F or Audit; prereq instructor consent; fall, spring, summer, every year) Independent project for advanced students to substantially further their theoretical knowledge base or professional competencies.

SPED 7100. Professional Issues in Special Education. (3.0 cr.; A-F or Audit; prereq Acceptance into master's of special education program; summer, offered periodically) Provides graduate candidates a seminar to write about and discuss current professional

issues raised in recognized sources within the field of special and general education (e.g., journals, education news sources, and topical conferences).

SPED 7200. Advanced Behavior Management Principles and Practices.

(3.0 cr.; A-F or Audit; prereq Acceptance into M.Sp.Ed. program; summer, offered periodically)

Application of theory and techniques in behavior management, assessment, intervention, monitoring, generalizing, and maintenance in behaviors of individuals with exceptionalities. Focus is on advanced principles and practices in behavior management as well as social skill instruction.

SPED 7710. Practice, Research, and Leadership I.

(3.0 cr.; A-F or Audit; prereq MEd student or instructor consent; summer, offered periodically)

Analysis of research approaches, preparation standards, leadership skills, and current issues and trends in special education, leading to a professional development plan. Information technology, professional ethics, and reflective change processes.

SPED 7720. Practice, Research, and Leadership II.

(3.0 cr.; A-F or Audit; prereq SpEd 7710 or instructor approval; summer, offered periodically)

Synthesis of research methods, special education research in selected areas, and change processes for groups in order to increase one's leadership capacity. Technology-based sources of educational research, leadership models, and strategic planning processes.

SPED 7730. Practice, Research, and Leadership III.

(3.0 cr.; A-F or Audit; prereq SpEd 7720 or instructor consent; summer, offered periodically)

Application of research and leadership skills to improve one's practice in special education. Educational organizations and approaches to organizational change. Socialization into leadership roles in special education profession through presentations, publications, and participation in national discussions.

SPED 7800. Special Education Law.

(3.0 cr.; A-F or Audit; prereq Acceptance into master's of special education program; fall, spring, summer, offered periodically)

Examination of special education statutory law and case law, principles of Individuals with Disabilities Act, Americans with Disabilities Act, and Section 504 of the Rehabilitation Act of 1973.

SPED 7912. Special Education Administration and Supervision.

(3.0 cr.; A-F or Audit; prereq Acceptance into master's of special education program; summer, offered periodically)

Analyze administrative theory that is applicable to special education, curricula development, fiscal issues, interagency agreements, role of human resources management and improvement of teaching with emphasis on effective procedures.

Statistics (STAT)

Swenson College of Science and Engineering

STAT 1411. Introduction to Statistics.

(LOGIC & QR; LE CAT2; 3.0 cr.; A-F or Audit; prereq Math ACT 21 or higher or a grade of at least C- in SSP 0103 or department approval; fall, spring, every year)

Statistical ideas involved in gathering, describing, and analyzing observational and experimental data. Experimental design, descriptive statistics, correlation and regression, probabilistic models, sampling, and statistical inference.

STAT 2411. Statistical Methods.

(LOGIC & QR; LE CAT2; 3.0 cr.; A-F or Audit; prereq Math ACT 24 or higher or a grade of at least C- in Math 1005 or higher or department approval; fall, spring, every year)

Graphical and numerical descriptions of data, elementary probability, sampling distributions, estimations, confidence intervals, one-sample and two-sample t-test.

STAT 3411. Engineering Statistics.

(3.0 cr.; A-F or Audit; prereq MATH 1297 with a grade of C- or better, cannot be applied to a math or statistics major; fall, spring, every year)

Statistical considerations in data collection and experimentation. Descriptive statistics, least squares, elementary probability distributions, confidence intervals, significance tests, and analysis of variance as applied analysis of engineering data.

STAT 3611. Introduction to Probability and Statistics.

(4.0 cr.; A-F or Audit; prereq A grade of at least C- in Math 1290 or Math 1296; fall, spring, summer, every year)

Basic probability, including combinatorial methods, random variables, mathematical expectation. Binomial, normal, and other standard distributions. Moment-generating functions. Basic statistics, including descriptive statistics and sampling distributions. Estimation and statistical hypothesis testing.

STAT 3612. Introduction to Probability and Statistics II.

(3.0 cr.; A-F or Audit; prereq 3611 and Math 1297 or equivalent; fall, spring, every year)

An introduction to statistics. Sample distributions, point and interval estimation, hypothesis testing, linear regression, one- and two-way analysis of variance, goodness-of-fit and non-parametric statistics.

STAT 4050. Introduction to Statistical Computing.

(3.0 cr.; A-F or Audit; prereq A grade of at least C- in STAT 3411 or 3611 or instructor consent.; fall, every year)

Statistical, graphical and numerical data analysis using modern statistical software. Database management and statistical modeling including regression and categorical data analysis. Topics in data generation and simulation.

STAT 4060. Introduction to Biostatistics.

(3.0 cr.; A-F or Audit; prereq Math 1290 or 1296 or 1596 and STAT 2411 or 3411 or 3611 with grade of C- or better or consent of instructor.; spring, every year)

Introduction to statistical methods applicable to biological and biomedical data. Analysis of bioassay, case-control, and disease/expose data. Introduction to statistics in clinical trials. Use of regression and logistic regression in analyzing biological/biomedical data. Categorical data analysis with application to the life sciences. Basic survival analysis.

STAT 4101. Actuarial Probability.

(1.0 cr.; S-N or Audit; prereq 3611, Math 3298 a grade of C- or better is required in all prerequisite courses; credit cannot be applied to math major or minor; no grad credit; fall, every year) Problem-solving techniques in probability used in the mathematical foundations of actuarial science.

STAT 4995. Special Topics (Various Titles to be Assigned).

(3.0-4.0 cr. ; A-F or Audit; spring, offered periodically) Topics in Statistics

STAT 5411. Analysis of Variance.

(3.0 cr.; prereq 2411 or 3411 or 3611; a grade of C- or better is required in all prerequisite courses; fall, every year)

Analysis of variance techniques as applied to scientific experiments and studies. Randomized block designs, factorial designs, nesting. Checking model assumptions. Using statistical computer software.

STAT 5511. Regression Analysis.

(3.0 cr.; A-F or Audit; prereq 3611, Math 3280 or Math 4326, a grade of C- or better in is required in all prerequisite courses; spring, every year)

Simple, polynomial, and multiple regression. Matrix formulation of estimation, testing, and prediction in linear regression model. Analysis of residuals, model selection, transformations, and use of computer software.

STAT 5515. Multivariate Statistics.

(3.0 cr.; prereq 5411 or 5511, Math 3280 or Math 4326, a grade of C- or better in is required in all prerequisite courses; fall, odd years)

Multivariate normal distribution, MANOVA, canonical correlation, discriminate analysis, principal components. Use of computer software.

STAT 5521. Applied Time Series Analysis.

(3.0 cr.; A-F or Audit; prereq Math 3280, Stat 3612 or 5511 or instructor consent; spring, every year)

Characteristics of time series; time series regression and exploratory data analysis; introduction of ARIMA models, including model building, estimation and forecasting; spectral analysis and filtering. Use of statistical software R.

STAT 5531. Probability Models.

(4.0 cr.; A-F or Audit; prereq 3611, Math 1297 or Math 1597, a grade of C- or better in is required in all prerequisite courses; spring, every year)

Development of probability models and their applications to science and engineering. Classical models such as binomial, Poisson, and exponential distributions. Random variables, joint distributions, expectation, covariance, independence, conditional probability. Markov processes and their applications. Selected topics in stochastic processes.

STAT 5571. Probability. (4.0 cr.; A-F or Audit; prereq 3611, Math 3298, a grade of C- or better in is required in all prerequisite courses; fall, every year)

Axioms of probability. Discrete and continuous random variables and their probability distributions. Joint and conditional distributions. Mathematical expectation, moments, correlation, and conditional expectation. Normal and related distributions. Limit theorems.

STAT 5572. Statistical Inference. (4.0 cr.; A-F or Audit; prereq 5571 with a grade of C- or better; spring, every year)

Mathematical statistics; Bayes' and maximum-likelihood estimators, unbiased estimators; confidence intervals; hypothesis testing, including likelihood ratio tests, most powerful tests, and goodness-of-fit tests.

STAT 8444. FTE: Doctoral. (1.0 cr.; No Grade Associated; prereq Doctoral student, adviser and DGS consent; fall, spring, summer, every year)

(No description)

STAT 8611. Linear Models. (3.0 cr.; A-F or Audit; prereq 5572 with a grade of C- or better; fall, even years)

Developing statistical theory of general linear model. Distribution theory, testing, and estimation. Analysis of variance and regression. (offered alt yrs)

STAT 8711. Statistics Seminar. (3.0 cr.; S-N or Audit; prereq 5572 with a grade of C- or better; spring, every year)

Applications of probabilistic and statistical modeling methods, such as linear and nonlinear regression, generalized linear models, Markov chains, and Poisson processes. Case-study analyses of models from areas such as natural sciences, medicine, engineering, and industry.

STAT 8888. Thesis Credits: Doctoral.

(1.0-24.0 cr. [max 100.0 cr.]; No Grade Associated; prereq max 18 cr per semester or summer; 24 cr required; fall, spring, summer, every year)

(No description)

Supportive Services Program (SSP)

Academic Affairs

SSP 103. Basic Mathematics and Introductory Algebra.

(0.0 cr.; S-N or Audit; prereq [3 cr equiv]; Credit will not be received if credit granted for Math 1004; cannot apply cr toward a degree. (the preparatory course fee is equal to 3 credits of resident tuition); fall, every year)

Computational math skills and applications, including arithmetic, introductory geometry, and introductory algebra.

SSP 1052. College Writing Strategies. (2.0 cr.; S-N or Audit; =[MED 1004]; prereq credit will not be granted if already received for WRIT 1120; fall, spring, every year)

Individualized approach to learning skills necessary for argumentative writing process,

including development of individual writing process, organization of argumentative paragraph and essay, and beginning research/library skills.

SSP 1054. Learning Strategies. (1.0 cr.; S-N or Audit; =[MED 1003]; fall, spring, every year) Focuses on the skills necessary to study more efficiently for college. Topics include: time management, test taking strategies, note taking, concentration, and library orientation.

SSP 1101. Personal Development. (2.0 cr.; A-F or Audit; fall, spring, every year)

Introduction to some of the components of the human personality and the relationship of the individual to the environment. Focuses on such topics as human relations, values, interpersonal skills and competencies, decision making, and conflict resolution.

SSP 1802. English as a Second Language:

Writing. (2.0 cr.; S-N or Audit; fall, spring, summer, offered periodically) Preparation for Comp 1120 for ESL students.

SSP 3001. Preparation for SSP Teaching

Assistantship. (1.0-3.0 cr. [max 6.0 cr.]; prereq instructor consent; spring, every year) Skills needed to develop and conduct effective small group learning experiences. Communication processes, leadership styles and responsibilities, goal setting, social influences, developmental stages of groups, learning theories, and content as related to appropriate SSP skills course.

SSP 3002. SSP Teaching Assistantship

Practicum. (1.0-3.0 cr. [max 6.0 cr.]; A-F or Audit; prereq instructor consent; fall, spring, every year) Leading structured small groups in designated SSP courses. TA responsibilities outlined in contract with faculty supervisor.

SSP 3003. Tutor Training: Individualization

of Instruction. (2.0 cr.; A-F only; prereq instructor consent; fall, spring, every year) Introduction to contemporary learning theory and its application to one-on-one and small group learning situations (tutorials). Emphasis on philosophy, procedures, and practices known to be effective in improving learning.

SSP 3004. Tutor Practicum. (1.0-2.0 cr. [max

3.0 cr.]; A-F only; prereq 3003 or instructor consent; fall, spring, every year) Supervised practicum for students leading one-on-one and small group tutorials. Tutor responsibilities outlined in contract with instructor.

Theatre (TH)

School of Fine Arts

TH 901. B.F.A. Qualifying Presentation. (0.0 cr.; S-N or Audit; prereq Department approval; fall, every year)

Presentation of performance audition or technical portfolio for admission to full B.F.A. candidacy.

TH 1001. Introduction to Theatre Arts. (FINE ARTS; LE CAT9; 3.0 cr.; A-F or Audit; fall, spring, every year)

Appreciation of theatre arts. Developing sensitivity and critical sophistication as articulate, discriminating theatregoers. Play viewing, play reading, critiques, and term projects.

TH 1031. Introduction to Theatrical Design.

(3.0 cr.; A-F or Audit; fall, spring, every year) Course will introduce students to the fundamental elements and principles of design and how they apply to the theatre experience of scenery, costumes, lighting and sound.

TH 1051. Introduction to Film. (FINE ARTS; LE CAT9; 3.0 cr.; A-F or Audit; fall, summer, every year)

History and genres of film; how movies are made. Watching and analyzing films and developing an articulate and discerning viewpoint. (2 hrs lect, 2.5 hrs lab)

TH 1053. Film and Society. (LE CAT9; 3.0 cr.; A-F or Audit; fall, every year)

An examination of how films influence the moral and cultural life of our time, and how culture affects film.

TH 1071. Musical Theatre History.

(HUMANITIES; LE CAT9; 3.0 cr.; A-F or Audit; spring, every year)

Musical theatre genre focusing on integration of theatre, music, and dance. Major librettists, composers, directors, choreographers, and performers.

TH 1111. Introduction to Acting. (FINE ARTS; LE CAT10; 3.0 cr.; A-F or Audit; fall, spring, every year)

Developing the ability to respond to imaginative situations with sincerity, individuality, and effectiveness; projects in elementary acting techniques.

TH 1112. Acting I. (3.0 cr.; A-F or Audit; prereq 1001 or 1801 or BFA Th major or instructor consent; spring, every year)

Introduction to fundamental skills of acting: objectives, actions, given circumstances, activities. Focus on freeing natural impulses through imagination and improvisation. For BFA theatre majors.

TH 1114. Music Theory for Musical Theatre

Performers. (2.0 cr.; A-F or Audit; prereq instructor consent; credit will not be granted if already received for Mu 1010 or 1011 or Mu 1111 or Mu 1112; fall, every year)

This course presents the technical musical tools needed by the Musical Theatre performer to prepare the musical elements of his/her audition and/or role. It is designed to teach the performer how to read music and music terminology, musical theatre song form analysis, how to play a melody line on the piano, how to respond and communicate with a musical director and/or conductor, and how to transpose a song into another key other than its original. The courses ultimate goal is to produce a musically literate actor, and one who can self-sufficiently learn and prepare any song or harmony part, be it for an audition or a performance.

TH 1116. Audition Techniques. (3.0 cr.; A-F or Audit; prereq instructor consent; spring, every year)

Theory, technique, and application of audition skills for the actor.

TH 1118. Voice and Movement for the Actor. (3.0 cr.; A-F or Audit; prereq instructor consent; fall, every year)

Introduction to voice and movement techniques designed to liberate, develop, and strengthen actor's body and voice.

TH 1199. Performance Practicum I. (LE CAT10; 1.0 cr. [max 12.0 cr.]; A-F or Audit; prereq instructor consent; by audition only; fall, spring, every year)

Rehearsal and performance of minor role, as determined by instructor, in a play or dance performance before a public audience in UMD Theatre productions.

TH 1299. Theatre Marketing/Management Practicum. (2.0 cr. [max 6.0 cr.]; A-F or Audit; prereq Th major or minor; fall, spring, every year)

Practical experience working in theatre box office, management, marketing, and advertising promotion for UMD theatre productions. (90 hrs work)

TH 1301. Stagecraft. (5.0 cr.; A-F or Audit; prereq 1001 or 1801 or instructor consent; fall, spring, every year)

Introduction to methods of planning, constructing, painting, rigging, and shifting stage scenery. Lab work required constructing and painting scenery and properties for theatrical productions.

TH 1351. Stage Rendering Techniques.

(3.0 cr.; A-F or Audit; prereq 1001 or 1801 or instructor consent; fall, every year)

Practical course in study of different rendering mediums, styles, and techniques for the theatrical designer.

TH 1399. Scenery and Properties Practicum.

(2.0 cr. [max 6.0 cr.]; A-F or Audit; prereq Th major or minor; fall, spring, every year)

Practical experience constructing and painting scenery and properties for theatrical productions. (90 hrs work)

TH 1401. Costume Construction I. (5.0 cr.; A-F or Audit; prereq 1001 or 1801 or instructor consent; fall, spring, every year)

Introduction to study and practice of methods and materials used in building costumes for theatrical productions. Lab work required.

TH 1451. Stage Makeup. (3.0 cr.; A-F or Audit; prereq 1001 or 1801 or instructor consent; fall, every year)

Introduction to principles and materials of stage makeup and their application in developing a character makeup for theatrical productions.

TH 1499. Costume Practicum. (2.0 cr. [max 6.0 cr.]; A-F or Audit; prereq Th major or minor; fall, spring, every year)

Practical experience working on costume construction and costume crafts for theatrical productions. (90 hrs work)

TH 1501. Stage Lighting I. (4.0 cr.; A-F or Audit; prereq 1001 or 1801 or instructor consent; fall, spring, every year)

Principles and practice of stage lighting.

TH 1551. Sound Design. (3.0 cr.; A-F or Audit; prereq 1001 or 1801 or instructor consent; spring, odd years)

Principles and practice of choosing, editing, and running sound cues for theatrical productions.

TH 1599. Lighting/Sound Practicum. (1.0 cr. [max 3.0 cr.]; A-F or Audit; prereq Th major or minor; fall, spring, every year)

Practical experience working on lighting and sound for theatrical productions. (45 hrs work)

TH 1601. Stage Management. (3.0 cr.; A-F or Audit; spring, even years)

Theory and practice of stage management techniques applicable to a variety of theatre forms and situations.

TH 1699. Running Crew Practicum. (2.0 cr. [max 6.0 cr.]; A-F or Audit; prereq instructor consent; fall, spring, every year)

Practical experience working backstage during the run of theatrical productions. (90 hrs work)

TH 1801. Elements of Theatre. (3.0 cr.; A-F or Audit; prereq th major; fall, every year)

Intensive study in rudimentary theatre vocabulary, research methods, principles of play production, preproduction script analyses, performance criticism, and postproduction assessment. Play viewing, play reading, critiques, and term projects.

TH 2112. Acting II: American Realism. (3.0 cr.; A-F or Audit; prereq instructor consent; fall, every year)

Continuation of 1112 with a concentration on American realism, characterization, and living truthfully in the moment.

TH 2113. Acting III: Classical Styles. (3.0 cr.; A-F or Audit; prereq 2112 or instructor consent; spring, every year)

Acting styles from various classical periods, emphasizes Shakespeare and verse.

TH 2114. Acting: Musical Theatre. (3.0 cr.; A-F or Audit; prereq instructor consent; spring, every year)

Application of theories and techniques of musical theatre performance.

TH 2118. Speech for the Actor. (3.0 cr.; A-F or Audit; prereq instructor consent; fall, every year)

Ear training and articulation (in anticipation of dialects); acquisition of nonregional dialect for the stage through use of phonetics and classical texts.

TH 2119. Stage Dialects. (3.0 cr.; A-F or Audit; prereq instructor consent; spring, odd years)

Facilitates actor's acquisition and performance of stage dialects.

TH 2399. Production Practicum II. (1.0 cr. [max 2.0 cr.]; A-F or Audit; prereq 1301 or 1401, instructor consent; fall, spring, every year)

Practical experience working in technical areas of theatrical production, providing management and leadership in all areas of theatre production.

TH 2400. Survey of the History of Costume. (3.0 cr.; A-F or Audit; spring, even years)

Course will explore the history of costume from ancient civilization through the 19th century.

TH 2801. Play Analysis: Dramatic Theory and Theatre Research. (3.0 cr.; A-F or Audit; prereq 1001 or 1801; fall, every year)

Exploring how to analyze a play from the perspective of those preparing for the production process. Beginning with play structure and theory, the course will examine plays from various periods and styles, using different perspectives to frame the analysis. Student will write analysis papers, learn to do research on various topics from several creative perspectives, and engage in classroom discussions.

TH 2851. Film History. (3.0 cr.; A-F only; prereq soph or instructor consent; spring, every year)

Survey of American and international cinema from 1870s to present day, with special focus on filmmakers, genres, and styles.

TH 3099. Theatre Practicum II. (2.0 cr. [max 12.0 cr.]; A-F or Audit; fall, spring, every year)

Experience in backstage areas and front-of-house operations or rehearsal and performance of a minor role in UMD theatrical or dance productions. Credit can be received for work in one of the following areas: performance, box office/marketing, costumes, scenery, properties, lighting/sound, makeup and stage management before/during performance runs for UMD Theatre productions (90 hours per semester).

TH 3111. Introduction to Scene Study.

(3.0 cr.; A-F or Audit; prereq 1111 or 1112 or instructor consent; not open to BFA th majors; spring, every year)

Continuation of 1111. Development of acting skills beyond the fundamental level for non-BFA theatre majors. Project work emphasis on characterization and contemporary scene study.

TH 3112. Improvisation for the Theatre. (3.0 cr.; A-F or Audit; prereq instructor consent; fall, every year)

Freeing the actor's natural impulses through in-depth, hands-on exploration of improvisational theatre. Emphasis placed on actor's learning to create without fear.

TH 3151. Stage Combat/Circus. (3.0 cr.; A-F or Audit; prereq 0901 or instructor consent; fall, every year)

Intensive study of techniques and principles of stage combat focusing on armed (rapier/dagger/broadsword) and unarmed combat. Physical development through various circus skills: juggling, tumbling, and balancing.

TH 3171. Acting IV: Character/Masks. (3.0 cr.; A-F or Audit; prereq 60 cr, BFA Th major, instructor consent; spring, every year)

Using the body to express and develop character through mask work, improvisation, and selected scene work.

TH 3199. Performance Practicum II. (2.0 cr. [max 12.0 cr.]; A-F or Audit; prereq instructor

consent; by audition only; fall, spring, every year)

Rehearsal and performance of major role, as determined by instructor, in a play or dance before a public audience of UMD Theatre productions.

TH 3201. Stage Direction. (3.0 cr.; A-F or Audit; prereq 1112, 60 cr, Th major or minor or instructor consent; fall, every year)
Comprehensive, portfolio approach focusing on interpretive role of director in contemporary theatre. Major tasks facing director as collaborator; lecture, written assignments, workshops, and projects.

TH 3301. Stagecraft II. (3.0 cr. [max 9.0 cr.]; A-F or Audit; prereq 1301; spring, every year)
This course will explore construction techniques such as metal working and finish carpentry. These skills are needed for anyone interested in pursuing a job in the field of scenery and/or properties construction.

TH 3331. Scenic Design I. (3.0 cr.; A-F or Audit; prereq 1301 or instructor consent; spring, every year)
Elements of design used in creation of scenery for theatre.

TH 3351. Theatrical Drafting. (3.0 cr.; A-F or Audit; prereq 1301; spring, odd years)
Principles and practice in techniques of drafting traditional and nontraditional types of stage scenery.

TH 3352. Stage Rendering Techniques II. (3.0 cr.; A-F or Audit; prereq 1351; fall, every year)
Practical course in study of different rendering mediums, styles, and techniques for the theatrical designer. Continuation of TH 1351.

TH 3355. Computer-Aided Theatrical Design. (3.0 cr.; A-F or Audit; prereq 1301 or instructor consent; spring, even years)
Computer-aided drafting and design with technical applications to scenic design, lighting design, and technical direction.

TH 3371. Scene Painting. (3.0 cr.; A-F or Audit; prereq 1301; fall, even years)
Advanced work in use of both traditional and modern methods of painting stage scenery emphasizing practical lab work. (2 hrs lect, 2 hrs lab)

TH 3375. Mechanical Design for Stage. (3.0 cr.; A-F or Audit; prereq 1301 or instructor consent; spring, odd years)
The course looks at how mechanical design principles are applied to common stage effects. Topics covered will include theatrical rigging, understanding forces and loads, material selection, fluid power mechanics, winches and motors.

TH 3399. Production Practicum II. (1.0 cr. [max 2.0 cr.]; A-F or Audit; prereq 1301 or 1401, 2399 and instructor consent; fall, spring, every year)
Practical experience working in technical areas of theatrical production, providing management and leadership in all areas of theatre production.

TH 3401. Costume Construction II. (3.0 cr.; A-F or Audit; prereq 1401 or instructor consent; spring, even years)
Advanced principles and practices of costume construction techniques emphasizing pattern drafting and draping and a study of advanced craft techniques.

TH 3441. Costume Design I. (3.0 cr.; A-F or Audit; prereq 1401, 1001 or 1801 or instructor consent; spring, every year)
Principles and practice of costume design with emphasis on designing and rendering costumes from various historical periods.

TH 3501. Advanced Digital Technology for the Theatre. (3.0 cr.; A-F or Audit; prereq 1501 or instructor consent; spring, even years)
Advanced techniques of computer technology for theatre production including operation and functionality of digitally controlled equipment for lighting, sound and stage equipment.

TH 3551. Introduction to Documentary Filmmaking. (3.0 cr. [max 6.0 cr.]; A-F or Audit; summer, every year)
The study of the principles of documentary filmmaking with hand-on experience in producing and publishing a documentary film.

TH 3552. Film Festival Production. (3.0 cr. [max 6.0 cr.]; A-F or Audit; summer, every year)
The study of and practice in the production of an international film festival including programming, corporate sponsorship, staff and board roles, marketing and media trends.

TH 3699. Production Management. (2.0 cr. [max 12.0 cr.]; A-F or Audit; prereq instructor consent; fall, spring, every year)
Participation in management and leadership in all areas of theatre production. (90 hrs work)

TH 3802. Script Analysis for Designers. (3.0 cr.; A-F or Audit; prereq 1001 or 1801; spring, even years)
Design students study the nature of the relationship between play scripts and theatrical designs through script and text analysis, literary criticism and research. Exploration of how dialogue and themes can be visualized through design.

TH 3851. Screenwriting. (3.0 cr.; A-F or Audit; prereq instructor consent; spring, every year)
Introduction to and practice in fundamentals of screenwriting. Dialogue, character, structure, story development, writing for a visual medium, formatting.

TH 3871. Playwriting. (FINE ARTS; LE CAT9; 3.0 cr.; A-F or Audit; spring, odd years)
Instruction and practice in fundamentals of playwriting, including dialogue, character, and scenario development; traditional and experimental formal structures; emphasizes theatre format with peripheral screenplay information.

TH 3881. New Play Development Workshop. (3.0 cr. [max 6.0 cr.]; A-F or Audit; prereq 1001 or 1801 or instructor consent; spring, even years)

Intensive work in development of new scripts from initial reading to minimally staged performance.

TH 3991. Independent Study in Theatre. (1.0-3.0 cr. [max 6.0 cr.]; A-F or Audit; prereq instructor consent; undergrads max 6 cr in 3991 and 5991 combined; fall, spring, every year)
Directed readings and projects arranged between student and faculty mentor.

TH 3995. Special Topics: (Various Titles to be Assigned). (1.0-3.0 cr. [max 9.0 cr.]; A-F or Audit; prereq Instructor consent; fall, spring, summer, offered periodically)
Intensive study of special topics falling outside usual theatre or dance courses. Topic announced before course offered.

TH 4151. Acting V: Senior Studio. (3.0 cr.; A-F or Audit; prereq instructor consent; no grad credit; fall, every year)
Capstone course utilizes scene study to access actor's skills, proficiencies, and artistic growth. Variety of styles make up final presentation of scenes and monologues rehearsed throughout semester.

TH 4171. Acting VI: Acting for the Camera. (3.0 cr.; A-F or Audit; prereq 4151 or instructor consent; no grad credit; spring, every year)
Contemporary acting adjustments necessary for film, television, and commercials.

TH 4331. Scenic Design II. (3.0 cr.; A-F or Audit; prereq 3331; fall, odd years)
Advanced study in creating scenic designs for a variety of theatrical forms, including musical comedy, opera, dance, and legitimate theatre.

TH 4351. Portfolio Preparation and Presentation. (3.0 cr.; A-F or Audit; prereq instructor consent; no grad credit; fall, every year)
Capstone course utilizes presentation of student's work in technical theatre/design to assess design/technical skills. Analysis of portfolio, job applications, resume development, and portfolio development techniques.

TH 4371. Scene Painting II. (3.0 cr.; A-F or Audit; prereq 3371; no grad credit; fall, even years)
This course will explore advanced techniques in theatrical painting, dimensional texture and surface treatment.

TH 4399. Theatre: Special Projects. (1.0-2.0 cr. [max 12.0 cr.]; A-F or Audit; prereq instructor consent; fall, spring, every year)
Projects in directing, choreography of individual or groups, or designing of costumes, lighting, scenery, or sound.

TH 4441. Costume Design II. (3.0 cr.; A-F or Audit; prereq 3441 or instructor consent; spring, odd years)
Advanced principles and practice of costume design with emphasis on designing and rendering costumes from various historical periods.

TH 4501. Stage Lighting II. (3.0 cr.; A-F or Audit; prereq 1501 or instructor consent; no grad credit; spring, odd years)

Advanced theories and techniques used in designing lights for traditional and nontraditional theatre works.

TH 4801. History of the Theatre I.

(HUMANITIES; 3.0 cr.; A-F or Audit; prereq instructor consent; fall, every year)
Survey of style, theory, performance, and production techniques of world theatre from theoretical origins through early 19th century.

TH 4802. History of the Theatre II. (3.0 cr.; A-F or Audit; prereq 4801 or instructor consent; spring, every year)

Survey of style, theory, performance, and production techniques of world theatre from 19th century to present.

TH 4851. Dramatic and Performance Theory. (3.0 cr.; A-F or Audit; prereq 3801 or instructor consent; spring, every year)

Survey and analysis of dramatic and performance theory texts, playwrights, and criticism.

TH 4901. Intern Teaching in Theatre. (3.0 cr. [max 9.0 cr.]; A-F or Audit; prereq instructor consent, no grad credit; fall, spring, every year)

Practical experience teaching beginning courses in department. Students serve as intern teachers, assisting instructor in administration of course.

TH 5991. Independent Study in Theatre.

(1.0-3.0 cr. [max 6.0 cr.]; A-F or Audit; prereq Sr, department approval; undergrads max 6 cr in 3991 and 5991 combined; fall, spring, summer, every year)
Directed, advanced readings and projects arranged between student and faculty mentor.

TH 5997. Internship in Professional Theatre.

(1.0-12.0 cr. ; S-N or Audit; prereq department approval; 1 cr for each 45 hrs work; fall, spring, summer, every year)
Internship with a cooperating professional, commercial, or repertory theatre.

Toxicology (TXCL)

Medical School - Duluth Campus

TXCL 5000. Directed Research in Toxicology.

(1.0-4.0 cr. [max 16.0 cr.]; S-N or Audit; prereq instructor consent; fall, spring, every year)
Special project that addresses specific issue in toxicology. Under guidance of faculty member.

TXCL 5012. Principles of Toxicology. (3.0 cr.; A-F or Audit; prereq Required: minimum one semester each of biochemistry, calculus and cell biology. Recommended: minimum one semester of human or animal physiology.; spring, even years)

Course will provide an introductory overview of the science of toxicology, including biomedical principles and regulatory practices governing the protection of human health and environmental quality.

TXCL 5013. Chemical Toxicology. (3.0 cr.; A-F or Audit; prereq 5012, instructor consent; credit will not be granted if already received for 8013; fall, even years)

Course will discuss the signs and symptoms and the mechanism of toxicity of different classes of chemicals spanning several organ systems, including chemical carcinogenesis.

TXCL 5101. Molecular and Cellular Basis of Nanoparticle Toxicity. (3.0 cr.; A-F or Audit; prereq Introductory Toxicology course; fall, every year)

Course will provide an introductory overview of the science of nantotoxicology through the discussion of nanotechnology in scientific research and assessment of the impact on biological systems.

TXCL 5545. Introduction to Regulatory Medicine. (2.0 cr.; A-F or Audit; prereq Grad student or instructor consent; spring, offered periodically)

Explanation of products requiring a pre-market approval and those that may be marketed without approval. Post-market surveillance. Adverse reactions, removal of product from market.

TXCL 8012. Advanced Toxicology I. (3.0 cr.; A-F or Audit; prereq 5011, Chem 4341 or instructor consent; spring, every year)

Absorption, distribution, metabolism, and excretion of xenobiotics; toxicokinetics; mechanisms of toxicity or specific classes of chemical agents.

TXCL 8013. Advanced Toxicology II. (3.0 cr.;

A-F or Audit; prereq 8012, Chem 4342, Phsl 5601 or instructor consent; fall, every year)
Kinetic and dynamic determinants of target organ toxicity; pathological alterations in structure/function relationships for major target organ systems; mechanisms of mutagenesis, carcinogenesis, and teratogenesis.

TXCL 8100. Investigative Toxicology. (1.0 cr. [max 2.0 cr.]; A-F or Audit; prereq 8013 or instructor consent; fall, spring, every year)

Evaluating toxicology research issues and literature.

TXCL 8333. FTE: Master's. (1.0 cr.; No Grade

Associated; prereq Master's student, adviser and DGS consent; fall, spring, summer, every year)
(No description)

TXCL 8444. FTE: Doctoral. (1.0 cr.; No Grade

Associated; prereq Doctoral student, adviser and DGS consent; fall, spring, summer, every year)
(No description)

TXCL 8666. Doctoral Pre-Thesis Credits.

(1.0-6.0 cr. [max 12.0 cr.]; No Grade Associated; prereq Max 6 cr per semester or summer; doctoral student who has not passed prelim oral; no required consent for the first two registrations up to 12 cr; departmental consent for the third and fourth registrations up to an additional 12 cr, or 24 cr total (for doctoral students admitted summer 2007 and beyond; doctoral students admitted prior to summer 2007 may register up to 4 times totaling 60 cr); fall, spring, summer, every year)

(No description)

TXCL 8777. Thesis Credits: Master's.

(1.0-18.0 cr. [max 50.0 cr.]; No Grade

Associated; prereq Max 18 cr per semester or summer; 10 cr total required (Plan A only); fall, spring, summer, every year)
(No description)

TXCL 8888. Thesis Credits: Doctoral.

(1.0-24.0 cr. [max 100.0 cr.]; No Grade Associated; prereq Max 18 cr per semester or summer; 24 cr required; fall, spring, summer, every year)
(No description)

University Studies (UST)

Academic Affairs

UST 999. Undergraduate Active Status. (0.0 cr.; No Grade Associated; prereq Department consent; fall, spring, summer, every year)

A zero-credit registration mechanism for undergraduate students to gain access to UMD classes and resources. Registration requirements established by departments and agencies within or outside the University (which include, but are not restricted to, registration required to hold an assistantship, defer loans, or maintain athletic eligibility or legal visa status) are NOT met by UST 0999

UST 1000. UMD Seminar. (1.0-2.0 cr. ; A-F or Audit; fall, spring, every year)

Facilitates the successful transition into college learning and student life at UMD.

Urban and Regional Studies (URS)

College of Liberal Arts

URS 1001. Introduction to Urban and Regional Studies. (LE CAT8; 3.0 cr.; A-F only; spring, every year)

Interdisciplinary introduction to urban and regional issues. Political, historical, socioeconomic, and spatial processes in the United States. Intended for urban and regional studies sophomores and others considering it as a major.

URS 3097. Internship in Urban and Regional Studies.

(1.0-6.0 cr. [max 8.0 cr.]; S-N only; prereq URS major, jr or sr, instructor consent; fall, spring, summer, every year)
Scheduled assignments with direct supervision in public agencies or relevant private firms.

URS 3991. Independent Study in Urban and Regional Studies. (1.0-4.0 cr. [max 6.0 cr.];

prereq instructor consent; fall, spring, summer, every year)

For students interested in doing advanced work in urban and regional studies.

Water Resources Science (WRS)

Swenson College of Science and Engineering

WRS 5101. Water Policy. (3.0 cr.; A-F or Audit; =[CE 5201]; prereq Grad student or instructor consent; credit will not be granted if already received for CE 5201; fall, every year)
Socio-cultural, legal, and economic factors that affect water resources management. Historical trends in water policy, resulting water laws in the United States. Federal state and local institutional structures for water management.

WRS 8050. Special Topics: (Various Titles to be Assigned). (1.0-3.0 cr. [max 6.0 cr.]; A-F or Audit; prereq instructor consent; fall, spring, summer, offered periodically)
Selected topics in water resources science.

WRS 8060. Directed Studies in Water Resources Science. (1.0-3.0 cr. [max 6.0 cr.]; A-F or Audit; prereq instructor consent; fall, spring, summer, offered periodically)
Directed studies in water resources science.

WRS 8095. Plan B Project. (3.0 cr.; S-N or Audit; prereq instructor consent; fall, spring, every year)
Satisfies Plan B project requirement. May appear on master's program, but does not count toward credit minimum in major. Project topic arranged between student and adviser. Written report required.

WRS 8100. Interdisciplinary Seminar in Water Resources. (0.5-3.0 cr. ; S-N only; prereq Graduate student; fall, every year)
Interdisciplinary seminar in water resources science.

WRS 8333. FTE: Master's. (1.0 cr.; No Grade Associated; prereq Master's student, adviser and DGS consent; fall, spring, summer, every year)
(No description)

WRS 8444. FTE: Doctoral. (1.0 cr.; No Grade Associated; prereq Doctoral student, adviser and DGS consent; fall, spring, summer, every year)
(No description)

WRS 8581. Research and Professional Ethics in Water Resources and Environmental Science. (0.5 cr.; S-N only; prereq Graduate student; spring, every year)
Ethics of water resources science and environmental engineering research/practice. Societal responsibility, plagiarism, record-keeping, authorship, confidentiality, conflicts of interest, professional relationships, fraud, reporting misconduct.

WRS 8666. Doctoral Pre-Thesis Credits. (1.0-6.0 cr. [max 12.0 cr.]; No Grade Associated; prereq Max 6 cr per semester or summer; doctoral student who has not passed prelim oral; no required consent for the first two registrations up to 12 cr; departmental consent for the third and fourth registrations up to an additional 12 cr, or 24 cr total (for doctoral students admitted summer 2007 and beyond; doctoral students admitted prior to summer 2007 may register up to 4 times totaling 60 cr); fall, spring, summer, every year)
(No description)

WRS 8777. Thesis Credits: Master's. (1.0-18.0 cr. [max 50.0 cr.]; No Grade Associated; prereq Max 18 cr per semester or summer; 10 cr total required (Plan A only); fall, spring, summer, every year)
(No description)

WRS 8888. Thesis Credits: Doctoral. (1.0-24.0 cr. [max 100.0 cr.]; No Grade Associated; prereq Max 18 cr per semester or summer; 24 cr required; fall, spring, summer, every year)

(No description)

Women's Studies (WS) College of Liberal Arts

WS 1000. Introduction to Women's and Gender Studies. (SOC SCI; LE CAT7; CDIVERSITY; LECD CAT07; 3.0 cr.; A-F or Audit; fall, spring, every year)
Introduction to discipline of Women's Studies - key concept, issues, and debates. Examination of the interaction of gender with class, race, ethnicity, sexual orientation, ability, and geographic location; and the way each of these is socialized. Examination of historical and current national and transnational issues as they relate to women and gender, and of the institutions that shape and impact women and gender roles and relations, including academia. Critical analysis skills.

WS 2101. Women, Race, and Class. (SOC SCI; LE CAT8; CDIVERSITY; LECD CAT08; 3.0 cr.; A-F or Audit; fall, spring, every year)
Racism, sexism, and classism are major factors which have influenced human relations from past to present. This course examines how the social-historical construction of race, class and gender continues to affect the experience of all people in particular people of color. This course seeks to enable students to understand the processes through which these social oppressions are created, normalized, internalized, maintained and perpetuated. A core element to this course is provoking students to recognize their own contribution in perpetuating oppressive systems, and their responsibility creatively to develop individual and collective acts of resistance to all of the "isms" and to societal transformation towards the just society.

WS 3000. Transnational Perspectives on Feminism. (SOC SCI; GLOBAL PER; 3.0 cr.; A-F or Audit; prereq 1000 or 2101 or instructor consent; fall, spring, offered periodically)
Examination of feminist movements worldwide. Focuses on feminist theories and research, and feminist non-governmental organization in a transnational perspective, and specifically on the effects of and resistance to such realities as racism, neo-colonialism, nationalism, imperialism, militarization, globalization, poverty, war, reproductive control, and violence against women in its many manifestations.

WS 3001. Third World Women. (GLOBAL PER; 3.0 cr.; A-F or Audit; fall, spring, every year)
Using comparative historical, political, socioeconomic and feminist perspectives this course critically examines how factors such as colonialism, imperialism, and globalization continue to impact, construct, and reconstruct gender relations in postcolonial cultures with adverse consequences for women in Third World countries. It also examines how condition in Third World countries are shaped by global economic systems, which lead to massive migrations of Third World women into the United States. It critically evaluate the concepts of universal subordination, particularly, a consciousness which categories

women in the Global South as "overall victims," the other, or exotic.

WS 3002. Latin American Women: Culture and Politics. (3.0 cr.; A-F or Audit; prereq 1000 or 2101 or instructor consent; spring, offered periodically)
Examination of contemporary economic and socio-political issues affecting Latin American women.

WS 3100. Feminist Thought. (HUMANITIES; CDIVERSITY; 4.0 cr.; A-F or Audit; prereq 1000 or 2101, 45 cr or instructor consent; fall, every year)
Examination and analysis of central ideas and concepts within diverse feminist theories - liberal, socialist, radical, multicultural, postcolonial, ecofeminist, lesbian, maternalist, and others - historical and contemporary. Theoretical debates surrounding issues of the bases of women's liberation and oppression; the nature and construction of gender, sexuality, and the body; feminist epistemologies; and ethical issues within feminism.

WS 3150. Women-Identified Culture. (CDIVERSITY; 3.0 cr.; A-F or Audit; spring, every year)
Chronological survey introducing a relatively new body of knowledge in women's studies about lesbian cultures. Lesbian studies in literature, history, law, sociology, aesthetics, and philosophy; international perspectives.

WS 3200. Women's Autobiographies. (GLOBAL PER; 3.0 cr.; A-F or Audit; fall, spring, offered periodically)
Women's self-concepts as expressed in autobiographical writings. Meanings women give their lives as women; impact of race and class; choices for artistic, political, intellectual, and/or private lives. Autobiographical techniques and style.

WS 3250. Women, Peace and War. (GLOBAL PER; 3.0 cr.; A-F or Audit; prereq 1000 or 2101 or 3750 or 3775 or instructor consent; fall, spring, offered periodically)
Feminist analysis of war and peace; debates regarding the gendered nature of war and peace; analysis of the interrelationships of patriarchy, masculinity, and militarism. Women's role in warfare as soliders, mothers, wives, munitions makers, etc/. and effects of war on women including disease, displacement, rape, trafficking and prostitution, etc. Feminism, and peace. Feminist peace activism and peacemaking efforts.

WS 3300. Women and Spirituality. (HUMANITIES; CDIVERSITY; 3.0 cr.; A-F or Audit; prereq 1000 or 2101 or 3150 or 3200 or 3400 or 3750 or 3775; instructor consent; fall, odd years)
Issues of spirituality, particularly as they relate to women, but inclusive of all genders. Examination of the impact of gender on spirituality, as well as the nature of women's diverse spiritual experiences, practices, and paths. non-sectarian, though inclusive of multicultural religious traditions, goddess, Jungian, and earth-based perspectives.

The course includes conceptual and textual analyses, as well experiential learning and practices.

WS 3301. Women and Religion. (GLOBAL PER; 3.0 cr.; A-F only; prereq 1000 or 2101 or 3150 or 3200 or 3400 or 3750 or 3775 or instructor consent; fall, offered periodically) Examination of women's roles and experiences within a variety of religions in the world; religious and theological doctrine as it applies to women and the construction of gender roles; examination of various religions as patriarchal institutions that create gender oppression, as well as sources of meaning and liberation in women's lives.

WS 3350. Women and the Law. (CDIVERSITY; 3.0 cr.; A-F or Audit; prereq 1000 or 2101 or instructor consent; fall, spring, offered periodically) Examination of how U.S. laws have and continue to affect women's and men's lives on the basis of gender, with particular attention to its impact on women. Examination of current legal issues, including gender equity in education and employment, marriage and family relationships, violence against women, and reproductive issues. Feminist jurisprudence, evaluation, and analysis of the laws from various feminist perspectives.

WS 3400. Women and Film. (GLOBAL PER; 3.0 cr.; A-F or Audit; fall, spring, summer, offered periodically) American and foreign films screened, analyzed, and reviewed from a feminist perspective. Role of women in history, economics, and politics of filmmaking.

WS 3450. Motherhood and Mothering: Institution and Experience. (3.0 cr.; A-F only; prereq 1000 or 2101 or instructor consent; spring, offered periodically) An examination of the institution, experience, and practices of motherhood and mothering, including the social, legal, medical, cultural, and economic factors shaping motherhood in the U.S. and elsewhere, and feminist analyses of the experience and practice of mothering across cultures.

WS 3595. Special Topics: (Various Titles to be Assigned). (1.0-4.0 cr. [max 9.0 cr.]; A-F or Audit; prereq 1000 or instructor consent; fall, spring, offered periodically) Topics that fall outside current women's studies courses. Topic announced before course offered.

WS 3600. Ecofeminist Theories and Practices. (SUSTAIN; 3.0 cr.; A-F or Audit; prereq 1000 or 2101 or instructor consent; spring, odd years) In-depth study of ecofeminist theories that explore the interlocking oppressions of women, the earth/nature/other animals, and colonized Others. Scientific, economic, religious, philosophical issues examined. Applied ecofeminist analysis of individual, local, regional, national and transnational ethical, social and environmental issues, such as food and farming, animals, toxins, birthing and reproductive technologies, water quality, and privatization, etc.

WS 3700. Women and Love. (3.0 cr.; A-F or Audit; spring, offered periodically) Feminist analysis of the role of love in women's lives, the interrelation of love, sex, freedom, power and gender. Examination of forces that shape love including advertising, mass media, literature, music, poetry, philosophy and cinema. Analysis of love including perspectives of ethnicity, class, age, and disability.

WS 3750. Voices of African Women. (GLOBAL PER; 3.0 cr.; A-F or Audit; spring, offered periodically) This course critically examines African women's daily-lived experiences. It explores the impact of global, historic, economic, and political forces, such as colonialism, neocolonialism, and current globalization impacts on their lives. This course studies the challenges of universalizing Western feminism, as a panacea to Africa women's problems. Using African eyes through African voices in texts, novels films photograph and living history, African women will be studied as knowing subject, social actors, and change agents but not as universal victims. Differences between women on the basis of class, ethnicity, religion, age sexuality, rural/urban residence, levels of education and marital status will be examined. The course will explore the rich diversity of African cultures, peoples, and natural resources. It will answer such important question as Why are African women portrayed as the poorest of the poor, victims of their cultures, traditions and African male sexism?

WS 3775. Women, Globalization and Food. (SUSTAIN; 3.0 cr.; spring, offered periodically) This course offers a critical feminist examination of the impact of globalization and economic restructuring on the tangled roots and route of women's work in the food chain in both the First World and Global South. The course also offers firsthand experiences by visiting origins of food, small and large-scale farms, community gardens, organic food stores and large corporate food chain stores as well as preparing meals from ingredients that students select based on tastes and affordability. Additionally, the course brings globalization to our doorsteps through meals that students prepare and serve by answering the question What is on your plate for dinner, lunch, or breakfast, and from what countries and whose labor? Finally, the course offers in-depth analysis of the processes through which current corporate industrial mega farms lead to hunger and water famine, environmental degradation and poor health, not only the Third World but also in the First World.

WS 3800. Feminist Activism and Community Organizing. (4.0 cr.; A-F or Audit; prereq 1000 or 2101; spring, every year) In-dept exploration of feminist activism from practical, scholarly and historical perspectives. Integration of theory and practice on local, national and international levels. History of feminist movement, and skills, strategies, and resources for effective feminist community organizing. Understand and participate in coalition building, nonviolent

communication, cross-cultural dialogue, public policy process, feminist leadership skills. Field work component.

WS 3891. Independent Study. (1.0-3.0 cr. [max 6.0 cr.]; A-F or Audit; prereq 1000 or 2101, instructor consent; fall, spring, summer, every year) Directed readings, research, and/or projects on topics of interest to the student not covered in regular course offerings. Students contract with an individual faculty member.

WS 3896. International Fieldwork in Women's Studies. (1.0-3.0 cr. [max 6.0 cr.]; A-F or Audit; prereq 1000 or 2101 or instructor consent; fall, spring, summer, offered periodically) Travel abroad with an instructor. Live with local families and learn about local women's lives through field work involving community visits, presentations by grassroots women, community-service work, reading, and follow-up writing and discussion. Repeatable once, in two different geographical areas.

WS 3897. Internship. (1.0-9.0 cr. ; S-N or Audit; prereq 1000, 2101, 3100, 15 cr WS or WS-related courses, WS major or minor, 53 cr, instructor consent; fall, spring, summer, every year) Work in public agency, private organization, or service agency offering practical application of women's studies theories and/or experience not available in classroom. Students must contract with an individual faculty members and with a site supervisor, set goals, fulfill requirements for credit earned, and submit written and oral evaluations of experience. Consult the Women's Studies website and internship Moodle site for information on local agencies and internship requirements and forms.

WS 4000. Seminar. (4.0 cr.; A-F or Audit; prereq 1000, 2101, 3100, 15 cr WS or WS-related courses, WS major or minor, or instructor consent; spring, every year) Senior capstone project, as well as examination and application of feminist inquiry and research methodologies. Seminar topic varies, to be determined by students in seminar and/or instructor.

WS 5595. Special Topics: (Various Titles to Be Assigned). (3.0 cr.; A-F or Audit; prereq 1000, 2101, 3100, 90 cr or grad student or instructor consent; fall, spring, every year) Advanced study. Topic announced before course offered.

WS 5897. Teaching Internship in Women's Studies. (1.0-2.0 cr. [max 4.0 cr.]; S-N or Audit; prereq 1000, 2101, 90cr, WS major, instructor consent; fall, spring, offered periodically) Practical experience assisting in teaching in Department of Women's Studies. Before interning for a course, students must obtain a grade of at least B+ in the course.

WS 5991. Independent Study. (1.0-4.0 cr. ; A-F or Audit; prereq 1000, 3100, 15 cr WS or WS related courses or grad student, instructor consent; fall, spring, summer, every year)

Readings, research, and/or projects on topics of interest to graduate students concerning women and women's issues.

Writing Studies (WRIT)

College of Liberal Arts

WRIT 1017. Freshman Seminar: Honors: The Rhetoric of Popular Culture. (LE CAT8; 3.0 cr.; A-F or Audit; =[WRIT 1007]; prereq Freshman, fewer than 30 cr, honors student; fall, offered periodically)

Students will reflect on the ways they are products of popular culture, in that the ways their thoughts, feelings and actions are in some sense constructed in response to the popular culture that surrounds them.

WRIT 1120. College Writing. (WRITING; LE CAT1; 3.0 cr.; A-F or Audit; prereq Students speaking English as a second language must have TOEFL score of 550; credit will not be granted if already received for COMP 1120; fall, spring, summer, every year) Instruction and practice in writing argumentative prose for academic situations with integrated computer lab. Emphasis on academic research, documentation, and the writing process.

WRIT 1506. Literacy, Technology and Society. (HUMANITIES; LE CAT7; 3.0 cr.; A-F or Audit; prereq Credit will not be granted if already received for Comp 1506.; fall, spring, offered periodically)

Historical survey of cultures without writing systems and cultures with writing systems and then later with printing, telegraph, radio, telephone, television, computers as well as other forms of technology. Survey of attitudes toward technology from Thoreau to Gandhi and beyond.

WRIT 2220. Information Design Skills. (1.0 cr. [max 2.0 cr.]; S-N or Audit; fall, spring, every year)

This course teaches software skills utilized in the Information Design Program. This course may be taken either prior to or concurrently with the advanced level courses. Students may repeat the course as a refresher.

WRIT 2506. Introduction to Writing Studies. (3.0 cr.; A-F or Audit; prereq 1120; fall, spring, offered periodically)

Considers writing itself as both a practice and an object of study. Drawing on composition, journalism, linguistics, literary studies, and rhetoric, the course offers a survey of historical, critical, and theoretical issues in writing studies. Writing assignments ask students to apply a writing studies framework to produce and analyze specific texts.

WRIT 3100. Advanced Writing: Language and Literature. (3.0 cr.; A-F or Audit; prereq 1120 or equivalent, min 60 cr; credit will not be granted if already received for Comp 3100; fall, spring, every year)

Study and practice of reading and writing about literature--poetry, fiction, drama, and creative non-fiction. Seeks to advance critical reading and analytical skills as a means to improving a student's proficiency in the conventions

of academic and professional discourses, including grammar, style, organization, argumentation, and documentation. Addresses career documents, proposals, and grant writing.

WRIT 3110. Advanced Writing: Arts and Letters. (3.0 cr.; A-F or Audit; prereq 1120 or equivalent, min 60 cr; credit will not be granted if already received for Comp 3110; fall, spring, every year)

Study and practice of writing tasks appropriate for the arts and letters. Seeks to advance research and critical thinking skills as well as skills in applying conventions of grammar, style, argumentation, and documentation. In addition, the course addresses professional writing for the arts, including reviews, proposals, grant writing, and career documents.

WRIT 3121. Advanced Writing: Business and Organizations. (3.0 cr.; A-F or Audit; prereq 1120 or equivalent, min 60 cr; credit will not be granted if already received for Comp 3121; fall, spring, every year)

Study and practice of writing tasks in business and organizations, including oral presentations. Exploration of rhetorical situations in professional practice, including research methods, document design, editing, effective collaboration, and ethical issues in the production of professional documents, such as instructions, proposals, short and long reports, and career documents.

WRIT 3130. Advanced Writing: Engineering. (3.0 cr.; A-F or Audit; prereq 1120 or equivalent, min 60 cr; credit will not be granted if already received for Comp 3130; fall, spring, every year)

Study and practice of writing tasks in engineering, including oral presentations. Exploration of rhetorical situations in professional practice, including research methods, document design, editing, effective collaboration, and ethical issues in the production of professional documents, such as instructions, lab reports, proposals, short and long reports, and career documents.

WRIT 3140. Advanced Writing: Human Services. (3.0 cr.; A-F or Audit; prereq 1120 or equivalent, min 60 cr; credit will not be granted if already received for Comp 3140; fall, spring, summer, every year)

Study and practice of writing tasks in education as well as other fields related to the human service professions. Designed to prepare students to master their use of Edited Standard Written English while producing professional documents, including a major research project with an oral presentation. Assignments focus on audience, purpose, and the process of writing as they relate to the workplace.

WRIT 3150. Advanced Writing: Science. (3.0 cr.; A-F or Audit; prereq 1120 or equivalent, min 60 cr; credit will not be granted if already received for COMP 3150; fall, spring, summer, every year)

Study and practice of writing tasks in science, including oral presentations. Exploration of rhetorical situations in professional practice,

including research methods, document design, editing, effective collaboration, and ethical issues in the production of professional documents, such as instructions, lab reports, proposals, short and long reports, and career documents.

WRIT 3160. Advanced Writing: Social Sciences. (3.0 cr.; A-F or Audit; prereq 1120 or equivalent, min 60 cr; credit will not be granted if already received for COMP 3160; fall, spring, summer, every year)

Study and practice of writing for those whose professional interests are in sociology, anthropology, geography, criminology, psychology, women's studies, history, political science, and similar fields. Assignments center on producing documents encountered in the workplace, such as career documents, proposals, research projects, oral presentations, observational studies, and position papers.

WRIT 3180. Honors: Advanced Writing. (3.0 cr.; A-F only; prereq Credit will not be granted if already received for Comp 3180, min 60 cr, UMD Honors Program, or instructor consent; fall, spring, offered periodically)

Develops research, critical thinking, and collaborative writing strategies as well as rhetorical skills to draft documents in multiple genres for multiple audiences. This includes professional correspondence and reports, research proposals, literature reviews, oral presentations and related documents for the honors project.

WRIT 4100. Introduction to Grant Writing and Project Planning. (3.0 cr.; A-F or Audit; =[WRIT 5100]; prereq 1120, min 60 cr, no grad credit; fall, spring, offered periodically)

Introduction to basic grant writing principles, including common types of grants, project planning, locating and researching funders, and writing effective narratives, preparing budgets, and evaluating program outcomes. Course utilizes lectures, discussion, group work, and guest speakers.

WRIT 4197. Internship in Writing. (1.0-3.0 cr. [max 6.0 cr.]; S-N only; =[WRIT 5197]; prereq instructor consent, no grad credit; fall, spring, summer, every year)

Practical writing experience with a media organization, publisher, business, or government agency.

WRIT 4200. Writing and Cultures. (3.0 cr.; A-F only; prereq 1120, minimum 60 cr; spring, even years)

Through historical, theoretical and applied lenses, examines the dialectic between writing and culture, that is, how writing shapes culture and, conversely, how culture shapes writing. Specific concepts (access, agency, community, identity and power) relevant to understanding how cultures and the social relations that constitute them are constructed and maintained will be examined in detail.

WRIT 4220. Document Design and Graphics. (3.0 cr.; A-F or Audit; =[WRIT 5220]; prereq 1120, min 60 cr, no grad credit; spring, offered periodically)

Principles and practice of using computer programs to design, create, and print documents that effectively integrate verbal and graphic texts.

WRIT 4230. Web Design and Digital Culture.

(3.0 cr.; A-F or Audit; =[WRIT 5230]; prereq Min 30 cr, no grad credit; fall, spring, offered periodically)
Practice in the aesthetic, cultural, and rhetorical uses of Web-design techniques, including discussion and writing about the theoretical and historical contexts of digital culture.

WRIT 4250. New Media Writing.

(3.0 cr.; A-F or Audit; =[WRIT 5250]; prereq minimum 60 cr, no grad credit; fall, spring, offered periodically)
Combines the theory and production of new media writing--digital, verbal practices in converged media--through the application of readings and discussion to five projects that progress from written, print-based genres to new-media presentation.

WRIT 4260. Visual Rhetoric and Culture.

(3.0 cr.; A-F only; =[WRIT 5260]; prereq minimum 60 cr, no grad credit; fall, every year)
In addition to teaching the mechanics of graphic production, this class draws widely on the disciplines of digital design, statistics, narrative literature, engineering, and technical writing to enable students to conceive, produce, and write about visual texts critically and effectively.

WRIT 4290. Advanced Web Design and Digital Culture.

(3.0 cr.; A-F or Audit; =[WRIT 5290]; prereq 4230, minimum 60 cr, no grad credit; fall, spring, offered periodically)
Provides students with instruction and practice in creating increased functionality and interactivity in Web-based projects, and with the conceptual tools and cultural contexts needed to manage and direct rhetorical initiatives in digital environments.

WRIT 4300. Research Methods for the Study of Writing.

(3.0 cr.; A-F or Audit; =[WRIT 5300]; prereq 1120, min 60 cr, no grad credit; fall, spring, offered periodically)
Provides students with instruction and practice in critiquing research, generating research questions, designing research projects, and reporting research results in the study of writing.

WRIT 4506. Capstone Course: Senior Portfolio Preparation.

(1.0 cr.; S-N or Audit; prereq Min 90 cr, writing studies major; fall, spring, every year)
Required capstone course for all writing studies majors. Portfolios for multiple purposes will be prepared under the guidance of the student's adviser.

WRIT 4591. Independent Study.

(1.0-3.0 cr. [max 6.0 cr.]; A-F or Audit; =[WRIT 5591]; prereq instructor consent, no grad credit; fall, spring, summer, every year)
Students choose projects with their instructor.

WRIT 5100. Introduction to Grant Writing and Project Planning.

(3.0 cr.; A-F or Audit; =[WRIT 4100]; prereq Credit will not be granted if already received for Comp 5100, Coll Grad or Grad student; fall, spring, offered periodically)

Introduction to basic grant writing principles, including common types of grants, project planning, locating and researching funders, and preparing effective narratives and budgets. Course utilizes lectures, discussion, group work, and guest speakers.

WRIT 5197. Internship in Writing.

(1.0-3.0 cr. ; S-N only; =[WRIT 4197]; prereq instructor consent, Coll Grad or Grad student; fall, spring, summer, every year)
Practical writing experience with a media organization, publisher, business, or government agency.

WRIT 5220. Document Design and Graphics.

(3.0 cr.; A-F or Audit; =[WRIT 4220]; prereq Credit will not be granted if already received for Comp 5220, max 3 cr may be applied to Grad prog; spring, every year)
Principles and practice of using computer programs to design, create, and print documents that effectively integrate verbal and graphic texts.

WRIT 5230. Web Design and Digital Culture.

(3.0 cr.; A-F or Audit; =[WRIT 4230]; prereq Credit will not be granted if already received for Comp 5230, Grad student; fall, spring, offered periodically)
Practice in the aesthetic, cultural, and rhetorical uses of Web-design techniques, including discussion and writing about the theoretical and historical contexts of digital culture.

WRIT 5250. New Media Writing.

(3.0 cr.; A-F or Audit; =[WRIT 4250]; prereq Credit will not be granted if already received for WRIT 4250, Grad student; fall, spring, offered periodically)
Combines the theory and production of new media writing--digital, verbal practices in converged media--through the application of readings and discussion to five projects that progress from written, print-based genres to new-media presentation.

WRIT 5260. Visual Rhetoric and Culture.

(3.0 cr.; A-F only; =[WRIT 4260]; fall, every year)
In addition to teaching the mechanics of graphic production, this class draws widely on the disciplines of digital design, statistics, narrative literature, engineering, and technical writing to enable students to conceive, produce, and write about visual texts critically and effectively.

WRIT 5290. Advanced Web Design and Digital Culture.

(3.0 cr.; A-F or Audit; =[WRIT 4290]; prereq Credit will not be granted if already received for Comp 5290, 5230, Coll Grad or Grad student; fall, spring, offered periodically)
Provides students with instruction and practice in creating increased functionality and interactivity in Web-based projects, and with the conceptual tools and cultural contexts needed to manage and direct rhetorical initiatives in digital environments.

WRIT 5300. Research Methods for the Study of Writing.

(3.0 cr.; A-F or Audit; =[WRIT 4300]; prereq Coll Grad or Grad student; fall, spring, offered periodically)
Provides students with instruction and practice in critiquing research, generating research

questions, designing research projects, and reporting research results in the study of writing.

WRIT 5591. Independent Study. (1.0-3.0 cr. [max 6.0 cr.]; =[WRIT 4591]; prereq College grad or grad student, credit will not be granted if already received for Comp 5991, max 3 cr may be applied to Grad prog, instructor consent; fall, spring, summer, every year)
Students choose projects with their instructor.

WRIT 8500. Graduate Seminar. (3.0-6.0 cr. ; A-F or Audit; prereq Credit will not be granted if already received for Comp 8500; fall, offered periodically)

Varying topics appropriate to study of composition, English, language, and rhetoric.

WRIT 8902. Teaching College Writing. (3.0 cr.; A-F only; prereq Credit will not be granted if already received for COMP 8902, required for tchg assts in Writ and Engl Depts, instructor consent; fall, every year)

Analyze theoretical works and study pedagogical principals and practices related to teaching academic writing in college, including methods, materials, and objectives. Includes a major research project as well as oral presentations and/or teaching demonstrations.

WRIT 8910. Practicum in Teaching Writing.

(1.0-4.0 cr. ; A-F or Audit; prereq Credit will not be granted if already received for Engl 8910 or Comp 8910, instructor consent; fall, spring, every year)
Teaching, tutoring, and assisting in composition courses; experience in preparation of materials, microteaching, and grading student work.

WRIT 8994. Directed Research in Writing Studies.

(1.0-3.0 cr. ; A-F or Audit; prereq Credit will not be granted if already received for Comp 8994; 8902; instructor consent; fall, spring, summer, every year)
Controlled research in methods, materials, and theories (both linguistic and rhetorical) used in composition classes, sometimes involving experiments with composition students in secondary schools and colleges.