Lat 3113. Intermediate Latin Prose. (4 cr. Prereq-[1001, 1102] or 1111 or 3111 or 3 yrs high school Latin or #) Reading Latin. Reviews elementary grammar, vocabulary, and morphology. Introduction to major themes/issues in Latin literature and Roman culture.

Lat 3114. Augustan Latin Authors. (4 cr. Prereq-3113 or A) Students progress from intermediate to advanced Latin reading while surveying the world of Augustan Rome. Authors include Livy, Virgil, and Ovid.


Lat 3310. Advanced Undergraduate Latin: History. (3 cr [max 12 cr]. Prereq-3114 or equiv or #) Roman history as the Romans wrote it; selections from Livy, Sallust, Tacitus, or Ammianus.

Lat 3320. Advanced Undergraduate Latin: Belles-Lettres. (3 cr [max 12 cr]. Prereq-3114 or equiv or #) Selections from expository Latin literature (essays, epistles, monographs).

Lat 3330. Advanced Undergraduate Latin: Oratory. (3 cr [max 12 cr]. Prereq-3114 or equiv or #) One or more appropriate authors studied each semester.

Lat 3340. Advanced Undergraduate Latin: Epic/Pastoral. (3 cr [max 12 cr]. Prereq-3114 or equiv or #) One or more appropriate authors studied each semester.

Lat 3350. Advanced Undergraduate Latin: Lyric/Elegiac. (3 cr [max 12 cr]. Prereq-3114 or equiv or #) One or more appropriate authors studied each semester.

Lat 3360. Advanced Undergraduate Latin: Drama. (3 cr [max 12 cr]. Prereq-3114 or equiv or #) One or more appropriate authors studied each semester.

Lat 3370. Advanced Undergraduate Latin: Satire. (3 cr [max 12 cr]. Prereq-3114 or equiv or #) One or more appropriate authors studied each semester.

Lat 3440. Advanced Undergraduate Latin: Later Latin. (3 cr [max 12 cr]. Prereq-3114 or A) Reading course covering authors of Late Antiquity, the Middle Ages and the Renaissance. Topics specified in Class Schedule.

Lat 3450. Advanced Undergraduate Latin: Classical Authors. (3 cr [max 12 cr]. Prereq-3114 or A) Readings from various classical Latin authors. Topics specified in Class Schedule.

Lat 3951W. Major Project. (4 cr. Prereq-[Greek-Latin or Latin major], three 3xxx Latin courses, #, A) Research project using documents and other sources from the ancient world. Students select project in consultation with a faculty member who directs the research and writing.

Lat 3960H. Honors Course: Advanced Undergraduate Latin Reading. (3 cr [max 12 cr]. Prereq-Regis in honors program or high ability as indicated by transcript) Student attends Latin 33xx, 3440, or 3450 and does additional work for honors credit.

Lat 3993. Directed Studies. (1-4 cr [max 12 cr]. Prereq- # and A) Guided individual reading or study.

Lat 5012. Latin Prose Composition. (3 cr. Prereq-3114 or A) Advanced understanding of Latin grammar, syntax, diction, and prose style through graduated exercises in prose composition.


Lat 5310. Latin Literature: History. (3 cr [max 12 cr]) One or more appropriate authors studied each semester.

Lat 5320. Latin Literature: Epistles and Essays. (3 cr [max 12 cr]) One or more appropriate authors studied each semester.

Lat 5330. Latin Literature: Oratory. (3 cr [max 12 cr]) One or more appropriate authors studied each semester.

Lat 5340. Latin Literature: Epic and Pastoral. (3 cr [max 12 cr]) One or more appropriate authors studied each semester.

Lat 5350. Latin Literature: Lyric and Elegiac Poetry. (3 cr [max 12 cr]) One or more appropriate authors studied each semester.

Lat 5360. Latin Literature: Latin Dramatists. (3 cr [max 12 cr]) One or more appropriate authors studied each semester. Authors vary.

Lat 5370. Latin Literature: Satire. (3 cr [max 12 cr]) Prereq.-Grad student or #) One or more authors.

Lat 5380. Latin Literature: Legal Texts. (3 cr [max 12 cr]) One or more appropriate authors studied each semester.

Lat 5390. Latin Literature: Religious Texts. (3 cr [max 12 cr]. Prereq-3114) Reading and discussion of religious texts from Latin antiquity, such as Varro’s Antiquitates Divinae, Cicero’s De natura deorum, Apuleius’s Metamorphoses, or Christian writers (Tertullian, Cyprian, Lactantius, Jerome, Augustine).

Lat 5410. Latin of Late Antiquity. (3 cr [max 12 cr]. Prereq-34xx or equiv or #) Pagan and Christian Latin literature selected from authors of the 3rd to 6th centuries A.D. Topics specified in Class Schedule.

Lat 5420. Medieval Latin. (3 cr [max 12 cr]. Prereq-34xx or equivalent or #) Literature from 6th to 15th centuries. Authors and genres vary; topics specified in Class Schedule.

Lat 5621. Latin Paleography. (3 cr. Prereq-Three 3xxx Latin or #) Analysis of various hands used in manuscripts of Latin authors with attention to date and provenance; transmission of ancient Latin literature.

Lat 5715. Introduction to the Historical-Comparative Grammar of Greek and Latin. (3 cr. Prereq.- # 2 yrs college Greek) Historical and comparative grammar of Greek and Latin from their Proto-Indo-European origins to the classical norms.

Lat 5717. History of Latin. (3 cr) Reading and analysis of documents illustrating the stylistic registers and evolution of the Latin language from its earliest attestations through the Middle Ages.

Lat 5993. Directed Studies. (1-4 cr [max 18 cr]. Prereq- # A) Guided individual reading or study.

Lat 5994. Directed Research. (1-12 cr [max 20 cr]. Prereq.- A) Guided research on original topic chosen by student.

Lat 5996. Directed Instruction. (1-12 cr [max 20 cr]. Prereq.- A) Supervised teaching internship.
Course Descriptions

LAS 3442. Chicano History to Present. (3 cr. §Chic 3442, §Hist 3442) The Chicano/o experience: migration, repatriation, the Bracero program, politics, the Chicano/o movement, work, society, and culture.

LAS 3502W. Foundations of Brazilian Culture. (3 cr. §Port 3502. Prereq–Port 3003 or equiv) Emphasis on Brazilian modern society. History, culture (music, art, cinema, literature, intellectual thought, popular culture, media), and social problems (ethnicity, tropical deforestation). Discussions and readings are in Portuguese.

LAS 4121W. Geography of Latin America. (3 cr. §Geog 4121) Interplay of natural environment and history in shaping contemporary Latin America. Political ecology of natural resources, food supply and distribution, urbanization and the informal economy, migration, ethnicity, and the role of the state and international agencies in domestic economies.

LAS 4465. Housing in World Perspective. (3 cr. §A-F only. §DHA 4465. DHA 2401, DHA 2463 or #) Evaluation of theories and concepts that allow an understanding of housing policies and housing choices of individuals, families, and households in developed and developing countries.

LAS 4479. Latin American Government and Politics. (3-4 cr. §Pol 4479. Prereq–Pol 1054 or Pol 3051 or non-pol sci grad or #) An overview of Latin American politics and political economy focused on authoritarianism, human rights, and re-democratization; development and economic policy; social movements; ethnicity and race; religion; revolution; U.S.-Latin American relations.

LAS 5105. Field Methods in Linguistics I. (4 cr. Prereq–5201, 5302 or #) Techniques for obtaining and analyzing linguistic data from unfamiliar languages through direct interaction with a native speaker.

LAS 5106. Field Methods in Linguistics II. (4 cr. Prereq–5105) Techniques for obtaining and analyzing linguistic data from unfamiliar languages through direct interaction with a native speaker.

Ling 2021. Syntax I. (3 cr. Prereq–3001 or 301H or 5001 or #) Syntactic phenomena/constructions in various languages. Principles of grammar construction/evaluation. Syntactic theories as instruments of grammatical analysis.


Ling 2025. Semantics. (3 cr. Prereq–2021 or #) Analysis of sentence meaning. Semantic properties. Relations such as analytically, entailment, quantification, and generativity. Philosophical background, formal techniques of semantic analysis, how sentence meaning depends on word meaning, syntax, and context. The role of semantics in grammatical theory.

Ling 2026. Linguistic Pragmatics. (3 cr. Prereq–2021 or #) The analysis of linguistic phenomena in relation to beliefs and intentions of language users; speech act theory, conversational implicature, presupposition, information structure, relevance theory, discourse coherence.


Ling 3302. Introduction to Linguistics. (3 cr. §Spch 5462. Prereq–5461 or Spch 5461 or #) Language learning and psychology of language; linguistic universals; language in society. Conversations.

Ling 4002. Linguistic Analysis. (3 cr. (Prereq–3001 or 3001H or 5001 or §5001 or §3001H or §5001 or #) Syntactic phenomena/constructions in various languages. Principles of grammar construction/evaluation. Syntactic theories as instruments of grammatical analysis.

Ling 4009W. Freshman Seminar. (3 cr. (max 6 cr. #A-F only) Topics specified in Class Schedule.

Ling 5001. Introduction to Linguistics. (4 cr. §3001, §5001) Phonetics, phonology, morphology, syntax, semantics, and historical-comparative linguistics; language learning and psychology of language; linguistic universals; language in society.

Ling 5001H. Honors: Introduction to Linguistics. (4 cr. §3001, §5001, §5001H) Prereq–Honors candidate or #) Phonetics, phonology, morphology, syntax, semantics, historical-comparative linguistics; language learning, psychology of language, linguistic universals; language in society.


Ling 5011. Foundations of Linguistics. (3 cr. §Spch 5462. Prereq–5461 or Spch 5461 or #) Language learning and psychology of language; linguistic universals; language in society.

Ling 5012. Language and Society. (3 cr. §Hist 5012) Language and social interaction; linguistic indicators of social status and attitudes; language and sex roles; linguistic ecology; language planning for multilingual communities; implications for education and public policy.

Ling 5015. Introduction to Language Acquisition. (3 cr. Prereq–3001 or 3001H or 5001 or #) First/second language acquisition.

Ling 5016. Introduction to Language Acquisition. (3 cr. Prereq–3001 or 3001H or 5001, a course in phonological and grammatical structure of a language) Introduction to research on the language and learning processes of second-language learners; the linguistic structure of their interlanguage, the cognitive and social factors which influence their acquisition of a new language.

Ling 5017. Introduction to Language Acquisition. (3 cr. Prereq–3001 or 3001H or 5001, a course in phonological and grammatical structure of a language) Introduction to research on the language and learning processes of second-language learners; the linguistic structure of their interlanguage, the cognitive and social factors which influence their acquisition of a new language.

Ling 5019. Language and Social Change. (3 cr. Prereq–3001 or 3001H or 5001, a course in phonological and grammatical structure of a language) Introduction to research on the language and learning processes of second-language learners; the linguistic structure of their interlanguage, the cognitive and social factors which influence their acquisition of a new language.

Ling 5021. Syntax I. (3 cr. Prereq–3001 or 301H or 5001 or #) Syntactic phenomena/constructions in various languages. Principles of grammar construction/evaluation. Syntactic theories as instruments of grammatical analysis.


Ling 5025. Semantics. (3 cr. Prereq–2021 or #) Analysis of sentence meaning. Semantic properties. Relations such as analytically, entailment, quantification, and generativity. Philosophical background, formal techniques of semantic analysis, how sentence meaning depends on word meaning, syntax, and context. The role of semantics in grammatical theory.

Ling 5026. Linguistic Pragmatics. (3 cr. Prereq–2021 or #) The analysis of linguistic phenomena in relation to beliefs and intentions of language users; speech act theory, conversational implicature, presupposition, information structure, relevance theory, discourse coherence.


Ling 5032. Phonology I. (4 cr. §3011, §5001) Phonology of human languages. Preparation for reading papers in the literature and for doing research in phonology.

Ling 5461. Conversation Analysis. (3 cr. §Spch 5461. Prereq–3001 or 3001H or 5001 or #) Discourse processes. Application of concepts through conversation analysis.

Ling 5462. Field Research in Spoken Language. (3 cr. §Spch 5462. Prereq–5461 or Spch 5461 or #) Transcribing and analyzing talk and movement related to talk. Applying concepts to recorded conversations.

Ling 5501. Introduction to Language Acquisition. (3 cr. Prereq–3001 or 3001H or 5001 or #) First/second language acquisition.

Ling 5505. Introduction to Second Language Acquisition. (3 cr. Prereq–3001 or 301H or 5001, a course in phonological and grammatical structure of a language) Introduction to research on the language and learning processes of second-language learners; the linguistic structure of their interlanguage, the cognitive and social factors which influence their acquisition of a new language.

Ling 5601. Historical Linguistics. (3 cr. §Spch 5461. Prereq–3001 or 3001H or 5001, a course in phonological and grammatical structure of a language) Introduction to research on the language and learning processes of second-language learners; the linguistic structure of their interlanguage, the cognitive and social factors which influence their acquisition of a new language.

Ling 5602. Linguistic Pragmatics. (3 cr. Prereq–2021 or #) The analysis of linguistic phenomena in relation to beliefs and intentions of language users; speech act theory, conversational implicature, presupposition, information structure, relevance theory, discourse coherence.


Ling 5605. Introduction to Second Language Acquisition. (3 cr. Prereq–3001 or 301H or 5001, a course in phonological and grammatical structure of a language) Introduction to research on the language and learning processes of second-language learners; the linguistic structure of their interlanguage, the cognitive and social factors which influence their acquisition of a new language.
Ling 5701. Sociolinguistics. (3 cr. Prereq–3001 or 3011 or 5001 or #) Social determinants of linguistic diversity, variation, and change. Topics may include social and regional dialects, language style and register, style-shifting and code-switching, the quantitative study of speech, linguistic and social inequality.

Ling 5721. Bilingualism. (3 cr. Prereq–3001 or 3011 or 5001 or #) Sociolinguistic theory and methods in the study of bilingualism; language ecology in multilingual societies; language and language behavior in the bilingual individual; language in ethnic conflict; implications for public policy and planning.

Ling 5801. Introduction to Computational Linguistics. (3 cr. Prereq–3001 or 3011 or 5001 or #) Programming experience helpful) Methods and issues in computer understanding of natural language. Programming languages and their linguistic applications. Lab projects.

Ling 5802. Computational Linguistics. (3 cr. Prereq–5801 or #) Computer processing of natural language. Applications to such areas as speech recognition and information retrieval.

Ling 5900. Topics in Linguistics. (1-4 cr [max 12 cr]. Prereq–#) Topics vary. See Class Schedule.

Ling 5931. Morphology and Syntax of Contemporary English. (3 cr. Prereq–3001 or 3011H or 5001 or #) Linguistic analysis of word/sentence structure of contemporary English. Focuses on data from recorded/written texts.

Ling 5932. Topics in the Structure of Modern English. (3 cr [max 12 cr]. Prereq–(3001 or 3011H or 5001) [5201 or 5931] or #) Aspects of the morphology, syntax, or semantics/pragmatics of modern English. Emphasizes analysis of written or recorded texts. Topics vary.


Management (Mgmt)
Department of Strategic Management
Curtis L. Carlson School of Management


Mgmt 3401. Fundamentals of Management. (3 cr; A-F only. Prereq–30-30 cr) General aspects or characteristics of organizations and their members. Why people groups in organizations feel/behave as they do. Processes/methods that improve behavior/attitudes/effectiveness of organizational members. Organizational member/manager skills. Guest speakers, group presentations, films.


Mgmt 3414. Topics in International Business, Government, and Society. (4 cr; A-F only) Selected topics.


Mgmt 3700. Topics in Management. (4 cr; A-F only. Prereq–At least 60 cr [completed or in progress]) Selected topics.

Mgmt 3800. Topics in Ethics. (4 cr; A-F only. Prereq–At least 60 cr [taken or in progress]) Topics vary with each offering.

Mgmt 3900. Topics in Leadership. (4 cr; A-F only. Prereq–At least 60 cr [completed or in progress]) Selected topics.

Mgmt 4002. Managerial Psychology. (4 cr; A-F only) Behavioral principles, methods, and skills that underlie and compose dimensions of managerial competence and contribute to managers’ effectiveness in preventing and solving problems within and between individuals and groups; development of human resource skills management needs based partially on experiential exercises.


Mgmt 4004W. Business Policy: Strategy Formulation and Implementation. (3 cr; A-F only. Prereq–90 credits; completion of business core courses) Integrative perspective on overall direction of the enterprise involving both choice of products and markets and selection of organization structures and management styles; case analysis involving the identification of key issues, evaluation of options, and making recommendations under conditions of uncertainty and incomplete information.

Mgmt 4005. Managing the Multinational Business. (4 cr; A-F only. Prereq–BGS 3400) Structures/strategies of global business. Personnel, technology, and operations in host nations. Challenges unique management of multinational firm. May include topics such as comparative culture, trade, and ethics.


Mgmt 5004. Negotiations. (2 cr; A-F only) Art and science of securing agreements between two or more parties who are interdependent and who are seeking to maximize their own outcomes; understanding individual, group, and organizational behavior in the context of these competitive situations; theory and process of negotiation applied to broad spectrum of problems faced by managers and professionals.

Mgmt 5505. Management of Innovation and Change. (2 cr; A-F only. Prereq–3001, CSOM upper div) Applying theories/research on how new organizational programs, products, and technologies are developed/implemented. Diagnostic skills. How innovation unfolds.

Mgmt 5510. Advanced Topics. (4 cr; A-F only) Specialized topics in management that vary and may include downsizing, ethics, trust, risk, alliances, organizational identity, organizational change, industry definition, team performance, organizational renewal, competitive advantage, hypercompetition, managing the knowledge worker, competence acquisition and preservation, and negotiation.


Marathi (Mar)
Department of Asian Languages and Literatures
College of Liberal Arts


Mar 1102. Beginning Marathi. (4 cr. §1102. Prereq–1101 or equiv or #) Emphasis on developing proficiency in all four language modalities—listening, reading, speaking, and writing.


Mar 3102. Beginning Marathi. (4 cr. §1102. Prereq–3101 or equiv or #) Emphasis on developing proficiency in all four language modalities—listening, reading, speaking, and writing.

Mar 3131. Intermediate Marathi. (4 cr. §3102 or 3102 or equiv or #) Speaking and comprehension; development of reading and writing skills based on Marathi-language material.

Mar 3132. Intermediate Marathi. (4 cr. §3102 or 3102 or equiv or #) Speaking and comprehension; development of reading and writing skills based on Marathi-language material.


Mar 5994. Directed Research. (3-5 cr [max 12 cr]. Prereq–#. A, D) Directed research on a subject agreed upon by student and instructor.

For definitions of course numbers, symbols, and abbreviations, see page 300.
Course Descriptions

Marketing (Mktg)
Department of Marketing and Logistics Management
Curtis L. Carlson School of Management

Mktg 3001. Principles of Marketing. (3 cr; A-F only. Prereq-Econ 1101, at least 60 cr)
Introduction to terms, concepts, and skills for analyzing marketing problems. Factors outside the organization affecting its product, pricing, promotion, and distribution decisions. Cases from actual organizations.

Mktg 3010. Marketing Research. (4 cr; A-F only. Prereq-3001. [OMS 1550 or equiv])
Methods for collecting/analyzing data to solve marketing problems. Research design, secondary/primary data collection, sample design, data analysis.

Mktg 4020. Advanced Logistics and Supply Chain Management. (2 cr; A-F only. Prereq-3001)
Analysis of the flow of physical product through channels of distribution and the linkages between the process of controlling such physical flows and the major functions of the firm, e.g., finance, marketing, and operations. Emphasis on organizing the interactions between firms and developing an integrative supply chain management strategy.

Mktg 4030. Selling and Sales Management. (4 cr; A-F only. Prereq-3001)
Emphasizes understanding the role of a sales manager to develop and implement a sales force plan that is an integral part of a company’s marketing strategy. Special attention on the impact of the sales manager’s decisions on the behavior of an individual’s sales person.

Mktg 4040. Buyer Behavior. (4 cr; A-F only. Prereq-3001)
Application of the behavioral sciences to understanding buyer behavior. Topics include perception, memory, affect, learning, persuasion, motivation, behavioral decision theory, social and cultural influences, and managerial implications.

Mktg 4050. Integrated Marketing Communications. (4 cr; A-F only. Prereq-3001)
Management of the communication aspect of marketing strategy. Emphasis on advertising, sales promotion, public relations, and direct marketing. Topics include setting communications objectives and budgets, media selection, creative strategy, and sales promotion techniques.

Mktg 4060. Marketing and Distribution Channels. (4 cr; A-F only. Prereq-3001)
Design and management of channels of distribution in both consumer and industrial settings. Analysis of the inter-relationships between marketing institutions in channels of distribution. Includes discussion and analysis of logistics and supply chain strategies.

Mktg 4070. International Marketing. (2 cr; A-F only. Prereq-3001)
Managing international marketing functions. Identifying marketing-based international business opportunities; understanding cultural factors in buyer behavior, constructing and evaluating global and culturally adjusted marketing strategies.

Mktg 4080. Marketing Strategy. (4 cr; A-F only. Prereq-3001)
Determination of product markets where organizations should compete based on their ability to create and maintain a competitive advantage. Emphasis on analyzing the external environment of business and the formation of a marketing strategy.

Mktg 4090. Marketing Topics. (2 cr [max 4 cr]; A-F only. Prereq-3001)
Selected topics and problems of current interest considered in depth. Class discussion and course projects.

Materials Science (MatS)
Department of Chemical Engineering and Materials Science
Institute of Technology

MatS 1001. Advances in Chemical Engineering and Materials Science. (2 cr; S-N only. Prereq-Recommended for [chemical engineering; materials science/engineering; minors])
Introduction to chemical engineering, materials science/engineering. Practical examples of important advances in both fields. Design problems, career opportunities. Lectures, demonstrations, interactive exercises.

MatS 2001. Introduction to the Science of Engineering Materials. (3-4 cr. Prereq.-2nd year IT [No credit for MatS majors])
Introduction to structure-property relationships of engineering materials. Atomic structure and bonding; crystal structures; imperfections in solids; strength of materials and strengthening mechanisms; phase transformations; heat treatment and control of microstructures; materials selection and design. Integrates properties of metals, ceramics, polymers, and composites. Laboratory experiments deal with material strength, creep, and fatigue of engineering alloys, and heat treatment of steel and aluminum.

MatS 2601. Introduction to Materials Science (Honors). (3 cr. Prereq.-IT lower div honors program)
Physical principles which govern materials properties at the microscopic scale. Starting from the atomic structure and interatomic bonding, it moves to more complex, physical properties: mechanical, electrical, optical and thermodynamical properties.

MatS 3011. Introduction to Materials Science and Engineering. (3 cr. Prereq.-Chem 1021, Math 1272 or 1372, Phys 1302)
Builds progressively from electrons to atoms to bonding to crystalline structures. Defects, X-ray diffraction, phase diagrams, microstructure as a basis for understanding mechanical/electrical properties. Metals, polymers, ceramics, semiconductors, composites.

MatS 3012. Metals and Alloys. (3 cr. Prereq.-[3011, [MatS or ChEn] s or sr] or #)

MatS 3041. Industrial Assignment I. (2 cr; A-F only. Prereq-­MatS upper div completion of required courses in MatS program through fall sem of 3rd yr; GPA of at least 2.80, registration in co-op program)
Industrial work assignment in engineering co-op program. Formal written report.

MatS 3801. Structural Characterization Lab. (2 cr; A-F only. Prereq-[3001, MatS upper div] or A)

MatS 3851W. Materials Properties Lab. (2 cr; A-F only. Prereq-[3011, MatS upper div])

MatS 4001. Thermodynamics of Materials. (4 cr. Prereq-Mats upper div)

MatS 4002. Mass Transport and Kinetics. (4 cr. Prereq-­CE 3101, upper div MatS)

MatS 4013. Electrical and Magnetic Properties of Materials. (3 cr. Prereq-[3011, upper div [MatS or ChEn] s or #)

MatS 4041. Industrial Assignment II. (2 cr; A-F only. Prereq-3041, completion of required courses in MatS program through fall sem of 4th yr; GPA of at least 2.80, registration in co-op program)
Industrial assignment in engineering co-op program. Application of materials science principles to engineering design problems in an industrial work environment. Formal written report.

MatS 4212. Ceramics. (3 cr. Prereq-[3011, [MatS or ChEn] s or sr] or #)

MatS 4214. Polymers. (3 cr. Prereq-[3011, [MatS or ChEn] s or sr] or #)

MatS 4221. Materials Design and Performance. (4 cr. Prereq-Mats 3012 or #)
Thermal and mechanical processing to control properties, selection of materials for electronic applications and other applications, analysis of costs/performance, analysis of failure in metallurgical structures by use of fracture mechanics methodology. Laboratory experiments involve creep, fracture, fatigue, optical and SEM metallography, surface science analysis, and statistics.

MatS 4301W. Materials Processing. (4 cr. Prereq-Mats 4212 and 4214)
Casting, solidification and plastic forming of metals; powder processing, forming operations, sintering of ceramics; and processing of thermoplastic and thermoset polymers. Computer applications of data collection and reduction. Additional laboratory projects available to graduate students.

MatS 4400. Senior Design Project. (3 cr. §4401. Prereq-Mats 5r or Mats majors)
Integration of coursework and lab experiences by applying scientific and engineering principles to comprehensive design project. Individual or team work on a project with faculty guidance. Areas of project selection typically include electronic materials, polymers, metals or ceramics. Written report and oral presentation required.

MatS 4401. Senior Design Thesis I. (2 cr; A-F only. §4400. Prereq-Mats senior, A, GPA of at least 3.00, project approval by faculty adviser)
First semester of a 2-semester thesis project. Research and design work directed by faculty member in Department of Chemical Engineering and Materials Science. Written reports are due at midsemester and end of semester. At least one research presentation must be given.

MatS 4402. Senior Design Thesis II. (2 cr; A-F only. Prereq-4401)
Course Descriptions

Maths 4511W. Corrosion and Electrochemistry of Corrosion. (4 cr; Prereq—Math 3011 or & upper div IT or grad) Electrochemical thermodynamics, electrochemical kinetics, theory of aqueous corrosion, theory of high temperature oxidation; specific topics include general corrosion, passivation, pitting, galvanic protection/corrosion, environmental degradation of mechanical properties, corrosion of electronic components, growth of oxide scales by diffusion, materials selection and design. Computers used to collect lab data.

Maths 4512. Corrosion and Electrochemistry of Corrosion. (4 cr; Prereq—Math 3011 or & upper div IT or grad) Electrochemical thermodynamics, electrochemical kinetics, theory of aqueous corrosion, theory of high temperature oxidation; specific topics include general corrosion, passivation, pitting, galvanic protection/corrosion, environmental degradation of mechanical properties, corrosion of electronic components, growth of oxide scales by diffusion, materials selection and design. Computers used to collect lab data.

Maths 4591. Independent Study in Materials Science. (1-3 cr; max 12 cr; Pre req—Upper div Math Sci) Library, theoretical, laboratory or design studies of scientific or engineering topics in materials science for an individual student. Course content and credits by arrangement with professor. Design credits available if arranged with professor. May be used for upper division Honors Program experience if arranged with professor.

Maths 5519. Basic Transmission Electron Microscopy. (1 cr; A-F only. Prereq—#) Theory/practice of analytical electron microscopy. Classroom sessions cover how instrument works, best-practice uses. Practical sessions allow students to hone skills.

Maths 5520. Basic Analytical Electron Microscopy. (1 cr; A-F only. Prereq—#) Theory/practice of analytical electron microscopy. Classroom sessions cover techniques, best-practice uses. Practical sessions allow students to hone skills.

Maths 5521. Thin Films and Interfaces. (1 cr; Pre req—IT upper div or grad student, Math 4013 or #) Fundamentals of vacuum science; vapor pressures and thin film deposition processes (physical and chemical vapor deposition, sputtering, laser ablation); thermodynamics and kinetics of thin film growth; epitaxy; film stability and reactions; structure-property relationship; multilayers and diffusion barriers; characterization techniques to include photon, electron, and ion spectroscopies. Computer-based homework problems.

Maths 5531. Electrochemical Engineering. (3 cr; Prereq—Math 3011 or & upper div IT or grad) Fundamentals of electrochemical engineering. Topics include electrochemical mass transfer electrokinetics, thermodynamics of cells, modern sensors, formation of thin films and microstructured materials. Computer-based problems will be assigned.

Mathematics (Math)

School of Mathematics

Institute of Technology

Math 1001. Excursions in Mathematics. (3 cr; Prereq—3 yrs high school math or placement exam or grade of at least C- in GC 0731) Breadth of mathematics, its nature/applications. Power of abstract reasoning.

Math 1008. Trigonometry. (3 cr; A-F only. Prereq—#) Condensation, radical, ionic, emulsion, ring-opening, metal-catalyzed polymerizations. Chain conformation, solution thermodynamics, molecular weight characterization, physical properties.


Math 5517. Electron Microscopy. (3 cr; A-F only) Transmission electron microscopy, scattering and diffraction, electron sources, lenses, apertures and resolution, specimen preparation, diffraction patterns, kikuchi diffraction, planar defects, strain fields, high resolution imaging, X-ray spectrometry.

Math 5518. Imaging and Diffraction in the Scanning Electron Microscope. (1 cr; A-F only. Prereq—#) Theory/practice of scanning electron microscopy. Classroom sessions cover how instrument works, best-practice uses. Practical sessions allow students to hone skills.

Math 1143. Introduction to Advanced Mathematics. (4 cr; A-F only. Prereq—1142 or 1272 or 1372 or #; recommended especially for students in social/biological sciences, business) Topics that are covered in more depth in 2243 and 2263, plus probability theory. Matrices, eigenvectors, conditional probability, independence, distributions, basic statistical tools, linear differential equations and systems of differential equations. Multivariable differentiability and linearization.

Math 1151. Precalculus II. (3 cr; §1151, §1157) Prereq—3 1/2 yrs high school math or placement exam or grade of at least C-in 1031 or 1051) Algebra, analytic geometry, trigonometry, complex numbers, beyond usual coverage found in three-year high school mathematics program.

Math 1155. Intensive Precalculus. (5 cr; §1031, §1051, §1151) Prereq—3 yrs high school math or placement exam or grade of at least C-in GC 0731 Algebra, analytic geometry, exponentials, logarithms, trigonometry, complex numbers, beyond usual coverage found in three-year high school mathematics program. One semester version of 1051-1151.

Math 1271. Calculus I. (4 cr; §1142, §1371, §1571) Prereq—4 yrs high school math including trig or placement test or grade of at least C-in 1151 or 1155) Differential calculus of functions of a single variable. Introduction to integral calculus of a single variable, separable differential equations. Applications: max-min, related rates, area, volume, arc-length.

Math 1272. Calculus II. (4 cr; §1372, §1572) Prereq—[1271 or 1272 or 1372 or #] with grade of at least C-) Techniques of integration. Calculus involving transcendental functions, polar coordinates, Taylor polynomials, vectors/curves in space, cylindrical/spherical coordinates.

Math 1281. Calculus With Biological Emphasis I. (4 cr; §1142, §1271, §1371, §1571) Prereq—[four yrs high school math including trigonometry] or [grade of at least C-in (1151 or 1155)] or placement exam, §1271) Differential calculus of single-variable functions, basics of integral calculus. Applications emphasizing biological sciences.

Math 1282. Calculus With Biological Emphasis II. (4 cr; §1372, §1271, §1572) Prereq—[1271 or 1281 or 1371] with grade of at least C-J or #) Techniques/applications of integration, differential equations/systems, matrix algebra, basics of multivariable calculus. Applications emphasizing biology.


Math 1372L. IT Calculus II. (4 cr; §1272, §1282, §1572) Prereq—IT, grade of at least C-in 1371) Techniques of integration. Calculus involving transcendental functions, polar coordinates, Taylor polynomials, vectors/curves in space, cylindrical/spherical coordinates. Emphasizes use of calculators, cooperative learning.

Math 1471H. Honors Calculus I for Secondary Students. (5 cr; Pre req—High school student, #) Differentiation/integration of single-variable functions. Emphasizes concepts/explorations.

Course Descriptions

Math 1473H. Honors Calculus III for Secondary Students. (2 cr)
Accele-rated honors sequence for selected mathematically talented high school students. Introduction to linear methods and first order differential equations.

Math 1474H. Honors Calculus IIB for Secondary Students. (3 cr; Prereq–Honors)
Accelerated honors sequence for selected mathematically talented high school students. Multivariable calculus through differentiation. Focuses on proofs and formal reasoning.

Math 1571H. Honors Calculus I. (4 cr; §1271, §1371.

Math 1572H. Honors Calculus II. (4 cr; Prereq–Grade of at least C- in 1571, IT Honors Office approval; parts of this sequence may be taken for cr by students who have taken non-honors calculus classes)

Math 1574H. Honors Calculus IV. (4 cr; Prereq–[2573 or equiv], IT Honors office approval)
Advanced linear algebra, differential equations. Additional topics as time permits.

Math 2582H. Honors Calculus II: Advanced Placement. (5 cr; A-F only. Prereq–A)
First semester of integrated three semester sequence covering infinite series, multivariable calculus (including vector analysis with Gauss, Green and Stokes theorems, linear algebra (with vector spaces), ODE, and introduction to complex analysis. Material is covered at a faster pace and at a somewhat deeper level than the regular honors sequence.

Math 2583H. Honors Calculus III: Advanced Placement. (5 cr; A-F only. Prereq–2582H or #)
Second semester of three-semester sequence. Infinite series. Multivariable calculus including vector analysis with Gauss, Green, and Stokes theorems. Linear algebra (with vector spaces), ODE, and introduction to complex analysis. Material is covered at a faster pace and deeper level than in regular honors sequence.

Math 3113. Topics in Elementary Mathematics I. (4 cr;
Prereq–[Grade of at least C- in 1031 or placement exam]) Arithmetic/geometric sequences. Counting, building on techniques from college algebra. Graph theory. Integers, rational numbers; emphasizes aspects related to prime factorization. Modular arithmetic with applications.

Math 3116. Topics in Elementary Math II: Short Course. (2 cr; A-F only. Prereq–Grade of at least C in 4113)
Probability/Statistics, vector geometry, real/complex numbers. Meets during first half of semester only. Grading standard one-third higher than 3116.

Math 3118. Topics in Elementary Mathematics II. (4 cr; Prereq–Grade of at least C in 4113)
Probability/Statistics, vector geometry, real/complex numbers, finite fields building on previously learned modular arithmetic, trees. Grading standard one-third higher than 3118.

Math 3593H. Honors Mathematics II. (5 cr; A-F only. Prereq–3592H or #)

Math 4005. Calculus Refresher. (4 cr; A-F only. Prereq–A)

Math 4065. Theory of Interest. (3 cr; Prereq–1272 or 1372 or 1572; primarily for [mathematics, business] majors interested in actuarial science)
Time value of money. Annuities, sinking funds, bonds, similar items.

Math 4113. Topics in Elementary Mathematics I. (4 cr;
Prereq–[Grade of at least C- in 1031 or placement exam]) Arithmetic/geometric sequences. Counting, building on techniques from college algebra. Graph theory. Integers, rational numbers; emphasizes aspects related to prime factorization. Modular arithmetic with applications. Grading standard one-third higher than 3113.

Math 4116. Topics in Elementary Math II: Short Course. (2 cr; A-F only. Prereq–Grade of at least C in 4113)
Probability/Statistics, vector geometry, real/complex numbers. Meets during first half of semester only. Grading standard one-third higher than 3116.

Math 4151. Elementary Set Theory. (3 cr; Prereq–One soph math course or #)
Basic properties of operations on sets, cardinal numbers, simply and well-ordered sets, ordinal numbers, axiom of choice, axiomatics.

Math 4152. Elementary Mathematical Logic. (3 cr.
§5166. Prereq–One soph math course or #)
Propositional logic. Predicate logic: notion of a first order language, a deductive system for first order logic, first order structures, Godel's completeness theorem, axiom systems, models of formal theories.

Math 4242. Applied Linear Algebra. (4 cr; Prereq–2243 or 2373 or 2573)
Systems of linear equations, vector spaces, subspaces, bases, linear transformations, matrices, determinants, eigenvalues, canonical forms, quadratic forms, applications.

Math 4281. Introduction to Modern Algebra. (4 cr;
Prereq–2283 or 3283 or #)
Equivalence relations, greatest common divisor, prime decomposition, modular arithmetic, groups, rings, fields, Chinese remainder theorem, matrices over commutative rings, polynomials over fields.

Math 4428. Mathematical Modeling. (4 cr; Prereq–2243 or 2573 or 2573)

Math 4457. Methods of Applied Mathematics I. (4 cr;
Prereq–[2243 or 2373 or 2573], [2263 or 2374 or 2574])

Math 4512. Differential Equations with Applications. (3 cr. Prereq—2243 or 2373 or 2573) Laplace transforms, series solutions, systems, numerical methods, plane autonomous systems, stability.


Math 4506. Advanced Calculus. (4 cr. Prereq—[2263 or 2374 or 2573]) [2283 or 2574 or 3283 or #] Axioms for the real numbers. Techniques of proof for limit theorems, uniform convergence. Rigorous treatment of differential/integral calculus for single/multi-variable functions.


Math 4990. Topics in Mathematics. (1-4 cr [max 12 cr]. Prereq—#) Non-thesis course such as partial differential equations, Fourier series, computational methods, Black-Scholes theory, numerical methods (including Monte Carlo simulation), interest-rate derivative securities, exotic options, risk theory.

Math 5165. Mathematical Logic I. (4 cr. Prereq—2283 or 3283 or Phil 5201 or CSci course in theory of algorithms or #) Theory of computability: notion of algorithm, Turing machines, primitive recursive functions, recursive functions, Kleene normal form, recursion theorem. Propositional logic.


Math 5259H. Honors: Fundamental Structures of Algebra I. (4 cr. Prereq—[2243 or 2373 or 2573], [2283 or 2574 or 3283]) Review of matrix theory, linear algebra. Vector spaces, linear transformations over abstract fields. Group theory, including normal subgroups, quotient groups, homomorphisms, class equation, Sylow’s theorems. Specific examples: permutation groups, matrix groups of geometric figures, matrix groups.

Math 5286H. Honors: Fundamental Structures of Algebra II. (4 cr. Prereq—5258) Ring/module theory, including ideals, quotients, homomorphisms, rings of matrices (unique factorization, euclidean, principal ideal), fundamental theorem for finitely generated modules over euclidean domains, Jordan canonical form. Introduction to field theory, including finite fields, algebraic/ transcendental extensions, Galois theory.

Math 5335. Geometry I. (4 cr. Prereq—[2243 or 2373 or 2573], [2263 or 2374 or 2574]) Advanced two-dimensional Euclidean geometry from a vector viewpoint. Theorems/problems about triangles/circles, isometries, connections with Euclid’s axioms. Hyperbolic geometry, how it compares with Euclidean geometry.


Math 5345. Introduction to Topology. (4 cr. Prereq—[2263 or 2373 or 2573], [2283 or 2574 or 3283]) Set theory. Euclidean spaces. Basics of general topology, including compactness/connectedness.

Math 5378. Differential Geometry. (4 cr. Prereq—[2263 or 2373 or 2573], [2243 or 2373 or 2574]; [2283 or 3283] recommended) Basic geometry of curves in plane and in space, including Frenet formula, theory of surfaces, differential forms, Riemannian geometry.

Math 5385. Introduction to Computational Algebraic Geometry. (4 cr. Prereq—[2263 or 2374 or 2573], [2243 or 2373 or 2574]) Geometry of curves/surfaces defined by polynomial equations. Emphasizes concrete computations with polynomials using computer packages, interplay between algebra and geometry. Abstract algebra presented as needed.

Math 5467. Introduction to the Mathematics of Waves. (4 cr. Prereq—[2243 or 2373 or 2573], [2283 or 2574 or 3283 or #], [2263 or 2374, 4567] recommended) Background theory/experience in waves. Inner product spaces, operator theory. Fourier transforms applied to Gabor transforms, multi-scale analysis, discrete waves, self-similarity. Computing techniques.

Math 5481. Mathematics of Industrial Problems I. (4 cr. Prereq—[2243 or 2373 or 2573]; [2263 or 2374 or 2574]) familiarity with some programming language) Topics in industrial math, including crystal precipitation, air quality modeling, electron beam lithography. Problems treated both theoretically and numerically.

Math 5482. Mathematics of Industrial Problems II. (4 cr. Prereq—[2243 or 2373 or 2573], [2263 or 2374 or 2574, 2574]) familiarity with some programming language) Topics in industrial math, including color photography, catalytic converters, photocopying.

Math 5485. Introduction to Numerical Methods I. (4 cr. Prereq—[2243 or 2373 or 2573]; familiarity with some programming language) Solution of nonlinear equations in one variable. Interpolation, polynomial approximation, numerical integration/differentiation, numerical solution of initial-value problems.


Math 5525. Introduction to Ordinary Differential Equations. (4 cr. Prereq—[2243 or 2373 or 2573], [2283 or 2574 or 3283]) Ordinary differential equations, solution of linear systems, qualitative/numerical methods for nonlinear systems. Linear algebra background, fundamental matrix solutions, variation of parameters, existence/uniqueness theorems, phase space. Rest points, their stability. Periodic orbits, Poincare-Bendixson theory, strange attractors.

Math 5535. Dynamical Systems and Chaos. (4 cr. Prereq—[2243 or 2373 or 2573], [2263 or 2374 or 2574]) Dynamical systems theory. Emphasizes iteration of one-dimensional mappings. Fixed points, periodic points, stability, bifurcations, symbolic dynamics, chaos, fractals, Julia/Mandelbrot sets.

Math 5578. Elementary Partial Differential Equations I. (4 cr. Prereq–[2243 or 2373 or 2573], [2263 or 2374 or 2574]). Emphasizes partial differential equations w/physical applications, including heat, wave, Laplace’s equations. Interpretations of boundary conditions. Characteristics, Fourier series, transforms, Green’s functions, images, computational methods. Applications include wave propagation, diffusions, electrostatics, shocks.

Math 5588. Elementary Partial Differential Equations II. (4 cr; A-F only. Prereq–[2243 or 2373 or 2573], [2263 or 2374 or 2574]). Heat, wave, Laplace’s equations in higher dimensions. Green’s functions, Fourier series, transforms. Asymptotic methods, boundary layer theory, bifurcation theory for linear/nonlinear PDEs. Variational methods. Free boundary problems. Additional topics as time permits.

Math 5594H. Honors Mathematics: Topics. (4 cr [max 12 cr]; A-F only. Prereq–[3593H with grade of at least B, experience in writing proofs] or [A-F, intended for mathematically-talented students with proven achievement in theoretical mathematics courses] Topics vary depending on interests of instructor. Theoretical treatment of chosen topic.


Math 5651. Basic Theory of Probability and Statistics. (4 cr. Stat 5101. Prereq–[2263 or 2374 or 2573], [2243 or 2373], [2283 or 2374 or 3283]) recommended) Logical development of probability, basic issues in statistics. Probability properties, random variables, their distributions/expected values. Law of large numbers, central limit theorem, generating functions, sampling, sufficiency, estimation.


Math 5705. Enumerative Combinatorics. (4 cr. Prereq–[2243 or 2373 or 2573], [2263 or 2374 or 2574 or 3283]) Basic enumeration, bijections, inclusion-exclusion, recurrence relations, ordinary/exponential generating functions, partitions, Polya theory. Optional topics include trees, asymptotics, listing algorithms, rook theory, invariant theory, permutation statistics. Math 5707. Graph Theory and Non-Enumerative Combinatorics. (4 cr. Prereq–[2243 or 2373 or 2573], [2263 or 2374 or 2574]; [2283 or 3283 or experience in writing proofs] highly recommended) Basic topics in graph theory: connectedness, Eulerian/Hamiltonian properties, trees, colorings, planar graphs, matchings, flows in networks. Optional topics include graph algorithms, Latin squares, block designs, Ramsey theory.


Math 5900. Tutorial in Advanced Mathematics. (1-6 cr [max 120 cr]) Individually directed study.

Mechanical Engineering (ME) Department of Mechanical Engineering Institute of Technology

ME 211. Introduction to Engineering. (4 cr; A-F only. Prereq–IT lower div) Develop skills critical for practicing engineers. Core disciplinary areas of mechanical engineering and engineering design. Extensive exposure to visual, written and oral communication forms, and computer-based design tools. Substantial design projects, including prototype construction.

ME 3041. Industrial Assignment I. (2 cr; A-F only. Prereq–ME upper div, reg in ME co-op program) Industrial work assignment in engineering internship program. Evaluation based on student’s formal written report covering the quarter’s work assignment.

ME 3080. Topics in Mechanical Engineering. (1-4 cr [max 8 cr. Prereq–A]) Specialized topics within various areas of mechanical engineering. Topics vary each semester.


ME 3222. Design and Manufacturing II. (4 cr; A-F only. Prereq–Upper div ME student, 3221. CSci 1113 or equiv) Selection of standard mechanical components such as bearings, gears, and fasteners. Analysis and synthesis of motion in machines. Displacement, velocity, and acceleration in mechanisms. Machine design project: apply lecture topics to develop new machines that fulfill customer specifications.


ME 3321. Thermodynamics. (4 cr; A-F only. Prereq–Chem 1021, Math 2243, Phys 1301, IT student, [wood and paper science or paper science engineering major]) Properties, equations of state, processes, cycles for reversible/irreversible thermodynamic systems. Modes of work/heat transfer. Equations for conservation of mass, linear momentum, energy, entropy. Mixture properties, thermodynamics, chemical equilibrium for ideal gases.


ME 4031W. Basic Mechanical Measurements Laboratory. (4 cr; A-F only. Prereq–[3501I, pr 3232, IE 4521, upper div ME) Experimental methods, instrumentation for engineering measurements, statistical estimates of experimental uncertainty, calibration, signal conditioning, selected transducers for mechanical measurements, data acquisition/processing, presentation of results. Measurement of temperature, pressure, humidity, stress-strain, force, velocity, and flow/radiative properties.

ME 4042. Industrial Assignment II. (2 cr; A-F only. Prereq–ME upper div, reg in ME co-op program) Industrial work assignment in engineering internship program. Evaluation based on student’s formal written report covering the quarter’s work assignment.

ME 4043W. Industrial Assignment III. (4 cr; A-F only. Prereq–4042) Solution of system design problems that require developing criteria, evaluating alternatives, and generating a preliminary design. Final report emphasizes design communication and describes design decision process, analysis, and final recommendations.

ME 4054W. Design Projects. (4 cr; A-F only. Prereq–2011, 3631, 3221, 3223, 3231, 3232, AEM 2021, AEM 3031) Students work in teams and undertake a single substantial design project. Design problems are open-ended. Lecture covers good product design process. Teams give formal presentation of progress at mid-semester design review and show completed work at the design show.

ME 4055W. Extended Design Project. (4 cr; A-F only. Prereq–4054) # Continuation of 4054 for students wishing to undertake a more substantial design project for an entire year. Permission granted when student takes 4054 and commits to undertake a two-semester design project. Meets with 4054.

ME 4081H. Mechanical Engineering Honors Thesis I. (2 cr; A-F only. Prereq–Upper div ME honors student, #) Unstructured research course, enabling honors students to do independent research supervised by faculty. Selection of suitable topics according to individual interests and faculty approval. Thesis and oral defense.

ME 4082H. Mechanical Engineering Honors Thesis II. (2 cr; A-F only. Prereq–Upper div ME honors student, #) Unstructured research course enabling honors students to do independent research supervised by faculty. Selection of suitable topics according to individual interests and faculty approval. Thesis and oral defense.
ME 4311W. Thermal Environmental Engineering Laboratory. (4 cr; A-F only. Prereq–3031, 3222, [ME upper div or grad student]) Experiments in psychrometrics, refrigeration, air conditioning, solar energy, indoor air quality, and other topics related to refrigeration, building heating/cooling, and indoor air quality.

ME 4231. Motion Control Laboratory. (4 cr; A-F only. Prereq–3031, 3201, ME upper div) Microprocessor programming, digital filters, frequency response testing, modeling of electromechanical systems, closed loop velocity and position control, programmable logic controllers, factory automation, open loop position control of a vibratory system using input shaping, closed loop position control using pole placement.


ME 4331W. Thermal Engineering Laboratory. (4 cr; A-F only. Prereq–IT upper div or grad student, 3031, 3321, 3322) Measurement and analysis of heat transfer in single phase, multiphase, and reacting environments. Emphasis on experimental measurements relevant to thermal/fluid systems as well as the statistical design of experiments and uncertainty analysis. Heat exchanger testing.

ME 4431W. Energy Conversion Systems Laboratory. (4 cr; A-F only. Prereq–Upper div ME or grad student, C or grade better in 3031, 3321, 3322 or 3324 with §) Senior lab in which material from courses is applied to analyze the operation and control of engines, power plants, heating and ventilation systems. Emphasis on principles underlying performance characteristics of devices, measurement techniques, interpretation of experimental data, and presentation of results.

ME 5080. Topics in Mechanical Engineering. (4 cr. Prereq–Upper div IT or grad student; submission of permission form, §) Topics vary each semester.

ME 5090. Advanced Engineering Problems. (1-4 cr. Prereq–ME upper div, §) Special investigations in various fields of mechanical engineering and related areas including an independent study project.

ME 5101. Vapor Cycle Systems. (4 cr; A-F only. Prereq–IT upper div or grad student) Vapor compression and absorption refrigeration systems; heat pumps; vapor power cycle analysis, regeneration, reheat, compound cycle modifications, combines gas turbine—vapor cycle systems.

ME 5103. Thermal Environmental Engineering. (4 cr; A-F only. Prereq–IT upper div or grad, 3322 or 3323) Thermodynamic properties of moist air; psychrometric charts; HVAC systems; solar energy; human thermal comfort; indoor air quality; heating and cooling loads in buildings.

ME 5105. HVAC System Design. (4 cr; A-F only. Prereq–5103, [IT upper div or grad student]) Design procedures used for heat exchangers, cooling towers, hydraulic systems, and air handling systems. HVAC system design for a commercial building.

ME 5113. Aerosol/Particle Engineering. (4 cr; A-F only. Prereq–IT upper div or grad student) Kinetic theory, definition, theory and measurement of particle properties, and elementary particle mechanics, particle statistics, Brownian motion and diffusion, coagulation, evaporation and condensation, sampling and transport.

ME 5115. Air Quality and Air Pollution Control. (4 cr; A-F only. Prereq–IT upper div or grad student) Air pollution sources, atmospheric transport, transformations, fate, and emissions control. Air pollution meteorology, dispersion, chemistry of secondary pollutant formation, standards and regulation. Control devices and techniques for gaseous and particulate emissions. Cyclones, electrostatic precipitators, wet and dry scrubbers, combustion modification.

ME 5116. Cleanroom Technology and Particle Monitoring. (4 cr; A-F only. Prereq–IT upper div or grad student) Fundamentals of cleanroom technology for microelectronics manufacturing; airborne and liquid-borne particulate contaminants; particle monitors; optical and condensation particle counters, wafer surface scanner, microscopy, filter performance and testing; cleanroom design and operation; high purity systems; particle detection in processing equipment.


ME 5228. Introduction to Finite Element Modeling, Analysis, and Design. (4 cr; A-F only. Prereq–IT upper div or grad, 3221, AEM 3031, CSci 1113, MatS 2001) Finite elements as principal analysis tool in computer-aided design. Numerical and implementation aspects for modeling and analyzing engineering problems encompassing stress analysis, heat transfer, and flow problems for linear situations. One-, two-, and three-dimensional practical engineering applications.

ME 5229. Computer Aided Engineering Laboratory. (4 cr; A-F only. Prereq–ME or AEM upper div or grad student, 5281 or equiv) Lab experiments illustrate and apply control theory to mechanical engineering systems. Emphasis on real-life control design and implementation, including dynamic modeling, controller design, analysis and simulation, hardware implementation, measurement and sensor calibration, data acquisition, and processing.

ME 5241. Computer-Aided Engineering. (4 cr; A-F only. Prereq–IT upper div or grad, 3322, CSci 1113 or equiv) Apply computer-aided engineering to mechanical design. Engineering design projects and case studies using computer-aided design and finite element analysis software; design optimization and computer graphical presentation of results.

ME 5243. Advanced Mechanism Design. (4 cr; A-F only. Prereq–IT upper div or grad, 3222 or equiv, basic kinematics and dynamics of machines, knowledge of CAD packages such as Pro/Engineer) Analytical methods of kinematic, dynamic, and kinetoelectrodynamic analysis and synthesis of mechanisms. Computerized design for function, path, and motion generation based on Burmeister theory.


ME 5248. Vibration Engineering. (4 cr. Prereq–Upper div IT or grad, 3281) Apply vibration theory to design; optimize isolators, damping mechanisms, viscoelastic constructions and structures. Use modal analysis methods to describe free vibration of complex systems, relating to both theoretical and test procedures.

ME 5281. Analog and Digital Control. (4 cr; Prereq–3281) Continuous and discrete time feedback control systems. Frequency response, stability, poles and zeros; transient responses; Nyquist and Bode diagrams; root locus; lead-lag and PID compensators, Nichols-Ziegler design method. Digital implementation aliasing; computer-aided design and analysis of control system.

ME 5286. Robotics. (4 cr; A-F only. Prereq–3282 or equiv, [upper div ME or AEM or CSci or grad student]) Manipulator forward/inverse kinematics, homogeneous transformations, coordinate frames, Jacobian/velocity control, task-space programming, computational issues. Determining path trajectories. Reaction forces, manipulator dynamics/control. Vehicle kinematics, dynamics, and guidance. Lab project demonstrates concepts.

ME 5341. Case Studies in Therapeutic Engineering and Design. (4 cr; A-F only. Prereq–IT upper div or grad student, 3321, 3322) Characteristics of applied heat transfer problems: nature of problem specification, incompleteness of needed knowledge base, accuracy issues. Categories of applied heat transfer problems (e.g., materials processing, turbomachinery, cooling of electronic equipment, biomedical thermal therapeutic devices, heat exchangers, HVAC systems).


ME 5348. Heat Transfer in Electronic Equipment. (4 cr. Prereq–Upper div IT or grad student, 3322 or 3324) Technology trends and packaging needs of microelectronic components; thermal characteristics, heat transfer mechanisms, and thermal failure modes of modern electronic and microelectronic equipment; reliability prediction techniques; thermal stress and strain in layered structures and solder joints.

ME 5351. Computational Heat Transfer. (4 cr; A-F only. Prereq–IT upper div or grad student, 3322) Numerical solution of heat conduction and analogous physical processes. Develop and use a computer program to solve complex problems involving steady and unsteady heat conduction, flow and heat transfer in ducts, flow in porous media, and other special applications.

ME 5361. Plasma-Aided Manufacturing. (4 cr; A-F only. Prereq–5611. Prereq–Upper div IT or grad student, 3321, 3322 or equiv) Properties of plasmas as a processing medium, process control and system design considerations using specific examples of plasma spray coating, welding, and microelectronics processing.
ME 5381. Biological Transport Processes. (4 cr; A-F only. §BMEn 3310, §ChEn 5753. Prereq–Upper div IT or grad student, transport class [3322 or ChEn 5103] or #) Fluid, mass, and heat transport in biological systems. Mass transfer across membranes, fluid flow in capillaries, interstitium, veins and arteries. Bioinstrument issues in single cells and tissues, artifici al organs, and membrane oxygenators, and drug delivery applications.

ME 5446. Introduction to Combustion. (4 cr; A-F only. Prereq–Upper div IT or grad student, #) Thermodynamics, kinetics, energy and mass transport, and pollutants in reacting systems. Reactors, laminar and turbulent flames. Ignition, quenching, and flame stability. Diffusion flames. Combustion in reciprocating engines, furnaces, and turbines, with emphasis on internal combustion engine performance and emissions.

ME 5461. Internal Combustion Engines. (4 cr; A-F only. Prereq–IT upper div or grad student, C or better in 3322 or 3324) Basic spark ignition and diesel engine principles, air, fuel-air and actual engine cycles, cycle modeling, combustion and emissions, knock phenomena, air flow and volumetric efficiency, mixture requirements, ignition requirements and performance. Lectures and complementary labs.

ME 5462. Gas Turbines. (4 cr; A-F only. Prereq–Upper div IT or grad student, #) Gas turbine cycles, regeneration, recuperation, reheat, intercooling, combined cycle plants, and thermochemical regeneration. Axial and radial flow compressors and turbines; combustor designs, energy analysis, emissions, and noise. Turbojet, fanjet, turboprop engine performance. Stationary power plants, vehicular propulsion, hybrid vehicles.

### Medical Technology (MedT)

#### Department of Laboratory Medicine and Pathology

**Medical School**

MedT 1010. Orientation in Medical Technology. (1 cr; S-N only. Prereq–Fr) Orientation to the medical technology (clinical laboratory science) profession.

MedT 4046. Introduction to Clinical Immunohematology. (2 cr; A-F only. Prereq–#) Principles of blood grouping, antibody identification, compatibility testing, serology, and immunology.

MedT 4045. Introduction to Clinical Immunohematology: Laboratory. (2 cr; A-F only. Prereq–#) Exercises illustrating basic techniques in blood grouping, antibody identification, compatibility testing, and detection of antibodies by serological and immunological methods.

MedT 4082. Applied Clinical Chemistry. (3 cr; S-N only. Prereq–4310, 4311, 4320, 4321, enrolled MedT student, #) Application of basic methods/techniques in clinical chemistry lab.


MedT 4087. Applied Diagnostic Microbiology. (2 cr; S-N only. Prereq–4100, 4102, enrolled MedT student, #) Isolation, identification, and antimicrobial susceptibility testing of clinically relevant microbes (bacteria, fungi, parasites) from patient specimens.

MedT 4089. Specialty Rotation. (1 cr; S-N only. Prereq–Completion of MedT preclinical professional courses, enrolled MedT student, #) One-week clinical rotation in a specialty lab such as immunophenotyping, cytogenetics, surgical pathology, molecular diagnostics, immunology, or forensics.

MedT 4090. Special Laboratory Methods. (1-2 cr. Prereq–#) Individual assignment to a special area of experience in the clinical lab.

MedT 4092. Honors Program: Laboratory Methods. (3 cr. Prereq–#) Individual assignment to special projects or research in one of the clinical areas of chemistry, hematology, immunohematology, or microbiology.

MedT 4100. Virology, Mycology, and Parasitology for Medical Technologists. (2 cr; A-F only. Prereq–One microbiology course with lab, one biochem course, enrolled MedT student, #) Basic aspects of lab diagnosis of viral, fungal, and parasitic infections. Lecture.


MedT 4105. Principles of Diagnostic Microbiology: Laboratory. (2 cr; A-F only. Prereq–One microbiology course with lab, one biochem course, enrolled MedT student, #) Current techniques used in lab diagnosis of infectious disease. Isolating/identifying bacteria/ yeasts. Antimicrobial susceptibility testing. Lab.

MedT 4127W. Introduction to Management and Education I. (1 cr; A-F only. Prereq–#) Basic concepts in management and education.

MedT 4251. Hematology I: Basic Techniques. (3 cr; A-F only. Prereq–#) Theory and application of basic principles and techniques in clinical hematology and hemostasis. Lecture and lab.

MedT 4252. Hematology II: Morphology and Correlation. (2 cr; A-F only. Prereq–[4251 or CLS 5251], enrolled MedT student, #) Fundamentals of examining blood and bone marrow. Emphasizes microscopic identification of immature/ abnormal cells. Clinical correlation of lab findings in hematology/hemostasis. Lecture, lab.

MedT 4253. Hemostasis. (1 cr; A-F only. Prereq–[4251 or CLS 5251], enrolled MedT student, #) Theory/application of specific concepts/techniques in hemostasis/coagulation. Lecture, lab.

MedT 4263. Comparative Hemostasis. (1 cr; A-F only. Prereq–#) Theory and application of specific concepts and techniques in hemostasis and coagulation.

MedT 4310. Clinical Chemistry I: Lecture. (2 cr; A-F only. Prereq–One organic chem course with lab, one biochem course, #) Principles and theory of clinical chemistry to assess renal and metabolic disease/dysfunction involving hormones, enzymes, lipids/lipoproteins, cardiac function, liver and digestive tracts. Emphasis on measurement methods and physiological significance.

MedT 4321. Clinical Chemistry II: Laboratory. (2 cr; A-F only. Prereq–One organic chem course with lab, one biochem course, 4310 or CLS 5310, #) Principles and theory of clinical chemistry to assess metabolic disease/dysfunction involving hormones, enzymes, lipids/lipoproteins, cardiac function, liver and digestive tracts. Emphasis on measurement methods and physiological significance.

MedT 4400. Immunological and Molecular Basis of Laboratory Testing. (1 cr [max 2 cr]; A-F only. Prereq–BioC 3021, #) Basic concepts in immunology, cytogenetics, molecular biology, and basic clinical laboratory testing. Lecture.

### Medicinal Chemistry (MedC)

#### Department of Medicinal Chemistry

**College of Pharmacy**

MedC 5185. Principles of Biomolecular Simulation. (3 cr. Prereq–Chem 3502 or #) Molecular simulation for students in medicinal chemistry, pharmacuetics, biochemistry, and chemical physics.


MedC 5202. Research and Development Process of Pharmaceutical Products. (2 cr; S-N only) New drug development process in the U.S. pharmaceutical industry.

MedC 5245. Introduction to Drug Design. (3 cr; A-F only. Prereq–Chem) Concepts that govern design/discovery of drugs. Physical, bioorganic, medicinal chemical principles applied to explain rational design, mechanism of action drugs.

MedC 5494. Advanced Methods in Quantitative Drug Analysis. (3 cr; A-F only. Prereq–#) Quantitative methods (HPLC, GC, TLC, and immunooassays) for analysis of drugs and metabolites in biological fluids. Advanced techniques such as capillary electrophoresis, supercritical fluid chromatography, GC-MS, LC-MS, and tandem mass spectrometry. Chromatographic theory and statistical approaches to method validation.

MedC 5495. Vistas in Medicinal Chemistry Research. (1 cr; S-N only) Selected topics of contemporary interest in medicinal chemistry.

MedC 5600. General Principles of Medicinal Chemistry. (3 cr; A-F only. Prereq–MedC grad student or #) Fundamental principles of drug receptors as therapeutic targets, drug-receptor interactions, enzyme inhibitors, drug metabolism and disposition.
Microbial Engineering (MicE)

BioTechnology Institute
College of Biological Sciences

MicE 5309. Biocatalysis and Biodegradation. (3 cr.) Prereq.–Chem through organic chem, microbial or adv chem, knowledge of word proc, e-mail, WWW access; access to college-level sci library recommended. Assessing validity of information on biocatalysis and biodegradation; fundamentals of microbial catabolic metabolism as it pertains to biodegradation of environmental pollutants; biocatalysis for specialty chemical synthesis; display of this information on the World Wide Web.

MicE 5355. Advanced Fermentation and Biocatalysis Laboratory. (3 cr.) Prereq.–[BioI 3301 or MicE 3301]; grad student in microbial engineering or upper-div major in [microbiology or chem engineering or biochemistry]. Methods in industrial microbiology, laboratory, and pilot scale fermentation/biocatalysis engineering. Laboratory experiments carried out in fermentation pilot plant. Operation of bench scale and pilot scale bioreactors, designing bioreactors, process optimization, process monitoring/control, scale-up experiments, experimental design, data analysis.

Microbiology (MicB)

Department of Microbiology

MicB 4111. Microbial Physiology and Diversity. (3 cr.) Prereq.–MicB/VBP 2022 or Biol/MicB/VBP 2032 or Biol/MicB 3301, Biol/BioC 3021 or Biol/4331, 3 cr genetics.


MicB 4131. Immunology. (3 cr. Prereq.–MicB/VBP 2022) Molecular, genetic, and cellular bases for humoral and cell-mediated immunity; innate immunity; antigen recognition by B and T lymphocytes; interactions between lymphocytes and other cells of the immune system; cytokines; immunoregulation; key aspects of clinical immunology.


MicB 4151. Molecular and Genetic Bases for Microbial Diseases. (3 cr.) Prereq.–[3301 or 3301 or equiv.] [4131 or ¥4131, Biol 3021 or Biol 3021 or Biol 4331]; [Biol 4003 or GCB 3022] recommended) Genetic basis of microbial pathogenesis. Effect of gene transfer/transportation on evolution of microbial pathogens and on their capacity to colonize, induce disease. Biochemical/cellular interactions between bacteria and their host organisms.


MicB 4215. Advanced Laboratory: Microbial Physiology and Diversity. (3 cr. A-F only. Prereq.–4111 or ¥4111) Isolation/cultivation of wide variety of bacteria. Physiological experiments illustrate characteristic features of microorganisms.

MicB 4235. Advanced Laboratory: Virology, Immunology and Microbial Genetics. (3 cr. Prereq.–Biol/ BioC 3021 or equiv; Biol/MicB 3301, two of the following MicB 4131, 4141, 4151) Techniques and experimental methods in microbial genetics, immunology and virology used to study microbes and their interactions with a host.

MicB 4793W. Directed Studies: Writing Intensive. (1-7 cr.; max 7 cr.) S-N only. Prereq.–#; no more than 7 cr of [4793, 4794, 4993, 4994] may count toward major requirements

Individual study on selected topics or problems. Emphasizes readings, use of scientific literature.

MicB 4794W. Directed Research: Writing Intensive. (1-7 cr.; max 15 cr.) S-N only. Prereq.–#, no more than 7 cr of [4793, 4794, 4993, 4994] may count toward major requirements

Laboratory or field investigation of selected areas of research.

MicB 4993. Directed Studies. (1-7 cr.; max 7 cr.) S-N only. Prereq.–Cr or Biol/MicB 3301, or # of MicB 4993 and/ or 4994 may count toward major requirements

Individual study on selected topics or problems with emphasis on selected readings and scientific literature.

MicB 4994. Directed Research. (1-7 cr.; max 7 cr.) S-N only. Prereq.–Cr or Biol/MicB 3301, or # of MicB 4993 and/or 4994 may count toward major requirements

Lab or field investigation of selected areas of research.

MicB 5205. Microbiology and Immunology for Medical Students. (0-7 cr.) Basic/clinical human immunology, medical microbiology. Molecular/cellular basis of immune responses, tolerance. Immunologic disease, serology, antimicrobial agents, chemotherapy. Basic/medical bacteriology, parasitology, mycology, virology. Unifying principles governing pathogenesis. Diseases are grouped with organisms important in differential diagnosis.

Middle Eastern Languages and Cultures (MELC)

Institute of Linguistics, ESL, and Slavic Languages and Literatures
College of Liberal Arts

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

MELC 3491. Classical Islamic Civilization. (3 cr. §Afro 3491, Hist 3491) Islamic legacy in the classical age (800-1400) in medical and natural sciences, mathematics, philosophy, literature, and transmission to Europe.

MELC 3505. Survey of the Middle East. (3 cr. §Arab 3505, §4305) Peoples, lands, and cultures of the Middle East. Historical survey from earliest civilizations to the present.

MELC 3511. Ancient Iran. (3 cr. §CAS 3511) The development of ancient Iranian culture under the Achaemenids and the Sassanians; the impact of the Zoroastrian religion on Iranians and of Hellenism on the east, especially on such domains as Bactria. Iran’s contribution to the flourishing of the cultures of the Silk Road, the thread that connected distant China and Europe.

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

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

For definitions of course numbers, symbols, and abbreviations, see page 300.
Course Descriptions

MELC 3531, Central Asian Culture and Literature. (3 cr. [CAS 3511]) Dynamics of life in contemporary Afghanistan, Iran, and Central Asia. Emphasizes role of ethnicity/ideology. Central Asian fictional illustrations of impact of sovietization on Islamic traditions.

MELC 3532, Russia and Central Asia. (3 cr. §§5532, §§AS 3532) Rise and fall of the Mongol Empire, formation of the Chaghatay Khanate and the Golden Horde. Russian expansion into Central Asia and rivalry with Britain. Russia and the Central Asian republics during and after the Soviet period.

MELC 3533, Islam and the West. (3 cr.) Cultural/intellectual trends that have defined the fundamental differences between Islam and the West. Development of historical, philosophical, and intellectual mindset of both spheres. Factors that have contributed and continue to contribute to tension, anxiety, and hatred between the Muslim world and Europe and the United States.

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

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

MELC 3543, Arabs under Mamluks and Ottomans: 1300–1920. (3 cr. §Arab 3543, §Hist 3543) Arabs under Mamluk rule. Struggle against Crusaders and Mongols. Disintegration and reemergence under Muhammad Ali of Egypt, dynamic struggles in Syria, rise of Young Turks and Arab revolt.

MELC 3544, Arab World 1920 Until the Present. (3 cr. §Arab 3544, §Hist 3544) Struggle in the Arab world for independence and its course since independence. Emphasis on development, political stability and unity, political structures, and the Arab-Israeli conflict.

MELC 3601, Persian Fiction in Translation. (3 cr. §5601, §CAS 3601, §CAS 5601) Impact of westernization on Iran, from 1920s to present. Materials produced by Iranian writers, film makers, and intellectuals. Internal/external forces that bind contemporary Iranian society to world civilization. Works of Hedayat (especially Blind Owl), Chubak, Al-i Ahmad, Daneshvar, and Behrangy are analyzed/interpreted.

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

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

MELC 5601. Medieval Sages. (3 cr. §CAS 5526) Development of medieval Islamic culture in Transoxiana; formation of Sufi orders; rise and development of Communist ideology; introduction of socialist principles into Central Asia; clash of Islamic principles with Communist dicta; Pan-Islamism; Pan-Turkism.

MELC 5531, Medieval Sages. (3 cr. §§AS 3531) Study and discussion of the intellectual life of the region from the rise of the Ghaznavids (A.D. 1000) to the fall of the Timurids (A.D. 1500). Ibn Sina (Avicenna), al-Biruni, al-Ghazali, Rumi, Sādī, and Firdowsi are among the sages whose lives are examined.

MELC 5602, Persian Fiction in Translation. (3 cr. §CAS 5601) Impact of westernization on Iran, from 1920s to present. Materials produced by Iranian writers, film makers, and intellectuals. Internal/external forces that bind contemporary Iranian society to world civilization. Works of Hedayat (especially Blind Owl), Chubak, Al-i Ahmad, Daneshvar, and Behrangy are analyzed/interpreted.

MELC 5603, Persian Poetry. (3 cr. §CAS 5602) Major poetic works of Iran dealing with life at the medieval courts, Sufic poetry, and “new” poetry are studied. Rudaki, Khayyam, Rumi, Hafiz, Yushij, and Farrukhzad are among the poets whose works are examined.

MELC 5993. Directed Studies. (1–10 cr. Prereq.—#) Can be applied throughout life.

Military Science (Mil) Department of Military Science (Army ROTC) Office of the Executive Vice President and Provost

Mil 0101. Military Science I Leadership Lab. (0 cr.; A–F only. Prereq.—Enrollment in 1010) Learn and practice basic skills. Gain insight into the Advanced Course in order to make an informed decision whether to apply for it. Build self-confidence and team building leadership skills that can be applied throughout life.

Mil 0102. Military Science I Leadership Lab. (1 cr. Prereq.—Enrollment in 1011) Learn and practice basic skills. Gain insight into the Advance Course in order to make an informed decision whether to apply for it. Build self-confidence and team building leadership skills that can be applied throughout life.

Mil 0103. Military Science II Leadership Lab. (1 cr. Prereq.—Enrollment in 1220) Learn and practice basic skills. Gain insight into the Advance Course in order to make an informed decision whether to apply for it. Build self-confidence and team building leadership skills that can be applied throughout life.

Mil 0104. Military Science II Leadership Lab. (1 cr. Prereq.—Enrollment in 1221) Learn and practice basic skills. Build self-confidence through individual and team building concepts. Gain insight into the advance course in order to make an informed decision on whether to apply. Further develop your leadership style through practical application scenarios.

Mil 0105. Military Science III Leadership Lab. (1 cr. Prereq.—Enrollment in 3130) Involves leadership responsibilities for the planning, coordination, execution, and evaluation of various training and activities with Basic Course students and for the ROTC program. Students develop, practice, and refine leadership skills by serving and being evaluated in a variety of responsible positions.

Mil 0106. Military Science III Leadership Lab. (1 cr. Prereq.—Enrollment in 3131) Involves leadership responsibilities for the planning, coordination, execution, and evaluation of various training and activities with Basic Course students and for the ROTC program. Students develop, practice, and refine leadership skills by serving and being evaluated in a variety of responsible positions.

Mil 0107. Military Science IV Leadership Lab. (1 cr. Prereq.—Enrollment in 3140) Involves leadership responsibilities for the planning, coordination, execution, and evaluation of various training and activities with Basic Course students and for the ROTC program. Students develop, practice, and refine leadership skills by serving and being evaluated in a variety of responsible positions.

Mil 0108. Military Science IV Leadership Lab. (1 cr. Prereq.—Enrollment in 3141) Involves leadership responsibilities for the planning, coordination, execution, and evaluation of various training and activities with Basic Course students and for the ROTC program. Students develop, practice, and refine leadership skills by serving and being evaluated in a variety of responsible positions.

Mil 1010. Introduction to ROTC. (1 cr. Prereq.—Enrollment in 1001) Increase self-confidence through team study and activities in basic drill, physical fitness, rappelling, leadership reaction course, first aid, making presentations, and basic marksmanship. Learn fundamental concepts of leadership in a profession in both classroom and outdoor lab environments.

Mil 1011. Introduction to Leadership. (1 cr. Prereq.—Enrollment in 1002) Learn/apply principles of effective leading. Reinforce self-confidence through participation in physically and mentally challenging exercises. Relate organizational ethical values to the effectiveness of a leader. Participation in a weekend exercise is optional, but highly encouraged.

Mil 1220. Self/Team Development. (2 cr.; A–F only. Prereq.—Enrollment in Basic Course) Learn and apply ethics-based leadership skills that develop individual abilities and contribute to the building of effective teams. Develop skills in oral presentations, writing concisely, planning of events, coordination of group efforts, advanced first aid, land navigation, and basic military tactics. Fundamentals of ROTC’s Leadership Development program.
Course Descriptions

Mortuary Science (Mort)

Medical School Administration

Mort 3005. History of Funeral Service. (2 cr; A-F only)
Development of funeral practices from a historical perspective with emphasis on ethnic and cultural groups that have had an impact on contemporary funeral service.

Mort 3012. Organization and Management of Funeral Business. (3 cr; A-F only; Prereq--Mortuary science major)
Principles and concepts of business organization and structure. Focus is on differences/similarities of funeral home management in a small business setting versus a corporate funeral home setting.

Mort 3014. Funeral Service Rules and Regulations. (3 cr; A-F only; Prereq--Mortuary science major)
Licensing/government regulations, compliance with regulations of state/federal regulatory agencies, cemetery and crematory rules and regulations, and Federal Trade Commission Funeral Practice Rule for the funeral industry.

Mort 3016. Funeral Service Marketing and Merchandising. (3 cr; A-F only; Prereq--Mortuary science major)
Funeral home marketing and merchandising, including advertising, promotion, purchasing, and pricing.

Mort 3018. Funeral Practice. (3 cr; A-F only; Prereq--Mortuary science major)
Practices and procedures related to funeral directing, including social, religious, ethical, and cultural issues; event planning; conducting funeral ceremonies; record keeping; computer applications.

Mort 3021W. Funeral Service Psychology. (3 cr; A-F only)
Applied psychological principles helpful in dealing with clients, especially those experiencing emotional crisis.

Mort 3022W. Funeral Service Counseling. (3 cr; A-F only; Prereq--Mortuary science major)
Principles, techniques, and basic helping skills of counseling as applied to funeral arrangement conferences.

Mort 3025. Business Law. (3 cr; A-F only)
Basic concepts/principles of business law.

Mort 3030. Funeral Service Law. (3 cr; A-F only)
Duty of burial, right to control funeral arrangements. Torfs involving final disposition of human remains. Wills, estates, probate. State/federal laws related to funeral practice.

Mort 3049. Microbiology. (2 cr; A-F only)
Basic principles of microbiology. Bacteriology, rickettsiology, virology, protozoology, mycology. Methods of transmission of infectious diseases. Control procedures for protection of public health as related to funeral service practice.

Mort 3050. Forensic Pathology: The Anatomy of Death Investigation. Forensic Pathology for the Living. (3 cr; A-F only; Prereq--Mort Sci major or A)
Investigating patterns of injury/disease as related to sudden, unusual, or unexpected deaths. Survey of natural disease processes, their effects on human body, from perspective of forensic investigation.

Mort 3051. Restorative Art. (2 cr; A-F only; Prereq--Mortuary science major)
Theory and procedures of restorative art.

Mort 3059W. Complicated Grief. (3 cr; A-F only; Prereq--Mortuary science major)

Mort 3061. Embalming Theory. (3 cr; A-F only; Prereq--Mortuary science major)
Principles/procedures of embalming theory as related to funeral service practice.

Mort 3065. Embalming Chemistry. (2 cr; A-F only; Prereq--Intro course in general chemistry, registration in mortuary science)

Mort 3090. Independent Study Project. (1-3 cr [max 6 cr]. Prereq--Matriculated mortuary science student)
Independent study course for which a final project, paper, or test is required as contracted between instructor, program director, and student.

Mort 3091W. Independent Study in Funeral Service. (1-4 cr [max 4 cr]. Prereq--Mortuary science major)
Students complete a project supervised by a faculty member. Credit(s) is negotiated with the faculty member based on the size and scope of the project. Students must demonstrate that the project has value within the major.

Mort 3151. Restorative Art Laboratory. (1 cr; A-F only; Prereq--Mortuary science major)
Practical principles and techniques for restorative art. Emphasis on modeling facial features with clay or wax and the use of restorative techniques and cosmetic application on dead human bodies.

Mort 3161. Embalming Laboratory. (1 cr; S-N only; Prereq--Mortuary science major)
Practices/procedures of embalming in a preparation room setting using human cadavers.

Mort 3171. Human Anatomy Laboratory. (2 cr; A-F only; Prereq--3 cr of biology, 3 cr of human anatomy; limited space for non-mortuary science majors)
Study of gross human anatomy, using cadavers. How anatomical structures relate to processes of post-mortem examination, embalming, pathology, restorative art, and forensic science.

Mort 3370. Funeral Service Seminar. (2 cr; A-F only; Prereq--Mortuary science major)
Cross-cultural competencies related to death, dying, and bereavement.

Mort 3379. Clinical Funeral Service Rotation. (2-3 cr [max 12 cr]. Prereq--Mort Sci major, matriculated into prog)
Practical experience working in clinical settings related to funeral service. Rotation sites include licensed funeral homes, licensed crematories, licensed cemeteries, and affiliated institutions such as hospices, hospitals, morgues, and coroner/medical examiners offices.

Mort 3380. Funeral Service Practicum. (8 cr; S-N only.
Prereq--Mortuary science major who has completed all other coursework)
Practical experience during one academic term in a funeral home as assigned by the program.

Museum Studies (MSt)

Graduate School

MSt 5001. Museum History and Philosophy. (3 cr; A-F only; Prereq--MSt)
Historical and philosophical roots of museum development in Europe and North America from the Renaissance to modern day museums and history centers. Emerging philosophical issues faced by museums today.

MSt 5012. Museum Practices. (3 cr; A-F only; Prereq--MSt 5011 or #)
Practical aspects of museum work. Standards, practices, responsibilities, and issues, all set in greater museum context. Curatorial and educational duties, collections management, security, funding, boards, public relations, installation, and budgeting.

MSt 5020. Internship. (1-4 cr [max 32 cr]. S-N only;
Prereq--MSt 5011, 5012, A)
Students arrange to perform a professional-level task in a museum of good standing under close supervision of a member of the museum’s professional staff. Instructor must approve a work plan and report.

For definitions of course numbers, symbols, and abbreviations, see page 300.
Course Descriptions

Music (Mus)

School of Music
College of Liberal Arts

Mus 0901. Junior Recital. (0 cr; A-F only. Prereq–Music major, concurrent registration in applied music, §). Preparation for junior recital. Student will be supervised by major applied instructor.

Mus 0951. Senior Recital. (0 cr; A-F only. Prereq–Music major, concurrent registration in applied music, §). Preparation for senior recital. Student will be supervised by major applied instructor.


Mus 1013. Rock I: The Historical Origins and Development of Rock Music to 1970. (3 cr; A-F only) Musical, cultural, historical, social, and political evolution of rock music, from its traceable antecedents in mid-19th century America through the early 1970s. Emphasizes music in which African, European, and other ethnic traditions combined in a uniquely American manner.


Mus 1051. Class Piano for Nonmusic Majors I. (2 cr) For nonmusic majors with little or no keyboard background. Functional skills such as reading, harmonizing, playing by ear and improvising, along with basic technique and study of elementary solo and ensemble repertoire.

Mus 1052. Class Piano for Non Music Majors II. (2 cr [max 2 cr]) For nonmusic majors with little or no keyboard background. Functional skills such as reading, harmonizing, playing by ear and improvising, along with basic technique and study of elementary solo and ensemble repertoire.

Mus 1151. Piano: Class Lessons I. (2 cr; A-F only. Prereq–Music major, §) Functional skills such as reading, transposing, harmonizing, improvising, and playing by ear. Keyboard theory, technique, and repertoire.

Mus 1152. Piano: Class Lessons II. (2 cr; A-F only. Prereq–Music major, §) Functional skills such as reading, transposing, harmonizing, improvising, and playing by ear. Keyboard theory, technique, and repertoire.

Mus 1155. Keyboard Skills I. (2 cr; A-F only. Prereq–[keyboard major or music major], extensive keyboard background, §) Reading, transposing, harmonizing, improvising, and playing by ear. Keyboard theory, technique, and music learning skills.

Mus 1156. Keyboard Skills II. (2 cr; A-F only. Prereq–1155, §) Reading, transposing, harmonizing, improvising, and playing by ear. Keyboard theory, technique, and music learning skills.

Mus 1260. Voice Class. (2 cr [max 4 cr. Prereq–Basic musicianship for learning and performing simple songs]) The fundamentals of speech and singing including information about the vocal instrument, the vocal process, vocal technique, and how to learn and perform three simple songs.

Mus 1471. Guitar: Class Lessons I. (2 cr; A-F only) Fundamentals for the beginning guitarist; progressive development of skills. Basic strumming techniques, harmonizations in basic keys. Students must furnish acoustic guitar.

Mus 1472. Guitar: Class Lessons II. (2 cr; A-F only. Prereq–1471 or §) Fundamentals for the beginning guitarist; progressive development of skills. Advanced strumming techniques, bass runs, finger-picking strums. Students must furnish acoustic guitar.

Mus 1501. Foundations of Musical Theory: Analysis and Ear-Training I. (3 cr; A-F only. Prereq–[Major music or §, permission number]) Basics of common-practice tonal harmony, part-writing, music analysis in various contexts, ear-training/sight singing.

Mus 1502. Foundations of Musical Theory, Analysis, and Ear-Training II. (3 cr; A-F only. Prereq–[Major music or §, permission number]) Basics of common-practice tonal harmony/part-writing, music analysis in various contexts, ear-training, sight singing.

Mus 1801W. Music, Society, and Cultures. (3 cr; A-F only. Prereq.–[Music major or §, permission number]) Study rural, urban, tribal musics throughout world with interdisciplinary methods of humanities/social sciences. World-wide distribution of musical creativity with audio/video documentation.

Mus 1804. World Music. (3 cr) Musical practice/meaning around the world and in our backyard. World music styles/perspectives in cultural context. Lectures, in-class music making, guest artists, videos, listening.

Mus 1902. Topics: Freshman Seminar. (3 cr; A-F only. Prereq–Fr or no more than 36 cr) Topics specified in Class Schedule.

Mus 1905. Topics: Freshman Seminar. (3 cr; A-F only. Prereq–Fr or no more than 36 cr) Topics specified in Class Schedule.

Mus 1907W. Topics: Freshman Seminar. (3 cr; A-F only. Prereq—Fr or no more than 36 cr) Topics specified in Class Schedule.

Mus 1910W. Topics: Freshman Seminar. (3 cr; A-F only. Prereq—Fr or no more than 36 cr) Topics specified in Class Schedule.

Mus 3021. Introduction to Music. (3 cr) Survey of European and American “art” and “popular” music in context of the arts. Aural analyses of musical styles/forms.

Mus 3029. Music in the 20th Century. (3 cr) Music in European and American culture from 1890s to present. Emphasizes interactions between high art, popular and ethnic musics, contributions of men and women as composers and performers, concurrent developments in the arts, dance, and literature, and music as social commentary.

Mus 3150. Accompanying Skills. (1 cr [max 8 cr; A-F only. Prereq–Fr or piano or organ major or §]) A practical introduction to every facet of the art of piano as an accompaniment and collaborative instrument.

Mus 3230. Chorus. (1 cr [max 8 cr. Prereq–Choral and/or instrumental music background; audition, §]) Includes the University Women’s Chorus, Men’s Chorus, Concert Choir, and Choral Union. Choruses participate in a variety of programs exploring both Western and non-Western repertoire from the Middle Ages through the 20th century. Concerts include touring, and collaborative campus and community performances.

Mus 3241. Vocal Literature I: German Lieder. (1 cr; A-F only. Prereq–Vocal performance or accompanying major; 2 yrs music theory and music history) An exploration of the German Lied, its origins, composers, and development. Musical and textual analysis of representative works, examination of the poetry which serves as song text, and brief survey of poets in the German Romantic period. Extensive listening assignments.

Mus 3242. Vocal Literature II: French Melodie. (1 cr; A-F only. Prereq–Vocal music or accompanying major; 2 yrs of music theory and music history) The French Melodie, its origins, composers, and development. Musical and textual analysis of representative works, examination of the poetry which serves as song text, and brief survey of the French Symbolist poets. Extensive listening assignments.

Mus 3261. Italian Diction for Singers. (1 cr; A-F only. Prereq–Voice or choral music major; concurrent regis in applied voice) The sounds and symbols of the International Phonetic Alphabet, rules for correct Italian lyric diction, rudimentary Italian grammar, the meanings of Italian musical expressive markings, and Italian words most commonly found in song texts.

Mus 3262. English Diction for Singers. (1 cr; A-F only. Prereq–Voice or choral music major; concurrent regis in applied voice) English lyric diction for performance of classical vocal music. Use International Phonetic Alphabet for standard transcriptions of song texts, compile a discography of British/American art songs, perform songs in class, and prepare poetry for oral presentation and improvisation.

Mus 3263. German Diction for Singers. (1 cr; A-F only. Prereq–Voice or choral music major; concurrent regis in applied voice) Principles and practice of German lyric diction for classical vocal music. Applied training, theory and practice in the International Phonetic Alphabet, elementary German grammar and common song vocabulary, 4 to 5 German songs performed in class for critique, and rules for pronunciation.

Mus 3264. French Diction for Singers. (1 cr; A-F only. Prereq–Voice or choral music major; concurrent regis in applied voice) Principles and practice of French lyric diction for classical vocal music. Transcriptions of French melodies into International Phonetic Alphabet, elementary French grammar and common song vocabulary, 4 to 5 French songs performed in class for critique, and rules for pronunciation.

Mus 3340. Jazz Ensemble. (1 cr [max 8 cr; A-F only. Prereq–Audition, §]) A 20-member performing organization covering significant jazz compositions and arrangements written specifically for this medium.

Mus 3350. Jazz Combo. (1 cr [max 8 cr; A-F only. Prereq–Audition, §]) A performance laboratory class with emphasis on improvisation and learning the jazz vocabulary. A minimum of two public performances is required each semester.

Mus 3401. Basic Conducting. (2 cr; A-F only. Prereq–1502, music major) Beginning course in basic conducting techniques and role of the conductor.

Mus 3410. University Wind Bands. (1 cr [max 14 cr]; A-F only. Prereq–Audition, #) Wind ensemble and symphony bands perform standard and contemporary literature; concerts and tour appearances. Players from all colleges may participate.

Mus 3420. Orchestra. (1 cr [max 8 cr]; A-F only. Prereq–Audition, #) Symphony orchestra performs standard repertory and major works with chorus; concerts and tour appearances. Players from all colleges may participate.

Mus 3430. Campus Orchestra. (1 cr [max 8 cr]; Prereq–A-F only. Prereq–#) An orchestra for players who are not music majors and/or are unable to register for University Orchestra. Standard chamber orchestra and string orchestra literature rehearsed and performed.

Mus 3440. Chamber Ensemble. (1 cr [max 8 cr]; A-F only. Prereq–#) Performance of chamber music; duos, trios, quartets, quintets, and other ensembles for instruments and voices.

Mus 3480. Marching Band. (1 cr [max 4 cr]; A-F only. Prereq–#) A 250-member performing organization open to players from all colleges. Performs at University football games and other athletic functions.

Mus 3490. Athletics Bands. (2 cr [max 16 cr]; A-F only. Prereq–#) Athletics bands for men’s hockey, men’s basketball, and women’s sports.


Mus 3502. Theory and Analysis of Tonal Music IV. (3 cr; A-F only. Prereq–3501, △) Harmony and voice-leading. Choral, madrigals and Masses. Advanced techniques of analysis for group and individual instruction at the intermediate, early intermediate, and late intermediate levels.


Mus 3504. Intensive Theory and Analysis of 20th-Century Music. (4 cr; A-F only. △Prereq–Music 3501, music major) or #) Theory/analysis of at least one style developed in 20th century (by semester).

Mus 3508. Review of Tonal Theory. (3 cr; A-F only. Prereq–Theory placement exam) For students planning to take 3501 or 3502. Fast-paced review of 1501, 1502, and 2501. May be repeated for credit.


Mus 3601W. History of Western Music I. (3 cr; A-F only. Prereq–1151 or 1155, 1501, music major) History of European art-music tradition, its social contexts from antiquity to 1700: composers, styles, structures, social institutions.

Mus 3602W. History of Western Music II. (3 cr; A-F only. Prereq–1502, 3601, music major) History of European art-music tradition, its social contexts, from 1700 to 1850. Composers, styles, structures, social institutions.

Mus 3603W. History of Western Music III. (3 cr; A-F only. Prereq–1503, 3602, music major, #) History of European/American art, popular music traditions, from 1850 to present. Composers, styles, structures, social institutions.

Mus 3950. Topics in Music. (1-3 cr [max 15 cr]) Each offering focuses on a single topic. Topics specified in Class Schedule.

Mus 3993. Directed Studies. (1-4 cr [max 10 cr]; A-F only. Prereq–#) Guided individual reading or study.

Mus 3995. Major Project. (1 cr; A-F only. Prereq–Undergrad music major in B.A. program, △, #) Required of music majors in senior year of the B.A. program. Research paper on topic of student’s choice in consultation with faculty mentor. Sign up in Undergraduate Studies office one term in advance.

Mus 5101. Piano Pedagogy I. (2 cr. Prereq–8 cr in MusA 1301 or MusA4101 or #) Demonstration and discussion of teaching techniques, methods, and materials for group and individual instruction at the intermediate, early intermediate, and late intermediate levels.

Mus 5102. Piano Pedagogy II. (2 cr. Prereq–8 cr in MusA 1301 or MusA 1401 or #) Demonstration and discussion of teaching techniques, methods, and materials for group and individual instruction at the intermediate and early advanced levels.

Mus 5111. Advanced Piano Pedagogy I. (2 cr; A-F only. Prereq–5102 or grad piano major or #) Demonstration and discussion of teaching techniques, methods, and materials for group and individual instruction at the intermediate and early advanced levels.

Mus 5112. Advanced Piano Pedagogy II. (2 cr; A-F only. Prereq–5101 or grad piano major or #) Demonstration and discussion of teaching techniques, methods, and materials for group and individual instruction at the intermediate and early advanced levels.

Mus 5120. Piano Pedagogy Practicum. (1 cr [max 4 cr]; A-F only. Prereq–5101-5102 or 5111-5112 or #) Supervised teaching of a piano pupil or group of pupils for one semester (minimum 12 weeks for one half-hour per week). Supervising instructor will assist with selection of materials, periodic consultation, and observation (live or video taped) of selected lessons.

Mus 5131. Advanced Keyboard Skills I. (2 cr; A-F only. Prereq–3502, sr or grad) Diatonic and chromatic harmony at the piano. Also diatonic and chromatic harmony at the piano. Realization of figured basses of the 17th and 18th centuries. Performance of choral, orchestral, and chamber music of the 17th and 20th centuries, from open score using all clefs.

Mus 5132. Advanced Keyboard Skills II. (2 cr; A-F only. Prereq–3502, sr or grad) Diatonic and chromatic harmony at the piano. Realization of figured basses of the 17th and 18th centuries. Performance of choral, orchestral, and chamber music of the 17th and 20th centuries, from open score using all clefs.

Mus 5141. Piano Literature. (2 cr; A-F only. Prereq–12 cr of MusA 1301 or MusA 1401 or #) Introductory survey of representative keyboard literature from the Baroque to the mid-20th century. Study of typical forms, style features, technical issues, and performance practice for each period.

Mus 5150. Body Awareness in Activity: The Alexander Technique. (2 cr; A-F only. △Prereq–5101-5102 or 5111-5112 or #) Principles and techniques of singing in English. Italian, Spanish, German, and French. International Phonetic Association alphabet used.

Mus 5170. Vocal Accompanying Skills and Repertoire. (2 cr [max 4 cr]; A-F only. Prereq–Accomp major) Performance class in accompanying Western and non-Western repertoire. Orchestral and choral repertoire. Prerequisite for work in all major and minor voice courses. Performance class (4 cr) with emphasis on orchestral reductions and solo repertoire. Requirements of performance class (3 cr) with emphasis on vocal techniques and performance practice.

Mus 5181. Advanced Piano Literature I. (2 cr; A-F only. Prereq–Grad piano major or #) Literature for piano from late Baroque period to mid-20th century.

Mus 5182. Advanced Piano Literature II. (2 cr; A-F only. Prereq–Grad piano major or #) Literature for piano from late Baroque period to mid-20th century.

Mus 5230. Chorus. (1 cr [max 8 cr]; Prereq–Choral and/or instrumental music background; audition, #) University Women’s Chorus, Men’s Chorus, Concert Choir and Choral Union. Choirs participate in a variety of programs exploring both Western and non-Western repertoire from the Middle Ages through the 20th century. Concerts include touring, collaborative campus and community performances.

Mus 5240. Chamber Singers. (1 cr [max 8 cr]; A-F only. Prereq–Audition, #) Mixed chorus of about 24 voices. Performances each semester for workshops and small choirs.

Mus 5241. Vocal Literature I. (3 cr [max 3 cr]; A-F only. Prereq–Audition, #) Vocal literature of major/minor composers from 17th/18th centuries to present. Structure, style, performance practice.

Mus 5242. Vocal Literature II. (3 cr; A-F only. Prereq–Audition, #) Vocal literature of major and minor composers from 17th century to present; structure, style, and performance practice.

Mus 5250. Opera Workshop and Ensemble. (1 cr [max 8 cr]; A-F only. Prereq–Audition, #) Preparation and performance of operatic arias, choruses, and scenes. Participation in fully staged or workshop productions of music theatre repertoire.

Mus 5270. Voice Practicum. (1 cr [max 2 cr]; Prereq–Undeclared or vocal major or #) Teaching voice class or individual students with peer and faculty feedback. Assist in class voice instruction or teach two students weekly in conjunction with one-week observation labs. May be taken for two semesters.

Mus 5271. Diction for Singers I. (2 cr; A-F only. Prereq–12 cr of MusA 1304 or grad music major or #) Principles and techniques of singing in English, Italian, Spanish, German, and French. International Phonetic Association alphabet used.

Mus 5272. Diction for Singers II. (2 cr; A-F only. Prereq–12 cr of MusA 1304 or grad music major or #) Principles and techniques of singing in English, Italian, Spanish, German, and French. International Phonetic Association alphabet used.

Mus 5275. Vocal Pedagogy I. (3 cr; Prereq–Sr vocal major or #) Advanced study of mind/body preparations for singing, anatomy, and physiology of the vocal mechanism. Voice use and care, historical and comparative pedagogy, learning theories, models and guidelines for teaching, instructional techniques, and diagnosing and solving vocal problems.
Mus 5277. Vocal Workshop. (1-2 cr [max 8 cr]; A-F only. Prereq—Music major or #) Short, vocal workshop workshops address specific topics including voice science, pedagogy, and performance of vocal repertoire. One workshop focuses on class voice instruction.

Mus 5279. Group Voice: Performance/Pedagogy. (2-3 cr; A-F only. Prereq—Performance only track: 2 cr per term. Performance/Pedagogy track: 3 cr per term; upper div student or grad student), #) Foundations/fundamentals of speech/singing, Vocal production, anatomy, physiology, terminology, Application of vocal techniques in learning/performing repertoire. Teaching methods, including voice/motion exercises.


Mus 5283. Choral Conducting Technique. (1 cr; A-F only. Prereq—#) Choral conducting, rehearsal techniques, interpretation of music.

Mus 5284. Choral Conducting I: Gregorian Chant Through Baroque. (2 cr; A-F only. Prereq—#) Techniques and rehearsal procedures. Focus on music before 1750 including works by Mozart, Haydn, Beethoven, Mendelssohn, Brahms, and Stravinsky.

Mus 5340. Jazz Ensemble. (1 cr [max 6 cr]; A-F only. Prereq—Audition, #) A 20-member performing organization covering significant jazz compositions and arrangements written specifically for this medium.

Mus 5341. Jazz Pedagogy. (2 cr; A-F only. Prereq—#) Teaching methods of vocal and instrumental jazz improvisation, basic arrangement techniques, and jazz history, bibliographies and materials.

Mus 5342. Jazz Theory. (3 cr; A-F only. Prereq—3502 or #) Beginning through advanced techniques for chord construction. Extended chords. Nomenclature in jazz idiom.

Mus 5380. Gospel Choir. (1 cr [max 4 cr]; A-F only) Performance ensemble. Students explore history of gospel music through experiential/participatory songs, field studies, songs of struggle, Southern, traditional, and contemporary songs.

Mus 5410. University Wind Bands. (1 cr [max 14 cr]; A-F only. Prereq—Audition, #) Wind ensemble and symphony bands perform standard and contemporary literature; concerts and tour appearances. Players from all colleges may participate.

Mus 5420. Orchestra. (1 cr [max 8 cr]; A-F only. Prereq—Audition, #) Symphony orchestra performs standard repertory and major works with choral, concerts and tour appearances. Players from all colleges may participate.

Mus 5421. Suzuki Violin Pedagogy I. (2 cr; A-F only. Prereq—Violin major or #) Philosophy and teaching techniques of Japanese pedagogue Shinichi Suzuki and their applications in Western culture. Discussion, playing experience, and observation of children’s lessons in the MacPhail Center Suzuki Program.

Mus 5422. Suzuki Violin Pedagogy II. (2 cr; A-F only. Prereq—#) Philosophy and teaching techniques of Japanese pedagogue Shinichi Suzuki and their applications in Western culture. Discussion, playing experience, and observation of children’s lessons in the MacPhail Center Suzuki Program.

Mus 5423. Suzuki Pedagogy Practicum. (1 cr [max 1 cr]; A-F only. Prereq—[[5424 or 5425] grad music student] or #) Supervised teaching of both individual and group lessons. Instructor provides periodic critiques from observation of live or videotaped lessons.

Mus 5424. Advanced Suzuki Violin Pedagogy I. (2 cr; A-F only. Prereq—5422 or #) Intensive examination of Suzuki techniques for intermediate and advanced violin students in Western society. Discussion, playing experience, observation of children’s lessons in the MacPhail Center Suzuki Program, and practical teaching experience.

Mus 5425. Advanced Suzuki Violin Pedagogy II. (2 cr; A-F only. Prereq—5424 or #) Intensive examination of Suzuki techniques for intermediate and advanced violin students in Western society. Discussion, playing experience, observation of children’s lessons in the MacPhail Center Suzuki Program, and practical teaching experience.

Mus 5426. Final Project in Suzuki Pedagogy. (1 cr; A-F only. Prereq—Grad music student in Violin Performance and Suzuki Pedagogy Program) Research project.

Mus 5427. Violin Pedagogy I. (2 cr; A-F only. Prereq—Violin or viola major or #) Private teaching of violin students at beginning, intermediate, and advanced levels. Discussion and demonstrations of pedagogical techniques.

Mus 5428. Violin Pedagogy II. (2 cr; A-F only. Prereq—Violin or viola major or #) Private teaching of violin students at beginning, intermediate, and advanced levels. Discussion and demonstrations of pedagogical techniques.

Mus 5440. Chamber Ensemble. (1 cr [max 8 cr]; A-F only. Prereq—Audition, #) Performance of chamber music: duos, trios, quartets, quintets, and combinations for instruments and/or voices.

Mus 5450. Orchestral Repertoire. (1 cr [max 3 cr]; A-F only. Prereq—#) Investigation of practical and performance problems in standard orchestral repertoire with regard to style and interpretation.

Mus 5464. Cello Pedagogy. (2 cr; A-F only) Concentrated study of cello teaching methods. Provides students with the strategies for teaching cello privately, develops analytical skills, and increases knowledge of cello repertoire. For practical application in conjunction with string technique course.

Mus 5466. Guitar Pedagogy. (2 cr; A-F only. Prereq—Guitar principal or major or #) Historical survey of methods and etudes from late 18th century to present, reflecting variety of content and approach. Works by Agyado, Sor, Giuliani, Tarrega, Segovia, Carlevaro, Duncan, Iznaloa, Dodgson, and Brindle.

Mus 5470. Woodwind Chamber Ensemble. (1 cr [max 5 cr]; A-F only. Prereq—Audition, #) Chamber music performance using homogeneous or mixed combinations of woodwind instruments.

Mus 5471. Woodwind Literature and Pedagogy I. (3 cr; A-F only. Prereq—Music major or #) A study of the major teaching materials for the five woodwind instruments including methods, duets, and solos used primarily for pedagogical reasons.

Mus 5472. Woodwind Literature and Pedagogy II. (3 cr; A-F only. Prereq—Music major or #) A study of chamber music involving one or more woodwind instruments. May include additional instrumentation such as piano, strings, and/or voice.

Mus 5473. History and Acoustics of Single Reed Instruments. (2 cr; A-F only. Prereq—Music major or #) Study of clarinet and saxophone history and literature, mechanical design and development, acoustics, modern schools of performance, selected teaching and performance techniques.

Mus 5480. University Brass Choir. (1 cr [max 8 cr]; A-F only. Prereq—Audition, #) The University Brass Choir is an ensemble of 16 brass and percussion players exploring unique literature that spans 400 years. From the rich antiphonal music of Giovanni Gabrieli (1557-1612) to the works of the 20th century. The Brass Choir performs in Twin Cities churches and concert halls.

Mus 5481. Trumpet Pedagogy. (2 cr. Prereq—5r or grad in music or #) Principles of trumpet pedagogy. Discussion of literature, history, and current teaching aids.

Mus 5485. Transcription for Winds. (2 cr. Prereq—3502 or #) Principles of music manuscript and transcription examples. Transcription projects with score and parts. Smaller projects that involve arrangements and original compositions.

Mus 5490. Percussion Ensemble. (1 cr [max 10 cr]; A-F only. Prereq—#) Practice and performance of standard and contemporary compositions for percussion instruments in various combinations.

Mus 5491. Percussion Literature I. (2 cr; A-F only. Prereq—#) Audition, #) Repertoire derived from orchestral and band literature for snare drum, timpani, mallet instruments, and various percussion accessories. Major works of the 20th century written for solo percussion, percussion ensemble, and chamber groups of percussion and non-percussion instruments.

Mus 5492. Percussion Literature II. (2 cr; A-F only. Prereq—#) Repertoire derived from orchestral and band literature for snare drum, timpani, mallet instruments, and various percussion accessories. Major works of the 20th century written for solo percussion, percussion ensemble, and chamber groups of percussion and non-percussion instruments.

Mus 5541. 16th-Century Counterpoint. (3 cr; A-F only. Prereq—3501, 3502 or pass basic skills exam) Polyphonic counterpoint in modal style of Renaissance. Writing exercises in species counterpoint and in two, three, and four parts. Cantus firmus techniques, mixed values, invertible counterpoint, canon. Representative works by Josquin, Lassus, Palestrina, Victoria, and others. Renaissance treatises by Artusi, Banchieri, Diruta, Morley, Zurliino, and others.

Mus 5542. 18th-Century Counterpoint. (3 cr; A-F only. Prereq—3501, 3502 or pass basic skills exam) Polyphonic counterpoint in tonal style of late Baroque. Short writing exercises in two-/three-part counterpoint including imitation, invertible counterpoint, mixed vocal/instrumental technique. Longer exercises in writing choral preludes, canons, minuets, inventions, and fugues. Analysis of representative works by J.S. Bach and his contemporaries.

Mus 5550. Class Composition. (2 cr [max 8 cr]; A-F only. Prereq—3502 or #) Original works in various forms. Development of individual compositional style in a post-tonal idiom. Various forms, performing forces, techniques.

Mus 5561. Orchestration I. (3 cr; A-F only. Prereq—3502) Scoring techniques for ensembles in combination and full orchestra; year-long sequence. Study of symphonic literature, scoring, orchestration, instrumentation, studio procedures, and performance considerations.

Mus 5562. Orchestration II. (3 cr; A-F only. Prereq—5561) Scoring techniques for ensembles in combination and full orchestra; year-long sequence. Study of symphonic literature, scoring, orchestration, instrumentation, studio procedures, and performance considerations.
Mus 5572. Chromaticism in Tonal Music. (3 cr; Prereq–3502)
Exploration of chromatic tonal practices through analysis of selected repertoire, completion of written exercises (figured bass, harmonization of melodies, model composition), ear-training, and keyboard exercises.

Mus 5591. Electronic Music: History, Literature, Principles. (3 cr; A-F only. Prereq–4 at least jр)

Mus 5592. Digital Music Synthesis and Processing Techniques. (3 cr; A-F only. Prereq–3502)
Study of specific dsp topics such as filtering, formant synthesis, reverberation techniques, and additive synthesis. Work with interactive MIDI applications.

Mus 5597. Music and Text. (3 cr; A-F only. Prereq–3502)
Designed for music majors only, this course gives an introduction to the analysis of music with texts such as art song and opera.

Mus 5611. Resources for Music Research. (3 cr; A-F only. Prereq–3603)
Development of skills in identifying, locating, and evaluating resources for research in music. Computer-searching techniques, acquaintance with basic reference sources in the field, preparation of the music research paper.

Mus 5620. Topics in Opera History. (3 cr [max 6 cr]; A-F only. Prereq–Grad music major or #)
Study of specific operas. Development of opera in context of other artistic, social, cultural, and political events, movements, and changes. Periods/countries vary each semester.

Mus 5644. Music in 20th-Century American Culture. (3 cr; A-F only. Prereq–3063, 5501 or #)
Stylistic and cultural bases of cultivated and vernacular traditions and their intersections. Topics include folk and ethnic musics, ragtime, city blues, jazz, rock, musical theater, impact of technology, modernism, nationalism, new accessibility.

Mus 5647. 20th-Century European/American Music. (3 cr; Prereq–3063 or equiv, 5501 or equiv, 12 undercr in music history)
Emphasizes major artistic movements, stylistic turning points, social roles of music. Interactions between high art, popular, ethnic musics; contributions of men and woman as composers and performers.

Mus 5658. History of the Symphony in the 20th Century. (3 cr; A-F only. Prereq–3603, 5501 or #)
History of symphony (and related genres) in Europe and America, ca. 1890 to present. Changing aesthetic concerns, structural, harmonic, and timbral innovations. Sociocultural contexts; analysis and criticism.

Mus 5666. Stravinsky. (3 cr; A-F only. Prereq–5502, 12 cr music history)
Analysis and criticism of representative works; aesthetic concerns as expressed in writings of Stravinsky and others; influence upon European and American composers; biographical issues and contributions to artistic life, particularly the ballet.

Mus 5668. Beethoven’s Symphonies. (3 cr; A-F only. Prereq–3601, #)
Analytical overview of selected movements from Beethoven’s 9 symphonies. Principles of sonata analysis (norm and deformation); introduction to wider contexts of interpretation and understanding (genre, expressive, social).

Mus 5804. Folk and Traditional Musics: Selected Cultures of the World. (3 cr; A-F only. Prereq–1801 or 1804 or music grad or #)
A study of selected music traditions from 5 to 7 world cultures. Genres, social institutions, concepts, styles, instruments, and uses.

Mus 5950. Topics in Music. (1-4 cr [max 15 cr])
Each offering focuses on a single topic. Topics specified in Class Schedule.

Mus 5993. Directed Studies. (1-4 cr [max 12 cr]; Prereq–# A, 2)
Guided individual reading or study.

Music Applied (MusA)

School of Music

College of Liberal Arts

Note: MusA 1101 through MusA 1123 are private instruction and include the following: (2 cr [max 16 cr]; A-F only. Prereq–Audition, ∆).

MusA 1101. Piano—Elective.
MusA 1102. Harpsichord—Elective.
MusA 1103. Organ—Elective.
MusA 1104. Voice—Elective.
MusA 1105. Violin—Elective.
MusA 1106. Viola—Elective.
MusA 1107. Cello—Elective.
MusA 1109. Flute—Elective.
MusA 1111. Oboe—Elective.
MusA 1112. Clarinet—Elective.
MusA 1113. Saxophone—Elective.
MusA 1114. Bassoon—Elective.
MusA 1115. French Horn—Elective.
MusA 1116. Trumpet—Elective.
MusA 1117. Trombone—Elective.
MusA 1118. Euphonium—Elective.
MusA 1119. Tubab—Elective.
MusA 1121. Percussion—Elective.
MusA 1122. Harp—Elective.
MusA 1123. Guitar—Elective.

Note: MusA 1301 through MusA 1523 are private instruction and, unless otherwise noted, include the following: (2-4 cr [max 16 cr]; A-F only. Prereq–Audition, ∆).

MusA 1301. Piano—Major.
MusA 1302. Harpsichord—Major.
MusA 1303. Organ—Major.
MusA 1304. Voice—Major.
MusA 1305. Violin—Major.
MusA 1306. Viola—Major.
MusA 1307. Cello—Major.
MusA 1309. Flute—Major.
MusA 1311. Oboe—Major.
MusA 1312. Clarinet—Major.
MusA 1313. Saxophone—Major.
MusA 1314. Bassoon—Major.
MusA 1315. French Horn—Major.
MusA 1316. Trumpet—Major.
MusA 1317. Trombone—Major.
MusA 1318. Euphonium—Major.
MusA 1319. Tubab—Major.
MusA 1321. Percussion—Major.
MusA 1322. Harp—Major.
MusA 1323. Guitar—Major.

Note: MusA 1901 through MusA 1923 are private instruction for transfer students, one semester only and include the following: (2-4 cr; A-F only. Prereq–Audition, ∆).

MusA 1901. Piano—Transfer.
MusA 1902. Harpsichord—Transfer.
MusA 1903. Organ—Transfer.
MusA 1904. Voice—Transfer.
MusA 1905. Violin—Transfer.
MusA 1906. Viola—Transfer.
MusA 1907. Cello—Transfer.
MusA 1908. Double Bass—Transfer.
MusA 1909. Flute—Transfer.
MusA 1911. Oboe—Transfer.
MusA 1912. Clarinet—Transfer.
MusA 1913. Saxophone—Transfer.
MusA 1914. Bassoon—Transfer.
MusA 1915. French Horn—Transfer.
MusA 1916. Trumpet—Transfer.
MusA 1917. Trombone—Transfer.
MusA 1918. Euphonium—Transfer.
MusA 1919. Tubab—Transfer.
MusA 1921. Percussion—Transfer.
MusA 1922. Harp—Transfer.
MusA 1923. Guitar—Transfer.
Course Descriptions

MusA 2301. Piano—Performance Major.
MusA 2302. Harpsichord—Performance Major.
MusA 2303. Organ—Performance Major.
MusA 2306. Viola—Performance Major.
MusA 2309. Flute—Performance Major.
MusA 2311. Oboe—Performance Major.
MusA 2312. Clarinet—Performance Major.
MusA 2313. Saxophone—Performance Major.
MusA 2315. French Horn—Performance Major.
MusA 2316. Trumpet—Performance Major.
MusA 2317. Trombone—Performance Major.
MusA 2318. Euphonium—Performance Major. (2-4 cr; Prereq—Audition, 2)
MusA 2319. Tuba—Performance Major.
MusA 2321. Percussion—Performance Major.
MusA 2323. Guitar—Performance Major.

Note: MusA 3101 through MusA 3319 are private instruction and include the following: (2-4 cr [max 16 cr]; A-F only. Prereq—Audition).

MusA 3101. Piano—Elective.
MusA 3102. Harpsichord—Elective.
MusA 3103. Organ—Elective.
MusA 3104. Voice—Elective.
MusA 3105. Violin—Elective.
MusA 3106. Viola—Elective.
MusA 3107. Cello—Elective.
MusA 3109. Flute—Elective.
MusA 3111. Oboe—Elective.
MusA 3112. Clarinet—Elective.
MusA 3113. Saxophone—Elective.
MusA 3114. Bassoon—Elective.
MusA 3115. French Horn—Elective.
MusA 3116. Trumpet—Elective.
MusA 3117. Trombone—Elective.
MusA 3118. Euphonium—Elective.
MusA 3119. Tuba—Elective.
MusA 3121. Percussion—Elective.
MusA 3122. Harp—Elective.
MusA 3123. Guitar—Elective.

Note: MusA 3301 through MusA 3309 are private instruction and include the following: (2-4 cr [max 16 cr]; A-F only. Prereq—Audition).

MusA 3301. Piano—Major.
MusA 3302. Harpsichord—Major.
MusA 3303. Organ—Major.
MusA 3304. Voice—Major.
MusA 3305. Violin—Major.
MusA 3306. Viola—Major.
MusA 3307. Cello—Major.
MusA 3309. Flute—Major.

Note: MusA 3311 through MusA 3323 are private instruction and include the following: (2-4 cr [max 24 cr]; A-F only. Prereq—Audition).

MusA 3311. Oboe—Major.
MusA 3312. Clarinet—Major.
MusA 3313. Saxophone—Major.
MusA 3314. Bassoon—Major.
MusA 3315. French Horn—Major.
MusA 3316. Trumpet—Major.
MusA 3317. Trombone—Major.
MusA 3318. Euphonium—Major.
MusA 3319. Tuba—Major.
MusA 3321. Percussion—Major.
MusA 3323. Guitar—Major.

Note: MusA 5101 through MusA 5123 are private instruction and include the following: (2 cr [max 8 cr]; A-F only. Prereq—Audition).

MusA 5101. Piano—Elective.
MusA 5102. Harpsichord—Elective.
MusA 5103. Organ—Elective.
MusA 5104. Voice—Elective.
MusA 5105. Violin—Elective.
MusA 5106. Viola—Elective.
MusA 5107. Cello—Elective.
MusA 5109. Flute—Elective.
MusA 5111. Oboe—Elective.
MusA 5112. Clarinet—Elective.
MusA 5113. Saxophone—Elective.
MusA 5114. Bassoon—Elective.
MusA 5115. French Horn—Elective.
MusA 5116. Trumpet—Elective.
MusA 5117. Trombone—Elective.
MusA 5118. Euphonium—Elective.
MusA 5119. Tuba—Elective.
MusA 5121. Percussion—Elective.
MusA 5122. Harp—Elective.
MusA 5123. Guitar—Elective.

Note: MusA 5401 through MusA 5423 are private instruction and, unless otherwise noted, include the following: (2-4 cr; Prereq—Audition).

Music Education (MuEd)

School of Music

MuEd 1201. Introduction to Music Education. (1 cr; A-F only)
Orientation to the profession of music education through in-school observations, readings, presentations, and self-reflection. Introduction to technology for music educators.

MuEd 1801. Introduction to Music Therapy. (2 cr; A-F only)
Methods, materials, and applications of music therapy in various clinical settings with emphasis on field observation.

MuEd 3301. Teaching Elementary Vocal and General Music. (3 cr; A-F only. Prereq—Music ed major)
Methods, materials, curriculum development, principals of learning, the child voice, rhythm, music reading, history, appreciation, listening, creativity, classroom instruments, and applications of technology for elementary school classroom music.

MuEd 3350. Student Teaching in Classroom Music. (4-8 cr [max 8 cr]; A-F only. Prereq—Music ed major or #)
Supervised teaching and observing of classroom and general music in elementary, junior high, and senior high schools.

Weekly seminar emphasizing classroom management, curriculum development, and administration of music programs.

MuEd 3415. Choral Conducting and Methods I. (4 cr; A-F only. Prereq—Music ed major or #)
Development of basic choral conducting skills and rehearsal techniques. Emphasizes interpretation of choral compositions. Methods, materials, and curriculum for school choral ensembles.


MuEd 3416. Choral Conducting and Methods II. (4 cr; A-F only. Prereq—Music ed major or #)
Development of choral conducting skills and rehearsal techniques. Emphasizes interpretation of choral compositions. Methods, materials, and curriculum for school choral ensembles.

Diction for singing. Secondary general music methodology.

MuEd 3450. Student Teaching in Vocal Music. (4-8 cr [max 8 cr]; A-F only. Prereq—Music ed major or #)
Supervised teaching and observing of vocal music in elementary, junior high, and senior high schools.

Weekly seminar emphasizing classroom management, curriculum development, and administration of music programs.

MuEd 3502. String Techniques and Teaching. (2 cr; A-F only. Prereq—Music ed or music therapy major or #)

MuEd 3503. Woodwind Techniques and Teaching. (2 cr; A-F only. Prereq—Music ed or music therapy major or #)

MuEd 3504. Brass Techniques and Teaching. (2 cr; A-F only. Prereq—Music ed or music therapy major or #)

MuEd 3505. Percussion Techniques and Teaching. (2 cr; A-F only. Prereq—Music ed or music therapy major or #)
Course Descriptions


MuEd 3517. Beginning Instrumental Methods and Materials. (3 cr; A-F only. Prereq–[2101, 3502, 3503, 3504, 3505, 3516, Mus 3401] with at least C-) Development of skills for teaching beginning instrumentalists.

MuEd 3518. Instrumental Methods and Conducting II. (3 cr; A-F only. Prereq–[2102, 3502, 3503, 3504, 3505, 3516, 3517, Mus 3401] with at least C-) Students synthesize knowledge/skills to develop/maintain curricular-oriented, comprehensive instrumental music program.

MuEd 3550. Student Teaching in Instrumental Music. (4-8 cr; max 8 cr; A-F only) Supervised teaching and observing of instrumental music in elementary, junior high, and senior high schools. Weekly seminar emphasizing classroom management, curriculum development, and administration of music programs.

MuEd 3650. Student Teaching Seminar. (2 cr; A-F only. Prereq–at least C- in all prerequisites [music, music education, professional education] courses) Reflective practice during student teaching. Developing materials for professional employment (e.g., resume, portfolio).

MuEd 3800. Introduction to Clinical Music Therapy Practice. (3 cr; A-F only. Prereq-Music therapy major or #) Introduction to lab and field studies of music therapy and music behavior. Pre-internship experiences in health, welfare, recreational, and educational settings.

MuEd 3804. Applications of Music Therapy I: Music Therapy for Children in Rehabilitative Settings. (4 cr; A-F only. Prereq-Music therapy major or #) Examination of specific techniques in quantification of study of music behavior; projects using behavioral observations.

MuEd 3805. Applications of Music Therapy II: Music Therapy in Long Term Care and Psychiatric Care. (4 cr; A-F only. Prereq-Music therapy major or #) Methods and materials for music therapy in school and hospital settings; designing and implementing programs for severely and moderately handicapped children and adults.

MuEd 3806. Preparing for a Music Therapy Career. (4 cr; A-F only. Prereq–Music therapy major or #) Identify and explore current controversies, issues, and values encountered in music therapy. Explore and analyze counseling processes and techniques. Students are placed in a health care facility for the term to gain pre-internship experience.

MuEd 3855. Music Therapy Internship. (6 cr; S-N only. Prereq–Music therapy major) Six-month resident internship in music therapy at an affiliated, approved hospital or clinic.


MuEd 5112. Research in Music Education: Techniques. (3 cr; A-F only. Prereq–Grad music ed major or #) Methods and techniques employed in investigating and reporting music education problems; proposal development; bibliographic skills involved in conducting a significant review of related research.

MuEd 5115. Research in Music Education: Measurement. (3 cr; A-F only) Assessment of music behaviors, including test design, interpretation of test results, and evaluation and reporting of student achievement; published tests in music; uses of assessment and measurement in the classroom and in research.

MuEd 5118. Research in Arts Education: Qualitative. (3 cr; A-F only. Prereq–Grad student in arts or #) Practical/systematic introduction to qualitative research procedures in arts education. Prepares students to develop research proposals. Students participate in a joint field exploration. Those who have established research interests may also work in another setting relevant to their long-term research goals.

MuEd 5211. Foundations of Music Education. (3 cr; A-F only) An overview of the historical, philosophical, and psychological foundations of music education.

MuEd 5313. Youth Music: Preferences, Influences, and Uses. (2 cr; A-F only) Youth music preferences and their determinants; how music influences youth behavior; students’ and teachers’ uses of commercial styles. Particularly appropriate for educators and parents.

MuEd 5433. Techniques and Materials: Choral Ensembles. (2 cr; A-F only. Prereq–Music or music ed major or #) Research and literature on vocal and choral music education; choral curriculum issues; repertoire selection; rehearsal techniques.

MuEd 5606. Movement-Based Methods for Music Education. (2 cr; A-F only. Prereq–Music or music ed major or #) Participation in movement activities; study of Dalrospo philosophy and techniques; applications of movement to music education; examination of research.

MuEd 5611. Teaching Music With Related Arts. (2 cr; A-F only) Methods and materials for teaching music in cultural context including other art forms.

MuEd 5647. Teaching the Percussion Instruments. (2 cr; A-F only) Contemporary approaches for teaching percussion in the schools; development of curricular materials and practices in percussion.

MuEd 5655. New Dimensions in Music Education. (2 cr; A-F only) Analysis of recent curricular trends and current issues.

MuEd 5664. Teaching Music on the Internet. (3 cr; A-F only) Home page development techniques, investigation of software and materials, audio and video utilities, and research applications.

MuEd 5667. Computer-Based Music Instruction. (3 cr; A-F only. Prereq–Music or music ed major or #) Design and development of computer applications for the music classroom. Creating interactive audio and video presentations for music theory, ear training, composition, analysis, music history, and appreciation.

MuEd 5686. Computerized Music Notation. (3 cr; max 6 cr) Fundamentals of music notation and printing utilizing the computer, MIDI keyboards, and Finale software program. Preparation of instrumental and vocal scores, part extraction and page layout. Basic techniques for sequencing and transcription.

MuEd 5699. Psychology of Music. (3 cr; A-F only. Prereq–Psy 1001 or Psy 3604 or #) Basic study of the psychology and psychoacoustics of music including hearing, music perception and cognition, values and preferences, musical abilities, musical systems, media music effects, the influence of music on human behavior, and psycho-socio-physiological processes involved in musical behavior.

MuEd 5750. Topics in Music Education. (1-4 cr; max 16 cr; A-F only. Prereq–Grad student in music education/therapy or education or special education or graduate student in gerontology or spirituality/healing or nursing student or psychology student) Focuses on single topic, specified in Class Schedule.

MuEd 5991. Independent Study. (1-4 cr; max 8 cr) A-F only. Prereq–Music ed or music therapy major or grad, A-F only. Independent study project organized by the student in consultation with the appropriate instructor.

Naval Science (Nav) Office of the Executive Vice President and Provost

Nav 1000. Professional Training in Naval Science. (1 cr [max 1 cr]; S-N only. Prereq–Fresh enrolled in NROTC) Instruction and training in basic military subjects and professional development, including military leadership, close order drill, marksmanship, honors and ceremonies, personnel inspections, and computer-based war game simulations. Classes and small group seminars on leadership and ethical issues with case studies.

Nav 1101. Introduction to Naval Science. (3 cr; A-F only) Navy organization, customs and traditions, officer and enlisted rank and rating structures, uniforms and insignia, shipboard duties, seamanship, damage control, and safety. Core values of the naval services, Navy regulations, and the Uniform Code of Military Justice.

Nav 1102. Seapower and Maritime Affairs. (3 cr; A-F only) Historical influences on development of U.S. Navy, from American Revolution to present. Critical, contemporary issues.

Nav 2000. Professional Training in Naval Science. (1 cr [max 1 cr]; S-N only. Prereq–Soph enrolled in NROTC) Instruction and training in basic military subjects and professional development, including military leadership, close order drill, marksmanship, honors and ceremonies, personnel inspections, and computer-based war game simulations. Classes and small group seminars on leadership and ethical issues with case studies.

Nav 2201. Ship Systems I: Naval Engineering. (3 cr; A-F only) Detailed study of ship characteristics/types. Design, hydrodynamic forces, stability, compartmentation, propulsion, electrical/auxiliary systems, damage control, administration. Basic concepts of theory/design for steam, gas turbine, diesel, nuclear propulsion.


Nav 3000. Professional Training in Naval Science. (1 cr [max 1 cr]; S-N only. Prereq–r-f enrolled in NROTC) Instruction and training in basic military subjects and professional development, including military leadership, close order drill, marksmanship, honors and ceremonies, personnel inspections, and computer-based war game simulations. Classes and small group seminars on leadership and ethical issues with case studies.

Course Descriptions


Nav 3310. Evolution of Warfares. (3 cr; A-F only) Great military leaders of history. Development of warfare, from dawn of recorded history to present. Focuses on effect of major military theorists, strategists, tacticians, technological developments.

Nav 4000. Professional Training in Naval Science. (1 cr [max 1 cr]; S-N only. Prereq–Sr enrolled in NROTC) Instruction and training in basic military subjects and professional development, including military leadership, close order drill, marksmanship, honors and ceremonies, personnel inspections, and computer-based war game simulations. Classes and small group seminars on leadership and ethical issues with case studies.


Nav 4402W. Leadership and Ethics. (3 cr; A-F only. Prereq–4401) Junior officer role. Responsibilities faced as leader, manager, professional officer of Naval Services. Develops specific competencies in areas of leadership, management, professional administration, development. Emphasizes Naval Service ethics, core values.

Nav 4410. Amphibious Warfare. (3 cr; A-F only) Development of amphibious doctrine, its expansion in Pacific Campaign of World War II. Detailed case studies of Tarawa, Iwo Jima, Okinawa illustrate amphibious planning.

Neuroscience (NSc)

College of Biological Sciences

NSc 4185. Itasca Summer Neurobiology Laboratory. (3 cr; A-F only. Prereq–§) Concepts in cellular neurosciences. Basis of membrane properties, including ionic/molecular mechanisms of resting, action, and synaptic potentials. State-of-the-art equipment and contemporary techniques used to examine experimental evidence.

NSc 5031W. Perception. (3 cr. Prereq–Psy 3031 or Psy 3051 or §) Cognitive, computational, and neuroscience perspectives on visual perception. Color vision, pattern vision, image formation in eye, object recognition, reading, impaired vision. Course is biennial: offered fall of odd years.

NSc 5037. Psychology of Hearing. (3 cr. Prereq–Psy 3031 or §) Biological and physical aspects of hearing, auditory psychophysics, theories and models of hearing, perception of complex sounds including music and speech, clinical and other applications.


NSc 5461. Cellular and Molecular Neuroscience. (4 cr; A-F only. Prereq–NSc grad student or §) Lectures by team of faculty, problem sets in important physiological concepts, discussion of original research papers.

NSc 5462. Neuroscience Principles of Drug Abuse. (2 cr; Prereq–#) Current research on drugs of abuse, their mechanisms of action, characteristics shared by various agents, and neural systems affected by them. Offered biennially, spring semester of even-numbered years.

NSc 5481. Invertebrate Neurobiology. (2 cr; A-F only. §Ent 5461) Fundamental principles/concepts underlying cellular bases of behavior and “systems” neuroscience. Particular invertebrate preparations. Offered annually the last 10 weeks of spring semester.

NSc 5540. Advanced Survey of Biomedical Neuroscience. (2 cr; Prereq–§ intended for members of biomedical community or students with advanced scientific backgrounds) Current topics in biomedical neuroscience, accompanied by supporting, fundamental concepts. Intensive, one week course.

NSc 5551. Itasca Cell and Molecular Neurobiology Laboratory. (4 cr; S-N only. Prereq–Neuroscience grad or §) Intensive lab introduction to cellular and molecular aspects of research techniques in contemporary neurobiology, held at Itasca Biological Station. Electrophysiological investigations of neuronal properties, neuropharmacological assays of transmitter action, and immunohistochemical studies in experimental preparations.


NSc 5661. Behavioral Neuroscience. (3 cr; A-F only. Prereq–Grad NSc major or grad NSc minor or §) Neural coding/representation of movement parameters. Neural mechanisms underlying higher order processes such as memorization, memory scanning, and mental rotation. Emphasizes experimental psychological studies in human subjects, single cell recording experiments in subhuman primates, and artificial neural network modeling.

Neuroscience Department (NSci)

Medical School

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

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

NSci 4105. Neurobiology Laboratory I. (2 cr; A-F only §Biol 3105, §Biol 4105, §Phsl 3105. Prereq–[3101 or Biol 3101 or Phsl 3101, [3102W or Biol 3102W, §]) Principles, methods, and laboratory exercises for investigating neural mechanisms and examining experimental evidence.

NSci 4115. Neurobiology Laboratory II. (2 cr; A-F only §Biol 3115, §Biol 4115, §Phsl 3115. Prereq–[3101 or Biol 3101 or Phsl 3101, [3102W or Biol 3102W, §]) Principles, methods, and laboratory exercises for investigating neural mechanisms and examining experimental evidence.

NSci 4151. Advanced Topics in Neuroscience. (3 cr; A-F only. §Phsl 4151. Prereq–Biol/NSci/Phsl 3101 or §) In-depth study of aspects of neurodevelopment, neurochemistry/molecular neuroscience, sensory systems, motor control, and behavioral neuroscience. Primarily for undergraduates majoring in neuroscience or related areas.

NSci 4167. Neuroscience in the Community. (1-3 cr [max 3 cr]; A-F only. Prereq–§) A service learning experience in which a student is paired with a middle school science teacher who has completed the BrainU program in neuroscience. Student observes and assists in implementing previously developed neuroscience educational activities and designs and implements a new classroom activity to teach concepts of neuroscience to middle school learners.

NSci 4793W. Directed Studies: Writing Intensive. (1-7 cr [max 7 cr]; S-N only. Prereq–A; no more than 7 cr of 4793, 4794, 4993, 4994 may count toward major requirements) Individual study of selected topics. Emphasis on readings, use of scientific literature. Writing intensive.

NSci 4794W. Directed Research: Writing Intensive. (1-7 cr [max 7 cr]; S-N only. Prereq–A; no more than 7 cr of 4793, 4794, 4993, 4994 may count toward major requirements) Lab or field investigation of selected areas of research. Writing intensive.

NSci 4993. Directed Studies. (1-7 cr [max 7 cr]; S-N only. Prereq–§; max of 7 cr of 4993, 4994 may count toward major requirements) Individual study of selected topics with emphasis on selected readings and use of scientific literature.

NSci 4994. Directed Research. (1-7 cr [max 7 cr]; S-N only. Prereq–§; max of 7 cr of 4993 and/or 4994 may count toward major requirements) Lab or field investigation of selected areas of research. Writing intensive.

NSci 5101. Introduction to Neuroscience for Graduate Students. (3 cr; A-F only §Biol 3101, §Phsl 3101. Prereq–[Biol 3021 or Biol 4331, § intended for grad students outside neuroscience program who require comprehensive intro) Basic principles of cellular/molecular neuroscience and nervous system. A term paper supplements lectures. Multiple-choice exams.
Nurs 3700. Human Experience of Health and Illness. (3 cr; A-F only. Prereq-Nursing student or #) Uses literature, film, and fine arts to explore health/illness as multiculturalindividual, family, and community experiences. Theoretical perspectives about health/illness. Social-cultural organization of health services, social mandate for professional participation in health/illness eversensitive.


Nurs 3704. Nursing Fundamentals I: Assessment and Intervention. (4 cr; A-F only. Prereq-Nursing student or #) Foundational psychomotor skills/interventions used in nursing practice when caring for persons throughout life span in various contexts. Theory/skills of health assessment, including health history and physical exam of infants/adolescents.

Nurs 3706. Therapeutic Communication. (3 cr; A-F only. Prereq-Nursing student or #) Developing therapeutic use of self. Applying communication strategies to provide optimal nursing care and to communicate with individuals, families, interdisciplinarians, and communities.

Nurs 3710. Statistics for Clinical Practice and Research. (3 cr; A-F only. Prereq-High school algebra or #) Quantitative literacy, numerical reasoning, measurement principles for clinical practice/research. Vital statistics, rates, data description. Probability and statistical inference (hypothesis testing, confidence intervals) for tests on means, proportions, correlations, and simple linear regression.

Nurs 3800. Nursing Topics. (1-4 cr. Prereq-#) Topics not included in regular courses.

Nurs 3999. Clinical Internship. (1 cr; S-N only. Prereq-Completed J yr of a baccalaureate nursing prog, accepted into an approved clinical internship prog. #) Clinical-based learning opportunities to encourage application of theory and research based knowledge in clinical practice. Students engage in experiences to enhance the development of their professional nursing role.

Nurs 4000. Introduction to Public Health. (2 cr. Prereq-Completed 15 cr) Health/health factors of populations. Principles of epidemiology, environmental health applied to selected public health issues. Emphasizes factors that affect health, distribution of health care resources.


Nurs 4103. Therapeutic Communication in Health Care. (3 cr. Prereq-#) Principles of interpersonal communication with clients/other health professionals. Interacting with clients, families, and communities.


Norwegian (Nor)

Department of German, Scandinavian, and Dutch

Nor 1001. Beginning Norwegian. (3 cr)
Emphasis on working toward novice-intermediate low proficiency in all four language modalities (listening, reading, speaking, writing). Topics include everyday subjects (shopping, directions, family, food, housing, etc.).

Nor 1002. Beginning Norwegian. (5 cr. Prereq-1001)
Continues the presentation of all four language modalities (listening, reading, speaking, writing) with a proficiency emphasis. Topics include free-time activities, careers, and the Norwegian culture.

Nor 1003. Intermediate Norwegian. (5 cr. Prereq-1002)
Emphasis on intermediate proficiency in listening, reading, speaking, and writing. Contextualized work on grammar and vocabulary is supported by work with authentic readings and essay assignments.

Nor 1004. Intermediate Norwegian. (5 cr. Prereq-1003)
Emphasis on developing intermediate mid-high proficiency in listening, reading, speaking, and writing. Contextualized work on grammar and vocabulary is supported by work with authentic readings and essay assignments.

Nor 1010. Online Basic Norwegian. (2 cr [max 8 cr])
Norwegian language/culture. Travel, weather, family, work, school, daily life. Students meet for orientation and midterm, then work at own pace using multimedia. Web course/mentor-student interactions through e-mail, threaded discussions, and audio messages.

Nor 3011. Advanced Norwegian. (3 cr; Prereq-1004 or 4004)
Designed to help students achieve advanced proficiency in Norwegian. Discussion of fiction, film, journalistic, and professional prose is complemented by grammar and vocabulary building exercises and a systematic review of oral and written modes of communication.

Nor 3012. Advanced Norwegian. (3 cr; Prereq-1004 or 4004)
Discussion of novels, short stories, plays, articles complemented by structural, stylistic, vocabulary-building exercises.

Nor 4001. Beginning Norwegian. (2 cr §1001. Prereq-1004 in another language or passing score on LPE or grad) Meets concurrently with Nor 1001; see Nor 1001 for description. This option is designed for students who have satisfied the CLA language requirement in another language or are graduate students or are otherwise exempt.

Nor 4002. Beginning Norwegian. (2 cr §1002. Prereq-1004 in another language or passing score on LPE or grad) Meets concurrently with Nor 1002; see Nor 1002 for description. This option is designed for students who have satisfied the CLA language requirement in another language or are graduate students or are otherwise exempt.

Nor 4003. Intermediate Norwegian. (2 cr §1003. Prereq-1004 in another language or passing score on LPE or grad) Meets concurrently with Nor 1003; see Nor 1003 for description. This option is designed for students who have satisfied the CLA language requirement in another language or are graduate students or are otherwise exempt.

Nor 4004. Intermediate Norwegian. (2 cr §1004. Prereq-1004 in another language or passing score on LPE or grad) Meets concurrently with Nor 1004; see Nor 1004 for description. This option is designed for students who have satisfied the CLA language requirement in another language or are graduate students or are otherwise exempt.

Nursing (Nurs)

School of Nursing

Nurs 1020. Challenge of Nursing. (2 cr; S-N only)

Nurs 10300. Freshman Seminar in Nursing. (1 cr [max 1 cr]; A-F only. Prereq-#)
Overview of nursing profession, including its historical roots, current roles/scope, and potential future evolution. Career opportunities/challenges.


Nurs 3690. Life Span, Growth, and Development I. (2 cr. Prereq-One general psychology and one general biology course or #)
An introductory, multimedia course that incorporates biological, sociological, and psychological perspectives of human life span development from the prenatal period through young adulthood.

Nurs 3691. Life Span, Growth, and Development II. (1 cr. Prereq-3690; one general psychology and one general biology course or #)
An introductory, multimedia course that incorporates biological, sociological, and psychological perspectives of human life span development for the period of young adulthood through aging and the death experience.
Course Descriptions

Nurs 4200. Care of Adults With Health Disruptions I: Physiological Conditions. (6 cr; Prereq–[4100, 4101, 4102, 4103, 4104, 4202, 4205, 4210] or [4210, 4302, 4306])

Nurs 4201. Nursing Care of Adults. (6 cr; A-F only)

Nurs 4202. Core Interventions for Nursing Practice. (2 cr. Prereq–[4200, 4202, 4210] or [4205, 4300, 4310])
Psychomotor skills in core nursing, complementary, and delegated medical interventions for persons/families, throughout the life span, experiencing health disruptions/developmental transitions.

Nurs 4203. Nursing Fundamentals II: Assessment and Interpretation. (4 cr; A-F only. Prereq–Nursing student or ¶)
Foundational, complex, and advanced psychomotor nursing interventions and their research basis. Lab components provide opportunities to perform psychomotor skills used in nursing/complementary interventions. Skills taught within caring framework.

Nurs 4205. Nursing Theory and Research. (3 cr. Prereq–Undagr in Nurs, [4200, 4202, 4210] or 4202, 4300, [4310])
Examine knowledge basic to the discipline and practice of nursing. Relationships among research, theory/theoretical formulations, and practice. Research process is introduced with attention to utilization of research in practice.

Nurs 4205V. Honors: Nursing Theory and Research. (3 cr. Prereq–Nurs honors)
Knowledge basic to discipline/practice of nursing. Relationships among research, theory, practice. Introduction to research process, with attention to use of research in practice. Students develop honors research proposal.

Nurs 4205W. Nursing Theory and Research. (3 cr. Prereq–Undagr in Nurs, [4200, 4202, 4210] or 4202, 4300, [4310])
Examine knowledge basic to the discipline and practice of nursing. Relationships among research, theory/theoretical formulations, and practice. Research process is introduced with attention to utilization of research in practice.

Nurs 4210. Care of Adults with Health Disruptions II: Psychiatric Illnesses. (4 cr. Prereq–4100, 4101, 4103, 4104, 4200, 4210) Forming therapeutic relationships with clients experiencing psychiatric illnesses. Collaborating with multidisciplinary team to assess psychiatric needs, develop holistic plan of care, help clients negotiate care, and evaluate client outcomes.

Nurs 4300. Family-Centered Nursing Care of Infants, Children, and Adolescents. (6 cr. Prereq–4100, 4101, 4102, 4103, 4104, [4202, 4205] or [4202, 4206], [4310])
Caring for children/families when children are acutely or chronically ill. Situations/conditions common to children. Opportunities for practice at hospitals, health care agencies, schools, and community organizations.

Nurs 4302. Expanded Interventions for Nursing Practice. (2 cr. Prereq–4202, 4210, 4300, 4306, [4310 or 4201, 4306])
Building on core interventions for nursing practice to perform psychomotor skills in expanded nursing, complementary, and delegated medical interventions when caring for persons throughout the life span in differing contexts.


Nurs 4310. Holistic Care of Childbearing Families. (4 cr. Prereq–4100, 4101, 4102, 4103, [4202, 4205, 4300] or [4300, 4302, 4306])
Nurse’s role during antepartum period, birth experience, and immediate postpartum phase. Health promotion, risk reduction, and active participation of clients to achieve optimum family health.

Nurs 4320. Psychiatric and Mental Health Nursing. (5 cr; A-F only)

Nurs 4322. Population-based Public Health Nursing. (5 cr; A-F only. Prereq–Nursing student or ¶)
Applying nursing research with individuals, families, communities, and systems. Students complete a community assessment, apply evidence-based practice within the context of social justice.

Nurs 4324. Transcultural Nursing and Global Health. (3 cr; A-F only. Prereq–Nursing student or ¶)
Influence of culture on health care delivery. Role of nurse in providing culturally appropriate care for increasingly diverse populations. Global health issues, factors affecting health infrastructure of populations.

Nurs 4400. Health Care of Populations. (3 cr. Prereq–4200, 4210, 4300, 4302, 4306, 4401, 4402, 4404, 4406, 4410)
Synthesize knowledge and skills of health and protect the health of populations through systematic assessment, planning, intervention, and evaluation. Emphasis on nursing research, roles, public health values, and collaborative activities promoting population health.

Nurs 4401. Health Care of Populations: Clinical Practicum. (2 cr. Prereq–4200, 4210, 4300, 4302, 4306, 4401, 4402, 4404, 4406, 4410) Guided practice in population-based nursing to promote and protect health through systematic assessment, planning, intervention, and evaluation. Critical examination of interdisciplinary collaboration, partnering with culturally diverse populations, and ethical decision-making in public health.

Nurs 4402. Taking Ethical Action in Health Care. (1 cr)
Distribution of scarce resources to meet health care needs in various health care settings. Ethics in a managed care environment. Increasing focus on how to take ethical action in health care.

Nurs 4404. Applied Nursing Research and Research Utilization. (2 cr. Prereq–4202 or ¶)
Design and carry out a research project of limited scope to develop fundamental skills in systematic inquiry, and interpreting and evaluating research as it applies to nursing practice. The final product is a scholarly research report.

Fundamental skills in systematic inquiry. Interpreting/evaluating research for applicability to nursing practice. Students develop honors research project or thesis.

Nurs 4406. Leadership and Management for Shaping Professional Nursing Practice. (4 cr. Prereq–4103, 4205, 4306)
Provides a basis for synthesis of current leadership and management theories within the professional practice of nursing. Examine the interaction among professional nursing issues, health care trends, and the leadership potential of nurses.

Nurs 4406W. Leadership and Management for Shaping Professional Nursing Practice. (4 cr; A-F only. Prereq–4103, 4205, 4306)
Provides a basis for synthesis of current leadership and management theories within the professional practice of nursing. Examine the interaction among professional nursing issues, health care trends, and the leadership potential of nurses.

Nurs 4407H. Honors: Seeking Solutions to Global Health Issues. (2 cr. Prereq–[4404H, nursing honors student] or ¶)
Global health issues from interdisciplinary perspective. Emphasizes ethical/cultural sensitivity, complexities of issues, in order to propose realistic actions for resolution.

Nurs 4410. Critical Care Nursing. (3 cr. Prereq–4202, 4210, 4300, 4302, 4306, 4310, 4400, 4401, 4402, 4404, 4406)
Acquire fundamental knowledge underlying the care of patients with life-threatening conditions and their families in a highly technologic and unpredictable environment. Analyze relationships of multi-system alterations in functioning from complex physiological disruptions using advanced critical thinking and prioritization skills.

Nurs 4412. Acute and Critical Nursing Care of Children. (3 cr. Prereq–4100, 4101, 4102, 4103, 4104, 4200, 4202, 4205, 4210, 4300, 4302)

Assessment/management of chronic health conditions of elders from cross-cultural, international perspective. Complex long-term health needs of elders, care delivery models that address these needs.

Nurs 4420. Managing Care of Adult Clients With Complex Health Conditions Across the Continuum. (3 cr. Prereq–4100, 4101, 4102, 4103, 4104, 4200, 4202, 4205, 4210, 4300, 4302)
Coordination of comprehensive nursing care to clients with multi-system illnesses and complex socio-emotional situations, across settings and over time. Specialized strategies such as discharge planning, care paths, end-of-life interventions, and interdisciplinary collaboration. Emphasizes achieving quality health outcomes for clients and their families.

Nurs 4430. Immunization Tour. (1 cr; A-F only. Prereq–4202, 4210, level II nursing student, ¶)
Student teams plan/implement influenza immunization clinics for U of M faculty, staff, and students. Interdisciplinary collaboration, public health principles, public health nursing interventions, leadership.

Nurs 4500. Nursing Leadership and Health Care Systems. (4 cr; A-F only. Prereq–4202, level II nursing student or ¶)
Nurse as leader/manager in client care and as colleague. Status, structure, environment, and operations of healthcare systems. Social, economic, technologic, and political factors influencing nursing care and health quality, access, and cost.

Nurs 4500W. Nursing Leadership and Health Care Systems. (4 cr; A-F only. Prereq–Nursing student or ¶)
Nurse as leader/manager in client care and as colleague. Status, structure, environment, and operations of healthcare systems. Social, economic, technologic, and political factors influencing nursing care and health quality, access, and cost.
Nurs 4501. Critical Care Nursing Practice. (3 cr. Prereq-4400, 4401, 4402, [4404 or 4404H], 4406W, 4410) Students participate in care of critically-ill patients with a nurse preceptor. Synthesize theoretical knowledge and practice skills. Increase competence in evaluating patient data from numerous sources. Provide safe, organized care to patients with life-threatening, multi-system problems.

Nurs 4503. Acute and Critical Nursing Care of Children Practicum. (3 cr. Prereq-4100, 4101, 4103, 4104, 4200, 4202, 4205, 4210, 4300, 4412) Acute/critical care setting. Students participate with preceptors in evaluating data from numerous sources, providing holistic care to children with life-threatening conditions or multi-system disorders, and providing care to their families.

Nurs 4505. Managing Chronic Health Conditions of Elders: a Study Abroad Practicum. (3 cr; A-F only. Prereq-4100, 4101, 4103, 4104, 4200, 4202, 4205, 4210, 4300, 4302, 4400, 4401, 4402, [4404 or 4404H], 4406W, 4410) Students participate in coordinating comprehensive nursing care to clients and their families with complex/chronic health problems across settings and over time with a nurse preceptor. Coordinating/implementing care for a group of clients. Functioning as an interdisciplinary team leader/member.

Nurs 4800. Nursing Topics. (1-16 cr [max 16 cr]. Prereq-#) Exploration of a topic to meet individual student needs.

Nurs 4801. Research Topics. (1-16 cr [max 16 cr]. Prereq-#) Exploration of research topic to meet individual student needs.


Nurs 5035. Practicum: Nursing Care for Clients With Complex Health Conditions. (5 cr; A-F only. Prereq-Postbaccalaureate certificate prog student, #) Clinical decision-making, comprehensive nursing care of clients with complex health problems. In collaboration with a clinical preceptor and a faculty advisor, students develop an individualized learning contract to meet course objectives.

Nurs 5040H. Seeking Solutions to Global Health Issues. (2-3 cr. Prereq-Grad student or sr nursing honors student or CLA upper div honors or #) Global health issues from interdisciplinary perspective. Emphasizes ethical/cultural sensitivity/complexities. Students propose realistic actions that could be taken to resolve these issues.

Nurs 5111. Learning Theories for Nursing Education. (1 cr) Overview of selected learning theories used in academic, patient, and staff education in nursing.

Nurs 5141. Ethical Issues in Health Care of Elders. (3 cr. Prereq-Grad student or nursing sr or #) Health care related ethical issues that confront elders, their families, health care providers, and society.

Nurs 5170. Research Topics. (0-16 cr [max 16 cr]. Prereq-#) Exploration of research topic to meet individual student needs.

Nurs 5171. SPSS Programming and Data Analysis. (2 cr. Prereq-Interdepartmental stats, [grad or professional student] or #) Skills needed to collect/analyze data using SPSS for Windows. Review of statistical methods.

Nurs 5172. Decision Making in Health Care. (2 cr. Prereq-Grad student, #) Selected classical conceptual models of decision making, their particular perspectives/limitations/usfulness for decision making about health care issues. Models/components used to assess, evaluate, teach, or help healthy people, patients, families, health care professionals, policy making groups in making health care decisions.

Nurs 5200. Holistic Health Assessment and Therapeutics for Advanced Practice Nurses. (3 cr. Prereq-#) Health assessment knowledge/skills for advanced nursing practice with patients across age span, including pregnancy. Selected nursing interventions, complementary therapies examined for application to specific populations/illnesses.

Nurs 5202. Introduction to Complementary Healing Practices. (3 cr) Historical and cultural context of the allopathic and complementary healing traditions. Philosophies and paradigms of selected complementary therapies and culturally based healing traditions; descriptions of selected interventions.


Nurs 5222. Advanced Physiology. (3 cr. Prereq-Grad nursing major or #) Systems approach to human physiology/pathophysiology. Physiologic changes across life span. Emphasizes clinical application using population-specific content related to various specialty areas in advanced practice nursing.

Nurs 5223. Assessment of Psychopathology for Advanced Practice Psychiatric/Mental Health Nursing. (4 cr. Prereq-Nurs grad or #) Advanced concepts from nursing theory and research, social sciences, neuropsychology, and neurophysiology used in the assessment of psychiatric symptoms and disorders across the age continuum. During clinical, develop proficiency in the assessment of psychopathology in clients with psychiatric symptoms.


Nurs 5225. Psychopharmacology for Advanced Practice Psychiatric/Mental Health Nursing. (3 cr. Prereq-Grad student or RN [with master's degree] or #) Advanced concepts in neuroscience, psychopharmacology, and clinical management related to psychopharmacologic treatment of psychiatric disorders/symptoms. Application to problems in various clinical settings.

Nurs 5228. Acute Care Pharmacotherapeutics. (3 cr; A-F only. Prereq-Grad student) Analysis of pharmacodynamics, physiological bases, therapeutic effects, and non-intended effects (common errors, adverse effects, side effects) for selected pharmacologic agents within drug categories commonly used in acute care.

Nurs 5300. Health Behavior Intervention: Theory and Application. (3 cr. Prereq-Grad or #) Interdisciplinary course examines theoretical foundations and research base of intervention strategies to promote health behavior acquisition, behavioral change, and maintenance for adults (individuals and groups). Critical examination of health behavior and patterns and health risk assessment: approaches to program creation.

Nurs 5340. Group as a Health-Care Intervention. (2 cr. Prereq-Grad or #) Theoretical concepts and research findings from the areas of group theory and dynamics are applied in the development of a model for using group as an intervention for various client populations.

Nurs 5501. Professional Issues in Nurse-Midwifery. (1-2 cr. Prereq-Grad student) Analysis of professional issues that confront and impact the practice of certified nurse-midwives. History and development of the professional organization including certification, legislation, ethical dimensions, public policy, and clinical practice issues.

Nurs 5520. Women's Issues: A Health Perspective. (3 cr. Prereq-Upper div or grad student) Multidisciplinary exploration and analysis of a broad range of women's health issues: physiological, developmental, historical, sociocultural, feminist, nursing and medical. Topics include health promotion and reproductive health issues across the life span.

Nurs 5522. Sociopolitical Context of Women's Health. (2-3 cr [max 3 cr; S-N only. Prereq-Grad student]) Women's health issues from multidisciplinary perspective. Sexual/reproductive health issues across life span. Sociocultural issues affecting health, such as poverty/violence.

Nurs 5601. School Nursing in the Educational System and the Community. (1-3 cr; A-F only. Prereq-3 yrs of college level courses) School health programs, assessment/intervention strategies. Integration of research findings. Applications with individuals, families, communities.

Course Descriptions

For definitions of course numbers, symbols, and abbreviations, see page 300.
Course Descriptions

Nurs 5604. Advanced Health Assessment and Interventions With Adolescents. (2 cr. Prereq–Cpsy 5103 or equiv or #) Integrates knowledge from nursing, public health, health behavior, and adolescent development as framework for developing health assessment/ intervention strategies for clinical practice with adolescents.

Nurs 5800. Nursing Topics. (1-4 cr [max 8 cr]. Prereq–#) Course allows students to study a topic not included in regular courses, or for faculty to offer a course to determine interest in a topic.


Nurs 5802. Spirituality and Nursing Practice. (2 cr. Prereq–For undergrad cr: nurs sr or RN; for grad cr: nurs grad student or #) Exploration of the concept of spirituality as integral to the whole person. Discussion of spiritual nursing care interventions.

Nurs 5803. Transcultural Nursing: Theories and Issues. (2 cr. Prereq–Cultural anth course or #) Study of cultural factors that influence theories, issues, and nursing care practices in diverse cultures and subcultures. Emphasis on nursing within international systems of health care and nursing practices related to various health-illness systems in this country and worldwide.

Nurs 5804. Therapeutic Healing Touch: Research and Practice. (2 cr; S-only. Prereq–Upper div or grad student [in health sciences or health care]) Therapeutic/Healing Touch as energetic based, biofield healing modality. Art/science of this modality. Research literature related to Therapeutic Touch/Healing Touch. Explanations for effects. Practice of Therapeutic Touch, intervention techniques.

Nurs 5805. The M’ technique. (1 cr; S-N only. Prereq–Undergrad nursing student or grad student in health sciences or health professional) Scientific/theoretical foundations/practice of ‘m’ technique, a touch therapy for promoting relaxation by topically administering essential oils. Appropriate applications. Demonstration/practice of technique. Interdisciplinary course.


Nurs 5807. Stories of Illness. (3 cr) Subjective experiences of various physical/mental illnesses. Social context of illness, society’s responses to illness. Ethical implications for patients/practitioners. Uses fiction, art, film, music, first-person accounts of illness, and anthropological, sociological, and historical literature.

Nurs 5808. American Indian Health and Health Care. (2 cr. Prereq–Upper div or grad student or #) Examines health of native nations in Minnesota with historical/cultural contexts. Epidemiology of major health conditions, health services, traditional Indian medicine, health beliefs. Opportunities for contact with Native American community.

Nurs 5809. Seminars in Critical Care. (2 cr) Analyzes current research/developments in treatments, care delivery, and ethical issues affecting critically ill patients and their families. Students participate with team of multidisciplinary faculty from Center for Critical Care in critiquing/presenting literature and discussing applications to clinical practice.

Nurs 5810. Health Activism. (3 cr) Interdisciplinary skill-building workshops. Sessions taught by community leaders/activists. Community project focuses on issues of health disparities, environmental justice, and access to care.

Nurs 5830. Advanced Clinical Nursing. (1-6 cr. Prereq–Graduate nursing major or #) Independent study or faculty seminar on special clinical topic.

Nurs 5900. Introduction to Principles and Practice of Anesthesia. (3 cr; A-F only. Prereq–Grad student in nurse anesthesia) Safe/effective administration of anesthesia for nurse anesthetists. Application in operating room setting under one-to-one guidance of a certified registered nurse anesthetist (CRNA).

Operations and Management Science (OMS)

Department of Operations and Management Science

Curtis L. Carlson School of Management

OMS 2550. Business Statistics: Data Sources, Presentation, and Analysis. (4 cr; A-F only. 1550. Prereq–[Math 1031 or equiv], at least 30 cr) Data analysis, basic inferential procedures, statistical sampling/design, regression/time series analysis. How statistical thinking contributes to improved decision making.

OMS 25504. Honors: Business Statistics: Data Sources, Presentation, and Analysis. (4 cr; A-F only. 2550. Prereq–[Math 1031 or equiv], at least 30 cr) Data analysis, basic inferential procedures, statistical sampling/design, regression/time series analysis. How statistical thinking contributes to improved decision making.


OMS 3041. Project Management. (2 cr; A-F only. Prereq–3000 or #) Principles and methods useful for planning and controlling a project, including development of project plan, resource planning and scheduling, and project monitoring and control. Selected computerized packages are studied, including PERT and CPM, and examples of different types of projects from manufacturing and service industries are used.

OMS 3056. Managing Supply Chain Operations. (4 cr; A-F only. Prereq–3000 or #) Decisions/tradeoffs managers face when directing operations of supply chain. Forecasting, capacity/ production planning, just-in-time, theory of constraints, managing supply chain flows, enterprise resource planning (ERP), supply chain design.


OMS 5170. Simulation Modeling and Analysis. (4 cr; A-F only. Prereq–OMS 6120 or BA 1550 or #) Techniques and application of computer simulation modeling and analysis. Includes animations of existing or proposed real-world facilities and processes. Examples of simulation in simulation programming language and environment. Simulation models and animations demonstrating actual operation of models. Planning, analysis, and interpretation of simulation experiment results.

Otolaryngology (Otol)

Department of Otolaryngology

Medical School

Otol 5101. Introduction to the Basic Sciences in Otolaryngology I: Ear. (2 cr. Prereq–Otolaryngology major or #) Multidisciplinary introduction to the basic sciences of the ear. Acoustics and psychoacoustics, temporal bone anatomy, external and middle ear mechanisms, cochlear physiology, auditory neurophysiology, ear embryology, ear biochemistry, immunology, fine structures, vestibular mechanisms and measurement. S-N grading option for nonmajors only.

Otol 5102. Introduction to the Basic Sciences in Otolaryngology II: Head and Neck. (2 cr. Prereq–Otol major or #) Multidisciplinary introduction to the basic sciences of the head and neck. Laryngeal anatomy and physiology, nasal anatomy and physiology, immune biology, embryology of head and neck. S-N grading option for nonmajors only.

Otol 5993. Directed Studies. (1-12 cr [max 12 cr]. Prereq–#) Directed readings and preparation of reports on selected topics.

Pharmacology (Phcl)

Department of Pharmacology

Medical School

Phcl 1450. Introduction to Pharmacology: Concepts of Drug Action. (1 cr; A-F only. Prereq–Upper div or #; courses in [biology, biochemistry] recommended) Selected topics on concepts of how drugs act, their discovery, implications for society. Lectures, discussion, visits to pharmacology research labs.

Phcl 3001. Dental Therapeutics. (2 cr; A-F only. Prereq–Regis dental hygiene program or #) Pharmacology for the dental hygienist. Principles of drug actions.


Phcl 5100. Pharmacology: Drugs and Disease. (3 cr; A-F only. Prereq–[College level physiology, basic biology], [prev or concurrent] courses in [pre-med or other health/biological sciences student] or #) Basic pharmacological principles, mechanisms of drug actions, major drug classes in medicine.

Phcl 5101. Pharmacology for Pharmacy Students. (3 cr; A-F only. Prereq–Regis 2nd yr pharmacy student or #) Action/fate of drugs. Lectures, lab.

Phcl 5102. Pharmacology for Pharmacy Students. (2 cr; A-F only. Prereq–5101 or #) Action/fate of drugs.

Phcl 5103. Pharmacology for Dental Students. (3 cr. Prereq–Regis dental student or #) Pharmacological principles/actions of drugs.

Phcl 5109. Problems in Pharmacology. (1-18 cr. Prereq–Upper div or grad student or #) Research projects and special problems by arrangement.

Phcl 5110. Introduction to Pharmacology. (2 cr [max 2 cr]; A-F only. Prereq–Grad student or #) Basic principles of Pharmacology. Focuses on molecular mechanisms of drug action.

Phcl 5111. Pharmacogenomics. (3 cr; A-F only. Prereq–Grad student or #) Human genetic variation, its implications. Functional genomics, pharmacogenomics, toxicogenomics, proteomics. Interactive, discussion-based course.
Phil 5210. Pharmacology. (1 cr; A-F only. Prereq–Grad student or #)
Principles of pharmacology. Meets with 6110.

Phil 5211. Pharmacology. (2 cr; A-F only. Prereq–5210 or #)
Continuation of 5210. Meets with 6111. Lectures on the major classes of drugs.

Phil 5212. Pharmacology. (3 cr; A-F only. Prereq–5211 or #)
Continuation of 5211. Meets with 6112

Phar 5462. Neuroscience Principles of Drug Abuse. (2 cr. Prereq.– #)
Current research on drugs of abuse, their mechanisms of action, characteristics shared by various agents, and neuronal systems affected by them. Offered biennial, spring semester of even-numbered years.

Pharmacy (Phar)
Department of Pharmacy Practice
College of Pharmacy

Phar 1001. Orientation to Pharmacy. (1 cr)
Pharmacy career opportunities, pharmacist’s role, issues faced by pharmacy profession, information about College of Pharmacy.

Phar 1002. Health Sciences Terminology. (2 cr)
Self-study introduction to terminology used in health sciences. Students systematically analyze/build words from combining forms, suffixes, and prefixes.

Phar 1003. Self Care: A Guide to Today's Nonprescription Pharmacy. (2 cr)
Self-study course. Nonprescription medications, appropriate self care. Vitamins, herbal products, pain relievers, cold medications. Non-drug treatments for minor illnesses. Textbook is supplemented with online coursework. Students use WebCT to view audio/video presentations, download reading materials, and complete self tests in preparation for exams.

Phar 1905. Seminar: What Your Mom Didn’t Tell You About Caring for Yourself. (2 cr; A-F only. Prereq–Fr)
Making independent decisions about self-care. Tools for being an educated health consumer.

Phar 3800. Pharmacotherapy for the Health Professions. (3 cr; A-F only. Prereq–Enrolled [nursing or radiation therapy or respiratory therapy] student) General drug therapy.

Phar 5201. Health Sciences Applied Terminology. (2 cr. Prereq–Basic knowledge of human anatomy/physiology) Self-study course. Medical terms, how to apply them when documenting/reporting patient care procedures.

Phar 5270. Therapeutics of Herbal and Other Natural Medicinals. (2 cr; A-F only. Prereq–Phll 6051, organic chemistry, pathophysiology of disease states, third yr pharmacy student) 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.


Philosophy (Phil)
Department of Philosophy
College of Liberal Arts

Phil 1001. Introduction to Logic. (4 cr; §1001H, §1021) Application of formal techniques for evaluating arguments.

Phil 1001H. Honors Course: Introduction to Logic. (4 cr. §1001, §1021) Application of formal techniques for evaluating arguments.


Phil 1002W. Introduction to Philosophy. (4 cr. §1002W, §1102, §1006W, §1026W) Problems, methods, historical/contemporary schools of philosophy.

Phil 1003V. Honors: Introduction to Ethics. (4 cr. §1003W, §1103) Central concepts, principal theories of moral philosophy.

Phil 1003W. Introduction to Ethics. (4 cr. §1003W, §1103) Central concepts/principal theories of moral philosophy.

Phil 1004V. Honors: Introduction to Political Philosophy. (4 cr. §1004W–§1004W) Central concepts, principal theories of political philosophy.

Phil 1004W. Introduction to Political Philosophy. (4 cr. §1004W) Central concepts, principal theories of political philosophy.

Phil 1005. Scientific Reasoning. (4 cr. Prereq–1st or 2nd yr student) Techniques for understanding/evaluating scientific information as presented in popular media and in specialized publications. Emphasizes general reasoning skills that do not require extensive training in particular sciences.

Phil 1006W. Philosophy and Cultural Diversity. (4 cr. §1006W, §1002W, §1102, §1026W) Central problems/methods of philosophy through culturally diverse texts. Focus is critical/comparative, reflecting range of U.S. philosophical traditions.

Phil 1007. Introduction to Political Philosophy Practicum. (1 cr. Prereq–§1004W) Students do at least two hours a week of community service and connect their service activities in writing to issues discussed in 1004.

Phil 1021. Accelerated Introduction to Logic. (3 cr. §1001, §1001H) Application of formal techniques for evaluating arguments.

Phil 1026W. Philosophy and Cultural Diversity. (3 cr. §1026W, §1002W, §1102, §1026W) Central problems/methods of philosophy through culturally diverse texts. Focus is critical/comparative, reflecting range of U.S. philosophical traditions.


Phil 1103. Introduction to Ethics. (4 cr. §1003W, §1003V) Central concepts, principal theories of moral philosophy.

Phil 1303. Business Ethics. (4 cr; A-F only) Purpose of business, its obligations to various stakeholders (e.g. stockholders, customers, employees), its social function.

Phil 1905. Topics: Freshman Seminar. (3 cr; A-F only. Prereq–Fr or max 36 cr) Topics specified in Class Schedule.

Phil 1910W. Topics: Freshman Seminar. (3 cr; A-F only. Prereq–Fr or max 36 cr) Topics specified in Class Schedule.


Phil 3001V. Honors: General History of Western Philosophy: Ancient Period. (4 cr. §3001V, §3011) Major developments in ancient Greek philosophic thought: pre-Socrates, Socrates, Plato, Aristotel, Hellenistic thinkers.

Phil 3001W. General History of Western Philosophy: Ancient Period. (4 cr. §3001V, §3011) Major developments in ancient Greek philosophic thought: pre-Socrates, Socrates, Plato, Aristotel, Hellenistic thinkers.

Phil 3005V. General History of Western Philosophy: Modern Period. (4 cr. §3005W, §3105) Major developments in philosophic thought of the modern period: renaissance beginnings, Descartes through Hume, with some attention paid to Kant.

Phil 3005W. General History of Western Philosophy: Modern Period. (4 cr. §3005W, §3105) Major developments in philosophic thought of the modern period: renaissance beginnings, Descartes through Hume. Some attention to Kant.

Phil 3101W. Classical Ancient Text. (3 cr) Introduction to and in-depth analysis of Plato’s Republic.


Phil 3105. General History of Western Philosophy: Modern Period. (4 cr. §3005W, §3005V) Major developments in philosophic thought of the modern period: renaissance beginnings, Descartes through Hume. Some attention to Kant.

Phil 3231. Philosophy and Language. (4 cr) Philosophical issues concerning the nature and use of human language.

Phil 3234. Knowledge and Society. (4 cr) Critical discussion of concepts such as knowledge, objectivity, justification, rationality, evidence, authority, expertise, and trust in relation to the norms and privileges of gender, race, class, and other social categories.

Phil 3301. Environmental Ethics. (4 cr) Philosophical basis for membership in moral community. Theories applied to specific problems (e.g., vegetarianism, wilderness preservation). Students defend their own reasoned views about moral relations between humans, animals, and nature.

Phil 3302W. Moral Problems of Contemporary Society. (4 cr. §3322W, §3402) Selected moral problems of private/public life.

Phil 3304. Law and Morality. (4 cr) A study of the relationship among law, morality, and our role as citizens.

Phil 3305. Medical Ethics. (4 cr) Moral problems confronting physicians, patients, and others concerned with medical treatment, research, and public health policy. Topics include abortion, living wills, euthanasia, genetic engineering, informed consent, proxy decision-making, and allocation of medical resources.

Phil 3307. Social Justice and Community Service. (4 cr) Exploration of concepts of justice, charity, equality, freedom, community service in connection with current social issues. Perspectives from philosophy, history, literature, and student involvement in the community. Community service for at least three hours per week.
Course Descriptions

Phil 3308. Social Justice and Community Service. (4 cr) Special exploration of diversity in connection with concepts of justice, charity, equality, freedom, community service. Perspectives from philosophy, history, literature, and student involvement in the community. Community service for at least three hours per week. Students may enroll in this course without having taken 3307.

Phil 3311W. Introduction to Ethical Theory. (4 cr) Nature and justification of moral judgments and moral principles; analysis of representative moral views.

Phil 3322W. Moral Problems of Contemporary Society. (3 cr §3302W, §3402) Selected moral problems of private/public life.


Phil 3502W. Introduction to Aesthetics. (3 cr) Development of aesthetic theories with applications to specific aesthetic problems.

Phil 3601W. Scientific Thought. (4 cr. Prereq–One course in philosophy or natural science) Introduction to philosophical issues concerning the nature of knowledge. Reading of historical and contemporary sources that describe major scientific achievements and controversies.

Phil 3602. Science, Technology, and Society. (3 cr; A-F only) Philosophical issues that arise out of interaction between science, technology, society (e.g., religion and science, genetics and society, science and the environment).

Phil 3607. Philosophy of Psychology. (4 cr. Prereq–One course in philosophy or psychology) Major theories of mind including the “invention” of the mind by Descartes, classical empiricism, the impact of Darwinism, Freud’s theories, Gestalt psychology, behaviorism, Chomsky’s rationalism, contemporary functionalism, the computer model.

Phil 3900H. Honors Seminar. (3 cr. Prereq–Honors regis, 6 cr of 3xxx-5xxx philosophy courses) Topics of contemporary interest varying from semester to semester.

Phil 3910W. Major Seminar. (3 cr. Prereq–Phil major or #) Development and presentation of the major project.

Phil 3993. Directed Studies. (1-3 cr [max 6 cr]. Prereq–#) Guided individual reading or study.

Phil 4003. Medieval Philosophy. (3 cr. Prereq–Grad or upper div undergraduate student) Survey of several major figures of the medieval Christian synthesis (e.g., Augustine, Anselm, Aquinas, Scotus, Ockham).

Phil 4004. 19th-Century Philosophy. (3 cr. Prereq–Upper div or grad student) Survey of several major figures from 19th century, e.g., Hegel, Schopenhauer, Mill, Kierkegaard, Marx, Nietzsche. Kant, 18th century, will also be studied, as background.

Phil 4008. Survey of Contemporary Philosophy. (3 cr. Prereq–3005 or #) Survey of major figures in contemporary analytic/phenomenological philosophy (e.g., Dewey, Russell, Wittgenstein, Heidegger, Carnap, de Beauvoir).

Phil 4009. Existentialism. (3 cr. Prereq–3005 or 4004 or #) Centrall themes (e.g., being-in-the-world, freedom, engagement) of several important existentialist thinkers (e.g., Kierkegaard,aspers, Sartre, de Beauvoir, Baldwin).

Phil 4100. Ancient Philosophers. (3 cr [max 6 cr]. Prereq–3001 or #) Major work of selected ancient philosophers (e.g., Plato’s Parmenides, Plato’s Sophist, Aristotle’s Metaphysics). Works discussed may vary from offering to offering.

Phil 4101. Medieval Philosophers. (3 cr [max 6 cr]. Prereq–3001 or 4003 or #) Major work of selected medieval philosophers (e.g., Anselm’s Proslogion, Aquinas’s Summa contra Gentiles, Books III, Nicholas of Cusa’s On Learned Ignorance). Works discussed may vary from offering to offering.

Phil 4104. Rationalists. (3 cr [max 6 cr]. Prereq–3005 or #) Major work of selected early modern rationalists (e.g., Descartes’ Principles of Philosophy, Spinoza’s Ethics, Conway’s Principles of the Most Ancient and Modern Philosophy, Leibniz’s Discourse on Metaphysics). Works discussed may vary from offering to offering.

Phil 4105. Empiricists. (3 cr [max 6 cr]. Prereq–3005 or #) Major work of selected early modern empiricists (e.g., Locke’s Essay Concerning Human Understanding, Berkeley’s Principles of Human Knowledge, Hume’s Treatise of Human Nature). Works discussed may vary from offering to offering.

Phil 4105. Kant. (3 cr. Prereq–3005 or 4004 or #) Major work (e.g., Critique of Pure Reason).

Phil 4107. Selected 19th- or Early to Middle 20th-Century Philosophy. (3 cr [max 6 cr]. Prereq–One sem history of philosophy) Major writings of selected 19th- or early to middle 20th-century philosopher (e.g., Schopenhauer’s World as Will and Idea, Thoreau’s Walden, Du Bois’s The Souls of Black Folk, Wittgenstein’s Philosophical Investigations, de Beauvoir’s The Second Sex).

Phil 4085. Wittgenstein. (3 cr. Prereq–3005 or 4231 or #) Major work (e.g., Philosophical Investigations).

Phil 4101. Metaphysics. (3 cr. Prereq–One course in history of philosophy or #) Philosophical theories concerning nature of reality.

Phil 4105. Epistemology. (3 cr; A-F only) Prereq–1001 or 1001 or #) Theories of nature/sources of knowledge/evidence.

Phil 4231. Philosophy of Language. (3 cr. Prereq–1001 or 5201 or #) Theories of reference, linguistic truth, relation of language/thought, translation/synonymy.

Phil 4310W. History of Moral Theories. (3 cr. Prereq–1003 or #) Issues in western moral philosophy from classical age to present.

Phil 4320W. Intensive Study of a Historical Moral Theory. (3 cr [max 6 cr]. Prereq–1003 or #) Intensive consideration of an author or theory in the history of moral or political philosophy.

Phil 4321W. Theories of Justice. (3 cr. Prereq–1004 or #) Philosophical accounts of concept/principles of justice.

Phil 4324. Ethics and Education. (3 cr. Prereq–6 cr in [philosophy or education] or #) What constitutes good education, both in terms of educational outcomes and of processes that promote learning? What connections are there between concepts of good education and of good society? Individual and Social Change. (4 cr; A-F only) Connections between education, social change. Theories of democratic/popular education, their application through in-depth practicum in community education settings.


Phil 4330. Contemporary Moral Theories. (3 cr. Prereq–1003 or #) Discusses view that evaluative judgments cannot be based on factual considerations alone, relation of this view to objectivity of ethics.

Phil 4414. Political Philosophy. (3 cr. Prereq–1004 or #) Survey of historical/contemporary works in political philosophy.

Phil 4501. Principles of Aesthetics. (3 cr. Prereq–3502 or one philosophy course or #) Problems arising in attempts to identify, characterize, or evaluate art.

Phil 4510. Philosophy of the Individual Arts. (3 cr. Prereq–3502) Aesthetic problems that arise in studying or practicing an art.

Phil 4521. Philosophy of Religion. (3 cr. Prereq–8 cr in philosophy) Conceptual problems that arise from attempts to provide rational justification for religious belief.

Phil 4605. Space and Time. (3 cr. Prereq–Courses in philosophy or physics) or #) Problems of nature/structure of space, time, and space-time.


Phil 4611. Philosophy of the Social Sciences. (3 cr. Prereq–9 cr of [philosophy or social science] or #) Criteria for describing/explaining human actions. Problems of objectivity, reduction, freedom.

Phil 4614. Philosophy of Psychology. (3 cr. Prereq–3607 or Psy 3501) (4 cr) Problems/prospects in recent developments in psychology, cognitive science, and philosophy of mind.

Phil 4615. Minds, Bodies, and Machines. (3 cr. Prereq–One course in philosophy or #) Mind-body problem. Philosophical relevance of cybernetics, artificial intelligence, computer simulation.

Phil 4622W. Philosophy and Feminist Theory. (3 cr. Prereq–8 cr in [philosophy or women’s studies] or #) Experiences and encounters between philosophy/feminism. Gender’s influence in traditional philosophical problems/methods. Social role of theorist/theorizing as they relate to politics of feminism.

Phil 4760. Selected Topics in Philosophy. (3 cr [max 9 cr]. Prereq–3xxx-5xxx course in phil or #) Philosophical problems of contemporary interest. Topics specified in Class Schedule.

Phil 4993. Directed Studies. (3 cr [max 6 cr]. Prereq–#) Guided individual reading or study.


Phil 5202. Symbolic Logic II. (4 cr. Prereq–5201 or #) Elements of set theory, including the concepts of enumerability and nonenumerability. Turing machines and recursive functions; the results of Church, Godel, and Tarski and the philosophical significance of those results.

Phil 5211. Modal Logic. (3 cr. Prereq–5201 or #) Axiomatic and semantic treatment of propositional and predicate modal logics; problems of interpreting modal languages.

Phil 5221. Philosophy of Logic. (3 cr. Prereq–5202 or #) Attempts to answer, “What is logic?” Scope of logic. Disputes about alternative logics. Theories concerning logical truth (e.g., conventionalism: view that logical truths are contingent).
Phil 5222. Philosophy of Mathematics. (3 cr. Prereq—College level logic or mathematics course or #) Major philosophical questions arising in connection with mathematics: What is mathematics about? How do we know the mathematics we do? What is the relation between mathematics and the natural sciences. Selected readings of leading contributors such as Frege, Dedekind, Russell, Hilbert, Brunner, Godel, Quine.

Phil 5323. Education and Social Change. (4 cr; A-F only. §4325) Connections between education, social change. Theories of dehumanizing/totalitarian education, their application through in-depth practicum in community education setting.

Phil 5324. Ethics and Education. (3 cr §4324. Prereq—6 cr in [philosophy or education] or #) What constitutes good education in terms of educational outcomes and of processes that promote learning. Connections between concepts of good education and of good society.

Phil 5325. Biomedical Ethics. (3 cr. Prereq—# for undergrads) A survey of major topics and issues in biomedical ethics including patients’ rights and duties, informed consent, confidentiality, ethical issues in medical research, the initiation and termination of medical treatment, euthanasia, abortion, and the allocation of medical resources.


Phil 5415. Philosophy of Law. (3 cr. Prereq—1003 or 1004 or 3202 or social science major or #) Analytical accounts of law and legal obligation.

Phil 5601. History of the Philosophy of Science. (3 cr. Prereq—#) History of logical empiricism, from its European origins in first half of 20th century to its emergence as nearly universal account of science in post-war Anglo-American philosophy.

Phil 5602. Scientific Representation and Explanation. (3 cr. Prereq—#) Contemporary issues concerning representation and explanation of scientific facts.

Phil 5603. Scientific Inquiry. (3 cr. Prereq—#) Philosophical theories of methods for evaluating scientific hypotheses, of role of experimentation in science, and of how hypotheses come to be accepted within a scientific community.

Phil 5605. Space and Time. (3 cr §4605. Prereq—Courses in [philosophy or physics] or #) Philosophical problems concerning nature/structure of space, time, and space-time.

Phil 5606. Philosophy of Quantum Mechanics. (3 cr) Problems of interpretation in ordinary (nonrelativistic) quantum mechanics. Two-slit experiment, Schrodinger cat paradox (measurement problem), Einstein-Podolsky-Rosen paradox. Leading approaches to interpretation (Copenhagen, hidden variables, universal wave function) and their connections with philosophical issues.

Phil 5611. Philosophy of the Social Sciences. (3 cr §4611. Prereq—8 cr of [philosophy or social science], grad student) or #) Criteria for describing/explaining human actions. Problems of objectivity, reduction, freedom.

Phil 5760. Selected Topics in Philosophy. (3 cr [max 9 cr. Prereq—3xxx-5xxx course in phil or #) Philosophical problems of contemporary interest. Topics specified in Class Schedule.

Phil 5993. Directed Studies. (1-3 cr [max 6 cr. Prereq—#, A, L]) Guided individual reading or study.

Physical Education (PE)

School of Kinesiology

College of Education and Human Development


PE 1007. Beginning Swimming. (1 cr) Introduction to basic aquatic safety, fundamentals of swimming and hydrodynamics. Principles of hydrodynamics and stroke mechanics; five basic strokes; basic rescue techniques with use of pool equipment; hydrotherapy for disabilities and other conditions, opportunities for competitive activities, lifetime enjoyment of aquatics.

PE 1014. Conditioning. (1 cr) Fundamentals of personal fitness. Principles of fitness; health and motor skill components of fitness; principles of training/conditioning programs; nutrition; weight control; common fitness injuries; motivation and consistency in fitness programs; stress management.

PE 1015. Weight Training. (1 cr) Introduction to weight training. Basic aspects of weight training including exercise selection and technique, charting workouts, program design, nutritional considerations, and safety.

PE 1016. Posture and Individual Exercise. (1 cr) Good posture techniques, individual exercises, fitness concepts, and mental techniques. Specific overall sound body and mind techniques to include flexibility exercises, cardiovascular fitness, resistance training, nutrition management, weight control, stress management, and self-thought.

PE 1022. Whitewater Kayaking. (2 cr. Prereq—Good general health, intermediate swimming ability) Basic/intermediate whitewater kayaking skills. Equipment parts/use, group development, river hydrology, navigation, paddle strokes, self-assisted rescues, river maneuvering/etiquette, swift-water safety. Emphasizes progression of practical skills necessary for kayaking. Involves 4-day paddling/camping trip.

PE 1029. Handball. (1 cr) Hand and eye coordination, footwork in practice and game conditions, and skills and strategies of service and rally for the court sport handball (four-wall version). Novice to intermediate levels of play accommodated.

PE 1031. Sabre Fencing. (1 cr) Basic sabre techniques, movement, an overview of fencing as a recreational sport and an Olympic sport, and the history of fencing.

PE 1032. Badminton. (1 cr) Fundamentals including etiquette, terminology, game rules for singles and doubles, footwork, shot selection, and strategy.

PE 1033. Foil Fencing. (1 cr) Fencing fundamentals, including basic foil techniques, movement, a general overview of fencing as a recreational sport and an Olympic sport, and the history of fencing.

PE 1034. Judo. (1 cr) Basic skills for throwing, falling, grappling (matwork), choking, arm and neck techniques; contest judo from Jiu-Jitsu; fundamental rules and scoring of contests. Videotapes used for technique instruction and contest appreciation.

PE 1035. Karate. (1 cr) Japanese Traditional Shotokan Karate (JTSK) is non-contact—no protective pads or gear are worn. Structural foundation, discipline and control, posture, basic body dynamics, blocking, kicking, punching techniques, as well as basic sparring (kumate) and forms (kata).

PE 1036. Racquetball. (1 cr) Fundamentals of racquetball, including equipment; safety and etiquette; terminology; game rules of singles, doubles, and cutthroat; grips; basic strategies; serves and shots.

PE 1037. Squash Racquets. (1 cr) Entry-level technique, basic equipment, international dimension courts, and fitness.

PE 1038. Beginning Tennis. (1 cr) Fundamental strokes, including forehands, backhands, volleys, lobs, overheads, and serves; introduction to doubles play; terminology, rules, and etiquette.

PE 1041. Cycling. (1 cr) Fundamentals of cycling, including physical fitness associated with aerobic training, stretching, safety, and bike maintenance. Students should provide bicycle in good working condition.

PE 1042. Orienteering. (1 cr) Fundamentals, including navigation of an orienteering course using map and compass; types of orienteering courses; multiple techniques and tactics of orienteering. Course is physically challenging and requires participation in three orienteering meets (Sunday afternoons).

PE 1043. Beginning Horse Riding. (1 cr) Techniques, styles, and communication of English riding. Students will learn riding techniques at a walk, trot, canter, and jumping.

PE 1044. Self-Defense. (1 cr) Physical, psychological, and de-escalation skills for acting in crisis situations. Distance, body language, and tone of voice are addressed. Physical skills include striking, kicking, shifting, blocking, releasing techniques, floor defenses, and applications to armed attackers and multiple attackers.

PE 1045. Rock Climbing. (1 cr. Prereq—Good general health, no neck or back problems) Safety, knots, equipment, techniques, and anchor systems used in climbing. Course includes all necessary equipment. Held at St. Paul Gym climbing wall.


PE 1048. Bowling. (1 cr) Fundamentals, including stance, approach and delivery, scoring, bowling terminology, and etiquette.

PE 1053. Ice Skating. (1 cr) Basic turns, basic stops, balance techniques, and various other skills from both the forward and backward positions. Equipment, safety issues, ice skating terminology.

PE 1055. Golf. (1 cr) Proper grip, stance, ball address, swing, club selection, psychological management, rules, and etiquette. Basic instruction in analyzing, assisting with, and coaching golf.

PE 1056. Nordic (Cross-Country) Skiing. (1 cr) Introduction to the fundamental techniques of classical and freestyle cross country skiing. Students will be taught through lecture and direct experience on cross country skiing trails.
Course Descriptions

PE 1057. Beginning Skiing. (1 cr)
Introduction to alpine skiing. Students are taught to stop, turn, and use lifts, as well as safety, etiquette, and purchase of equipment. Class held at Highland Hills ski area in Bloomington.

PE 1058. Snowboarding. (1 cr. Prereq–Good general health, injury free, $75 facility fee)
Introduction to alpine snowboarding. Using American Teaching System, classes are split into nine skill levels, beginning through advanced. Held at Hyland Ski and Snowboard School in Bloomington.

PE 1059. Track and Field. (1 cr)
Introduction to track and field: conditioning and training, events and skills, strategies, track and field knowledge, equipment, facilities, and technology.

PE 1065. Beginning Tumbling and Gymnastics. (1 cr)
Rolls, handstands, cartwheels, extensions, handsprings, tucks (flips). Spotting techniques. Skills on bars, vault, and beam.

PE 1067. Basketball. (1 cr)
Fundamental skills and rules of basketball, with emphasis on basic court movement and different offensive and defensive strategies.

PE 1072. Soccer. (1 cr)
Fundamentals of soccer including sporting behavior both on and off the field, game rules, soccer terminology, participation and competition drills, fundamental soccer skills, practical instruction in strategy.

PE 1073. Softball. (1 cr)
Development of basic skills for lifetime involvement.

PE 1074. Beginning Volleyball. (1 cr)
Basic skills, team play, rules, officiating, and strategy.

PE 1075. Ice Hockey. (1 cr. Prereq–1053 or equiv or #)
Offensive/defensive strategies/techniques, goal tending, scrimmage play. Students need their own equipment.

PE 1107. Intermediate Swimming. (1 cr. Prereq–#; 1007 or equiv; proficient ability to swim 100 meters)
Intermediate swimming skills. Fundamentals of swimming and hydrodynamics.

PE 1133. Intermediate Foil Fencing. (1 cr. Prereq–1031 or equiv or #)
Intermediate/advanced technical/tactical actions in foil, rudimentary epee skills, intermediate/advanced footwork, Rules, officiating, bout tactics.

PE 1135. Intermediate Karate. (1 cr. Prereq–1035 or equiv or #)
Techniques of Japanese traditional Shotokan Karate taught through Ippon Kumite (one step sparring), San Kumite (three step sparring), and Heian Shodan Kata/Nidan Kata (forms). Testing for orange belt is optional.

PE 1136. Intermediate Racquetball. (1 cr. Prereq–#; 1036 or equiv)
Improvement of basic skills and strategies. Format is determined by the number of players and their level of ability.

PE 1138. Intermediate Tennis. (1 cr. Prereq–1038 or equiv or #)
Review terminology, rules, etiquette. Improve basic skills. Singles/doubles strategy, competitive play.

PE 1154. Figure Skating. (1 cr. Prereq–1053 or equiv or #)

PE 1157. Intermediate Skiing. (1 cr. Prereq–1057 or equiv or #)
Assessment is made to determine skill level
Developing advanced skills in alpine skiing. Skiing safely on more difficult terrain. Class held at Highland Hills ski area in Bloomington.

PE 1165. Intermediate Tumbling and Gymnastics. (1 cr. Prereq–1055 or #)
Rolls, handstands, cartwheels, extensions, handsprings, tucks (flips), twists. Spotting techniques. Skills on bars, vault, and beam.

PE 1174. Intermediate Volleyball. (1 cr. Prereq–#; 1074 or equiv)
Development of a broader understanding of volleyball systems of play, and incorporation of offensive and defensive formations into team play. Fundamental skills will be developed further and more advanced skills will be introduced. Team play, transition, coaching, officiating.

PE 1205. Scuba and Skin Diving. (1 cr. Prereq–1107 or equiv or #)
Diving equipment, physics, physiology, decompression, emergencies, recreational dive planning, ocean and aquatic life, snorkeling/SCUBA equipment usage, buoyancy control, entries, emergencies.

PE 1305. Scuba Stress Rescue and Accident Management. (1 cr; A-F only. Prereq–Open Water SCUBA Certification or higher, [CP] Professional First Aid] certified, own SCUBA equipment [mask, fins, snorkel, buoyancy compensator, regulator, depth pressure gauge, wet suit] or pay $65 rental fee)
Continuing education after basic SCUBA course, visit over water, personal safety, SCUBA rescue, recognizing/reducing diver stress. SCUBA Schools International (SSI) Stress and Rescue certification.

PE 1306. Lifeguard Training. (1 cr. Prereq–[Proficiently swim 500 meters, at least 17 yrs old] or #)
Upon completion, certifications are obtained in the following categories: American Red Cross Lifeguarding Today and First Aid; CPR for the Professional Rescuer; and Waterfront Lifeguarding.

PE 1411. Water Safety Instructor. (2 cr; Prereq–[Proficiency in basic strokes, completion of skill/written pre test] or #)
Advanced lifesaving techniques, treading strategies.

PE 1415. Advanced Weight Training and Conditioning. (1 cr. Prereq–[1014, [1015 or equiv] or #; one or year of serious weight training recommended)
Introduction to advanced forms of cardiovascular weight training: Powerlifting, Olympic weightlifting, bodybuilding, sport-specific training. Proper technique, exercise selection, programming, nutrition, anatomy/physiology of weight training.

PE 1720. Special Activities in Physical Education. (2-3 cr; max 9 cr)
Activities or related opportunities not normally available through regular course offerings.

Physical Medicine and Rehabilitation (PMed)

Department of Physical Medicine and Rehabilitation Medical School

PMed 1002. Orientation to Physical Therapy. (1 cr; S-N only)
Introduction to the profession of physical therapy through lectures, discussions, patient presentations, clinic visit, videotapes, and exposure to treatment equipment.

PMed 1003. Orientation to Occupational Therapy. (1 cr; S-N only)
Survey of the profession through lectures, films, demonstrations, and tours. For students investigating the field of occupational therapy.

PMed 5121. Issues in Mental Health. (1 cr; S-N only. Prereq–One course gen psych, one course abnorm psych)
Psychiatric/neuropsychological assessment/treatment. Issues related to medical/community management and to roles of OT/PT with respect to clients with mental health needs. Interaction between physical/mental health and disability.

PMed 5122. Descriptive Neurology. (4 cr; A-F only. Prereq–Registered occupational therapy student or #)
Developmental skills in alpine skiing. Skiing or #; assessment is made to determine skill level
Fundamental skills will be developed further and more advanced skills will be introduced. Team play, transition, coaching, officiating.

PMed 5131. Theory of Physical Medicine and Rehabilitation Applied to Medical Sciences. (2 cr; A-F only. Prereq–OT of PT student)
Diagnostic procedures. Medical, surgical, and rehabilitation management of patient problems in orthopedics, surgery, pediatrics, dermatology, medicine, cancer, and speech. Correlation to current practice. Presentation of patient cases.

PMed 5182. Functional Neuromotor and Neurophysiology. (4 cr; A-F only. Prereq–Registered occupational therapy student or #)
Neuroanatomic structures as functional systems, basic neurophysiologic concepts. Emphasizes applications for understanding/treating physical dysfunctions.

PMed 5215. Clinical Practice of Physical Therapy I. (1 cr; S-N only. Prereq–Reg PT student)
First of three-course sequence. Emphasizes sensitivity to needs of patients, families, and health-care coworkers. Patient handling techniques, communication skills, awareness of cultural differences, psychological aspect of disability, and use of community resources.

PMed 5216. Clinical Practice of Physical Therapy II. (1 cr; S-N only. Prereq–Registered 2nd yr PT student)
Second of a three-course sequence. Emphasizes sensitivity to needs of patients, families, and health-care coworkers. Patient-handling techniques, communication skills, awareness of cultural differences, psychological aspect of disability, use of community resources. Offered summer session.

PMed 5217. Clinical Practice of Physical Therapy III. (1 cr; S-N only. Prereq–Registered 2nd-year PT student)
Third of three-course sequence. Sensitivity to needs of patients, families, and health-care coworkers. Patient handling techniques, communication skills, awareness of cultural differences, psychological aspects of disability, use of community resources.

PMed 5222. Electrotherapy and Electrophysiological Testing. (2 cr; A-F only. Prereq–Reg PT student)
Theory and technique of movement analysis and treatment using electrophysiological testing and therapeutic devices.

PMed 5231. Clinical Biomechanics. (5 cr; A-F only. Prereq–Registered PT student, intro calculus, intro physics)
Forces/structures internal/external to body responsible for normal/abnormal human movement. Analysis techniques, independent assignments. Muscle function, palpation of normal individuals, analysis to detect deviation from norm.

PMed 5235. Clinical Internship I. (3 cr; S-N only. Prereq–Reg PT student)
Five-week, full-time internship. Select and perform physical therapy evaluation techniques, interpret results, define rationale for physical therapy service, develop a care plan, implement treatment program, and communicate patient/client care process as a physical therapy professional.

PMed 5260. Professional Issues in Physical Therapy. (3 cr; A-F only. Prereq–Reg PT student)
Current professional issues, dilemmas, and trends in health care. Evaluation and treatment skills in physical therapy specialty areas.

PMed 5282. Therapeutic Exercise II. (3 cr; A-F only. Prereq–Registered PT student)
Principles of neurophysiology, physiology, motor control, and motor learning as basis for therapeutic intervention in motor dysfunction.

PMed 5284. Musculoskeletal II. (4 cr; A-F only. Prereq–Registered PT student)
Problem-solving approach to evaluating, treating, and preventing selected musculoskeletal conditions across life span. Chart review, history taking, strength testing, functional testing, gait/posture examination, special orthopedic tests. Therapeutic exercises, orthopedic ambulation, joint mobilization, splinting, patient education. Second of two-course sequence.
PMed 5287. Neurorehabilitation I. (4 cr; A-F only. Prereq–Regis PT student) Assessment and rehabilitation of patients with neurological conditions (e.g., cerebral vascular disease traumatic brain injury, multiple sclerosis, Parkinson’s disease, amyotrophic lateral sclerosis). Using treatment procedures, orthotics, and equipment to improve function and prevent, stabilize, or decrease impairments.


PMed 5293. Research Design in Physical Therapy. (3 cr; A-F only. Preregistered 2nd yr PT student) Predictive research, elementary statistical concepts, analysis of scientific literature, Tools to design experiments and analyze data acquired from student group projects. Design/statistical formats: risk analysis, multivariate regression analysis, designs of reliability studies, traditional group designs. Students give preliminary presentation of analysis to their peers.

PMed 5295. Clinical Education. (12 cr; S-N only. Preregistered 3rd yr PT student) Students must demonstrate proficiency in communication, team participation, and evaluation/ treatment; predict outcomes; and manage a variety of patient diagnoses/problems consistently with good/ safe judgment.

PMed 5300. Concepts for Occupational Therapy Practice. (4 cr; A-F only. Preregis-Regis OT student or #) Critical thinking, ethics, professional resources/ organizations, patient-therapist relationship. Level I fieldwork experience.

PMed 5312. Therapeutic Occupation. (4 cr; A-F only. Preregis-Regis OT student or #) Occupational therapy philosophy, history, and frames of reference. Activity analysis applied to purposeful, therapeutic activities for individuals and groups.

PMed 5341. Introduction: Evaluation and Intervention I. (4 cr; A-F only. Preregis-Regis OT student or #) Assessment concepts/techniques. Application to patient populations with both mental health/physical disabilities. Treatment planning/documenta tion.

PMed 5342. Compensatory Rehabilitation: Evaluation and Intervention II. (4 cr; A-F only. Preregis-5300, 5313 or #) Assessment of daily living performance areas; adaptation techniques to compensate for performance deficits. Level I fieldwork experience.

PMed 5343. Specialty Topics: Evaluation and Intervention III. (4 cr; A-F only. Preregis-5342 or #) Applies critical thinking model to assessment/ intervention of selected patient populations with mental/physical problems requiring specialized approaches. Focus on habilitation/rehabilitation of populations with multiple performance component deficits. Fieldwork.

PMed 5344. Neurorehabilitation: Evaluation and Intervention IV. (5 cr; A-F only. Preregis-5343 or #) Assessment/intervention related to perception, cognition, reflexes, sensory integration, and motor control. Application to individuals with multiple performance component deficits. Fieldwork.

PMed 5360. Dynamics of Group Models. (2 cr; A-F only. Preregis-5313 or #) Application of group/team dynamics in diverse professional settings.

PMed 5370. Theory of Occupation. (1 cr; A-F only. Preregis OT student or #) Occupational therapy frames of reference, role of activity, and historical development of profession.

PMed 5375. Community Resources and Health-Care Issues. (2 cr; A-F only. Preregis-[5300, 5342] or #) Analysis of community health-care systems, including cultural/family influences on individual health and decision making. Students identify current trends in health care and determine responses to them at social, political, or legislative level.

PMed 5376. Adult Education and Planning. (1 cr; A-F only. Preregis-5352 or #) Skills needed to plan, implement, and evaluate adult educational programs/materials for patient/family education, peer/professional education, and education of others in order to carry out therapeutic interventions. Student teaching unit, community based activity.

PMed 5380. Management of Occupational Therapy Services. (3 cr; A-F only. Preregis-[5360, 5375, 5376] or #) Administration/management of occupational therapy services within managed care environment. Issues in Medicare, HMOs, TQM, consultation, human resources, promotion of profession. Emphasizes program development in current organizational structures.

PMed 5391. Occupation across the Life Span. (3 cr; A-F only. Preregis-[5375, 5376] or #) The well elderly, school therapy, work-related injuries/industrial rehabilitation. Fieldwork.

PMed 5392. Research in Occupational Therapy. (3 cr; A-F only. Preregis-5313 or #) Analysis of scientific literature, development of research proposals.

PMed 5393. Functional Anatomy and Kinesiology. (4 cr; A-F only. Preregis-Regis OT student or #) Gross human anatomy emphasizing skeletal, muscular, circulatory, and peripheral nervous systems of the extremities and trunk. Includes cadaver lab procedures. Analyzing functional human movement from a biomechanical perspective.

PMed 5394. Orthotics. (3 cr; A-F only. Preregis-5341 or #) Analysis, design, and construction of orthotic devices.

PMed 5395. Independent Study in Occupational Therapy. (1-4 cr [max 16 cr] Preregis-Regis OT student or #)

**Physics (Phys)**

**School of Physics and Astronomy**

**Institute of Technology**

**Phys 1001W. Energy and the Environment.** (4 cr. Prereq- 1 yr high school algebra) Fundamental principles governing physical world in context of energy/environment. Lab.

**Phys 1011. Physical World.** (3 cr; A-F only. Preregis-One yr high school algebra, Internet connectivity) Topics represented in context of real world situations. Motion, forces, momentum, energy, heat, vibrations, sound, light, electricity, magnetism. Emphasizes development of logical reasoning skills. Lab.

**Phys 1101W. Introductory College Physics I.** (4 cr. Prereg-High school algebra, plane geometry, trigonometry; primarily for students interested in technical areas) Fundamental principles of physics in the context of everyday world. Use of kinematics/dynamics principles and quantitative/qualitative problem solving techniques to understand natural phenomena. Lecture, recitation, lab.

**Phys 1102W. Introductory College Physics II.** (4 cr. Prereg-1101; primarily for students interested in technical areas) Fundamental principles of physics in the context of everyday world. Use of conservation principles and quantitative/qualitative problem solving techniques to understand natural phenomena. Lecture, recitation, lab.
Course Descriptions

Phys 2311. Modern Physics. ([4 cr. Prereq—[1302 or 1402], Chem 1022, Math 2243]
Broad overview of classical concepts developed in the twentieth century. Special relativity, wave-particle
duality, Schrodinger equation, Bohr atom, hydrogen
atom in wave mechanics, many-electron atoms, x-rays,
nuclear structure, radioactivity, nuclear reactions,
statistical physics.

Phys 2403H. Honors Physics III. ([4 cr. §2303, §2503.
Schrödinger Equation and simple applications.
General structure of wave mechanics. Operator
methods, perturbation theory, radiation from atoms.

Phys 4101. Quantum Mechanics. ([4 cr. Prereq—[2103 or 2601 or Chem 3502], two sems soph math]
Mathematical structure of quantum mechanics.
Schrödinger Equation and simple applications.

Phys 4101. Quantum Mechanics. ([4 cr. Prereq—[2303 or 2601 or Chem 3502], two sems soph math]
Mathematical structure of quantum mechanics.
Schrödinger Equation and simple applications.
General structure of wave mechanics. Operator
methods, perturbation theory, radiation from atoms.

Phys 4111. History of 19th-Century Physics. ([3 cr. Prereq—JHSCI 4111, general physics or #]
Legacy of 19th-century experimental and theoretical
physics especially light, electricity, magnetism, and
heat. Experimental and theoretical discoveries in
19th-century physics set within the context of
concurrent educational, institutional, and political
developments in Europe and the United States.

Phys 4201. Statistical and Thermal Physics. ([3 cr. Prereq—2601]
Principles of thermodynamics and statistical
mechanics. Selected applications such as kinetic
theory, transport theory, and phase transitions.

Phys 4211. Introduction to Solid-State Physics. ([3 cr. Prereq—4101, 4201]
A modern presentation of the properties of solids.
Topics include vibrational and electronic properties
of solids; diffraction of waves in solids and electron
band structure. Other possible topics include optical
properties, magnetic phenomena, and superconductivity.

Phys 4221. Magnetism: Physics, Geophysics, and
Engineering. ([2 cr. Prereq—GEO 4221; 1302 or 1402]
Fundamentals of magnetism including elementary
statistical mechanics, rock magnetism, and
micromagnetic modeling. Important applications
of magnetism in geophysics, biomagnetism, magnetic
sensors, and recording will be introduced.

Phys 4303. Waves, Optics, and Relativity. ([3 cr. Prereq—4001, 4002]
Further topics in analytical mechanics, electricity and
magnetism including mechanical and
electromagnetic wave phenomena, physical
and geometrical optics, and relativistic dynamics of
particles and fields.

Phys 5071. Concepts in Physics. ([3 cr. Prereq—2201, 2303]
Overview of physics with emphasis on 20th-century
developments. Primarily for secondary teachers and
science majors wishing to understand the connections
within physics.

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Overview of physics with emphasis on 20th-century
developments. Primarily for secondary teachers and
science majors wishing to understand the connections
within physics.

Phys 5002. Classical Physics II. ([4 cr. Prereq—5001 or equiv or #]
Symmetry in quantum mechanics, space-time
symmetries and the rotation group, Clebsch-Gordan
coefficients and the Wigner-Eckart theorem.

Phys 5002. Classical Physics II. ([4 cr. Prereq—5001 or equiv or #]
Symmetry in quantum mechanics, space-time
symmetries and the rotation group, Clebsch-Gordon
coefficients and the Wigner-Eckart theorem.

Phys 5022. Relativity, Cosmology, and the Universe. ([4 cr. §Ast 5022, 2601 or #]
Large-scale structure and history of universe.
Introduction to relativistic and relativistic world
models. Physics of early universe. Cosmological
tests. Formation of galaxies.

Phys 5041. Analytical and Numerical Methods of
Physics I. ([4 cr. Prereq—Grad or #]
Survey of mathematical techniques, both analytic
and numerical, needed for physics. Application to
physical problems.

Phys 5042. Analytical and Numerical Methods of
Physics II. ([4 cr. Prereq—5041 or #]
Survey of mathematical techniques, both analytic
and numerical, needed for physics. Application to
physical problems.

Phys 5071. Physics for High School Teachers:
Experimental Foundations and Historical Perspectives. ([3 cr. Prereq—Gen physics, #, no cr for physics grad or grad
general education minor]
In-depth examination of a conceptual theme in
physics, its experimental foundations and historical
perspectives. Kinematics and dynamics from
Aristotle through Einstein; nature of charge and
light; energy and thermodynamics; electricity,
magnetism, and quantized fields; structure of matter.

Course Descriptions

Phys 2311. Modern Physics. ([4 cr. Prereq—[1302 or 1402], Chem 1022, Math 2243]
Broad overview of classical concepts developed in the twentieth century. Special relativity, wave-particle
duality, Schrodinger equation, Bohr atom, hydrogen
atom in wave mechanics, many-electron atoms, x-rays,
nuclear structure, radioactivity, nuclear reactions,
statistical physics.

Phys 2403H. Honors Physics III. ([4 cr. §2303, §2503.
Schrödinger Equation and simple applications.
General structure of wave mechanics. Operator
methods, perturbation theory, radiation from atoms.

Phys 4101. Quantum Mechanics. ([4 cr. Prereq—[2103 or 2601 or Chem 3502], two sems soph math]
Mathematical structure of quantum mechanics.
Schrödinger Equation and simple applications.

Phys 4101. Quantum Mechanics. ([4 cr. Prereq—[2303 or 2601 or Chem 3502], two sems soph math]
Mathematical structure of quantum mechanics.
Schrödinger Equation and simple applications.
General structure of wave mechanics. Operator
methods, perturbation theory, radiation from atoms.

Phys 4111. History of 19th-Century Physics. ([3 cr. Prereq—JHSCI 4111, general physics or #]
Legacy of 19th-century experimental and theoretical
physics especially light, electricity, magnetism, and
heat. Experimental and theoretical discoveries in
19th-century physics set within the context of
concurrent educational, institutional, and political
developments in Europe and the United States.

Phys 4201. Statistical and Thermal Physics. ([3 cr. Prereq—2601]
Principles of thermodynamics and statistical
mechanics. Selected applications such as kinetic
theory, transport theory, and phase transitions.

Phys 4211. Introduction to Solid-State Physics. ([3 cr. Prereq—4101, 4201]
A modern presentation of the properties of solids.
Topics include vibrational and electronic properties
of solids; diffraction of waves in solids and electron
band structure. Other possible topics include optical
properties, magnetic phenomena, and superconductivity.

Phys 4221. Magnetism: Physics, Geophysics, and
Engineering. ([2 cr. Prereq—GEO 4221; 1302 or 1402]
Fundamentals of magnetism including elementary
statistical mechanics, rock magnetism, and
micromagnetic modeling. Important applications
of magnetism in geophysics, biomagnetism, magnetic
sensors, and recording will be introduced.

Phys 4303. Waves, Optics, and Relativity. ([3 cr. Prereq—4001, 4002]
Further topics in analytical mechanics, electricity and
magnetism including mechanical and
electromagnetic wave phenomena, physical
and geometrical optics, and relativistic dynamics of
particles and fields.

Phys 5071. Concepts in Physics. ([3 cr. Prereq—2201, 2303]
Overview of physics with emphasis on 20th-century
developments. Primarily for secondary teachers and
science majors wishing to understand the connections
within physics.

Phys 5071. Concepts in Physics. ([3 cr. Prereq—2201, 2303]
Overview of physics with emphasis on 20th-century
developments. Primarily for secondary teachers and
science majors wishing to understand the connections
within physics.
Course Descriptions

Phys 5081. Introduction to Biopolymer Physics. (3 cr.) Prereq—Working knowledge of [thermodynamics, statistical mechanics] Introduction to biological and soft condensed matter physics. Emphasizes physical ideas necessary to understand behavior of macromolecules and other biological materials.

Phys 5201. Thermal and Statistical Physics. (3 cr.; A-F only. #4201. Prereq—2001 or equiv; primarily for grad students) Principles of thermodynamics and statistical mechanics. Selected applications such as kinetic theory, transport theory, and phase transitions.

Phys 5401. Physiological Physics. (4 cr.; Prereq—1301 or 1401) Musculoskeletal system, circulatory system/membrane transport, biological control systems, propagation/action potential in nervous system, bioluminiscence, electromagnetism at cellular level.

Phys 5402. Radiological Physics. (4 cr.; Prereq—1302 or 1402) Signal analysis, medical imaging, medical x-rays, tomography, radiation therapy, nuclear medicine, MRI, and similar topics.

Phys 5701. Solid-State Physics for Engineers and Scientists. (4 cr.; Prereq—Grad or advanced undergrad in physics or engineering) Crystal structure and binding; diffusion; phonons; thermal and dielectric properties of insulators; free electron model; band structure; semiconductors.

Phys 5702. Solid State Physics for Engineers and Scientists. (4 cr.; Prereq—5701 or #) Diamagnetism and paramagnetism; ferromagnetism and antiferromagnetism; optical phenomena; lasers; superconductivity; surface properties; ferroelectricity.

Phys 5950. Colloquium Seminar. (1 cr.; S-N only. Prereq—Grad student or advanced undergrad in physics, A) Colloquium of School of Physics and Astronomy.

Phys 5980. Introduction to Research Seminar. (1 cr; max 3 cr.; S-N only. Prereq—Grad or upper div phys major) Introduction to the research activities of the School of Physics and Astronomy.

Phys 5993. Directed Studies. (1-5 cr; max 15 cr.; Prereq—#) Independent, directed study in physics in areas arranged by the student and a faculty member.

Phys 5994. Directed Research. (1-5 cr; max 15 cr.; Prereq—#) Problems, experimental or theoretical, of special interest to students. Written reports.

Physiology (Phsl)
Department of Physiology

Medical School

Phsl 1001. Human Physiology. (3 cr. Prereq—High school chem, high school bioI) How major organs system functions (nerve, muscle, circulation, respiration, endocrine, renal, gastrointestinal, temperature regulation and energy metabolism). Function in terms of mechanism. Ideas presented in terms of scientific concepts and methods, although a scientific background is not assumed.

Phsl 3051. Human Physiology. (4 cr.; Prereq—[Biol 1009 or 1 yr college bioI; 1 yr college chem] For pre-allied health sciences majors. How major organ systems function (nerve, muscle, circulation, respiration, endocrine, renal, gastrointestinal, temperature regulation and energy metabolism). Fall offering emphasizes independent learning using e-mail extensively for information exchange between students and faculty. One-hour lecture, two-hour lab.


Phsl 3071W. Principles of Physiology for Majors. (5 cr.; A-F only. Prereq—Physiology major, 1 yr college chem and physics and math through integral calculus) Human physiology with emphasis on quantitative aspects. Organ systems (circulation, respiration, gastrointestinal, renal, endocrine, muscle, peripheral and central nervous systems), cellular transport processes, and scaling in biology. Papers on current topics of interest based on published laboratory research required.

Phsl 3095. Problems in Physiology. (1-5 cr; max 20 cr.; Prereq—3061 or college physics, #) Individualized study in physiology. Students address a selected problem in physiology through library or lab research, supervised by physiology faculty.

Phsl 3701. Physiology Laboratory. (2 cr; A-F only. Prereq—3061 or 3011 or #3011 or #3071) Lab experiments in physiology. Emphasizes quantitative aspects, including analysis of organ systems.

Phsl 4095. Honors Problems in Physiology. (2-4 cr; max 4 cr; A-F only. Prereq—#3071, physiology honors candidate, permission of the DUS) Students pursue a selected topic in physiology through library or laboratory research supervised by physiology faculty. Not suitable for graduate credit.

Phsl 5061. Principles of Physiology for Biomedical Engineering. (4 cr.; Prereq—Biomedical engineering grad, 1 yr college chem and physics and math through integral calculus) Human physiology with emphasis on quantitative aspects. Organ systems (circulation, respiration, renal, gastrointestinal, endocrine, muscle, central and peripheral nervous systems), cellular transport processes, and scaling in biology.

Phsl 5094. Research in Physiology. (1-5 cr; max 20 cr.; Prereq—#) Independent lab research project in physiology, supervised by physiology faculty.

Phsl 5095. Problems in Physiology. (1-5 cr; max 20 cr.; Prereq—#) Individualized study in physiology. Students address a selected problem through library or lab research, supervised by physiology faculty.


Phsl 5201. Computational Neuroscience I: Membranes and Channels. (3 cr. Prereq—Calculus through differential equations) Neural excitation (ion channels, excitation models, effects of neural morphology) using UNIX workstations to simulate empirical results. Includes the Hodgkin-Huxley model, nonlinear dynamic systems analysis, voltage and ligand gated ion channels, ion transport theories, and impulse initiation and propagation.

Phsl 5202. Computational Neuroscience II: Neural Systems and Information Processing. (3 cr. Prereq—Understanding of UNIX, Phsl/NSc 5201 or equiv) Quantitative examination of information processing by networks based on experimental data and theoretical models. Neural codes, neural network models and information processing, neural control systems, computational maps.

Phsl 5444. Muscle. (3 cr. §3810C 5444. Prereq—3061 or 3071 or 5061 or Bioc 3021 or Bioc 4331 or #) Muscle: membranes: structures, mechanisms, and physiological roles of channels/pumps. Muscle contraction: force generation by actin/myosin.

Phsl 5510. Advanced Cardiac Physiology and Anatomy. (2-3 cr. Prereq—#) Fundamental concepts, advanced topics related to clinical/biomedical currents and physiology. Lectures, laboratories, workshops, anatomical dissections. Intense, one week course.

Phsl 5511. Advanced Neuromuscular Junction Function Physiology. (2-3 cr. Prereq—#) Fundamental concepts and advanced topics related to mechanical aspects of pulmonary function (e.g., elastic recoil, airway resistance). Lectures, laboratories, demonstrations. Intense, one week course.


Phsl 5701. Physiology Laboratory. (1-2 cr; max 2 cr.; A-F only. Prereq—#) Experiments in physiology. Emphasizes quantitative aspects, including analysis of organ systems.

Plant Biology (PBio)
Department of Plant Biology

College of Biological Sciences

PBio 1212. Plants and Society. (3 cr.; Prereq—Non-biology major) Roles that plants play and have played in human biological and cultural development.

PBio 4321. Taxonomy of Minnesota Flora. (3 cr. Prereq—Biol 2002 or Biol 3007) Identification of common vascular plants of Minnesota and surrounding region; distinguishing characteristics of local taxa; descriptive terminology; use of manuals of flora. Includes lab and field trips.

PBio 4404. Developmental Plant Anatomy. (3 cr. Prereq—Biol 2002 or Biol 3007) Introduction to the microscopic structure and development of plants at the cell, tissue, and organ level. Emphasis on relationships between anatomy and the ontogeny, phylogeny, and ecology of seed plants with some reference to lower vascular plants.

Course Descriptions


PlBio 4793W. Directed Studies: Writing Intensive. (1-7 cr [max 7 cr]; S-N only. Prereq–#) Individual study on selected topics or problems. Emphasizes readings, use of scientific literature. Written report.

PlBio 4794W. Directed Research: Writing Intensive. (1-7 cr [max 7 cr]; S-N only. Prereq–#) Lab or field investigation of selected areas of research, including written report.

PlBio 4801. Plains and Boreal Flora. (4 cr; A-F only. Prereq–Taxonomy course, A) Survey of state summer flowering plants and ferns with particular reference to local flora. Identification of important plant families using technical keys, and field recognition of common species and habitat preferences; collecting methods, literature, and taxonomic methods.


PlBio 4993. Directed Studies. (1-7 cr [max 7 cr]; S-N only. Prereq–#) Individual study on selected topics or problems. Emphasizes selected readings, use of scientific literature.

PlBio 4994. Directed Research. (1-7 cr [max 7 cr]; S-N only. Prereq–#) Lab or field investigation of selected areas of research.


PlBio 5301. Plant Genomics. (3 cr. Prereq–[Intro course in genetics, intro course in biochemistry] or #) Introduction to genomics. Emphasizes plants and related model organisms. DNA marker/sequencing technology, comparative genomics, whole genome sequencing, DNA chips/microarrays, EST libraries and SAGE analyses, gene-knockout systems, genome databases, sequence comparison/clustering algorithms, visualization tools.


PlBio 5514. Plant Molecular Biology. (3 cr. §5414. Prereq–BioC 3021 or Biol 3021 or BioC 4003 or BioC 4332 or equiv) Survey topics in plant molecular biology. How advances in molecular/genomic biology are being used to better understand plant physiology and developmental biology. Uses of transgenic plants in research/biotechnology.
POL 5300. Current Topics in Molecular Plant Pathology. (3 cr) [max 2 cr] A-F only. Prereq. [BioC 4125, course in [plant pathology or microbiology], course in genetics, lab in [molecular biology, biotechnology] or equivalent] or # Interactive class. Students read, discuss, and critique publications in molecular plant pathology. Each week, students focus on one article and examine it from different dimensions (underlying principles, experimental strategies, data analysis, impact on the broader discipline).

POL 5301. Plant Genomics. (3 cr) Prereq. Intro course in genetics or # Introduction to genomics. Emphasizes plants and relevant model organisms. DNA marker/sequencing technology, comparative genomics, whole genome sequencing, DNA chips/microarrays, EST libraries and SAGE analysis, gene-knockout systems, genome databases, sequence comparison/clustering algorithms, visualization tools.

POL 5302. Genomics of Plant-Associated Microbes. (3 cr; A-F only. Prereq. [BioC 4125, course in [plant pathology or microbiology], course in genetics, lab in [molecular biology, biotechnology] or equivalent] or #) Genomics research for plant-associated microbes. Journal articles, discussions, case studies. Identification/characterization of genes in plant-microbe interactions. Analysis of plant pathogens, research methodologies. Linkage/gene/physical mapping, candidate genes, sequencing, gene silencing, knock-out, ESTs, microarrays, bioinformatics. Topics include training modules, field trips, guest lectures, individual/group projects.

POL 5999. Special Workshop in Plant Pathology. (1-4 cr) Workshops on a variety of topics in plant pathology offered at locations other than the Twin Cities campus. See Class Schedule or department for current offerings.

Polish (Plsh)

Institute of Linguistics, ESL, and Slavic Languages and Literatures

College of Liberal Arts

Plsh 1101. Beginning Polish. (5 cr) Develop basic proficiency in listening, speaking, reading, and writing and become acquainted with Polish culture. First of four courses designed to satisfy CLA language graduation requirement.

Plsh 1102. Beginning Polish. (5 cr. Prereq–1101 or equiv) Develop basic proficiency in listening, speaking, reading and writing to and acquaint students with Polish culture. Second of four courses designed to satisfy CLA language graduation requirement.

Plsh 3001. Intermediate Polish. (5 cr. Prereq–1102 or equiv) Conversation, composition, advanced grammar, translation, and readings in appropriate literature. Third of four courses designed to satisfy CLA language graduation requirement.

Plsh 3002. Intermediate Polish. (5 cr. Prereq–3001 or equiv) Conversation, composition, advanced grammar, translation and readings in appropriate literature. Fourth in a sequence. AX courses designed to satisfy CLA language graduation requirement.

Plsh 3601. Survey of Polish Literature: Baroque through Romanticism. (3 cr) Reading and analysis of major works of Polish literature from Baroque through Romanticism.

Plsh 3602. Survey of Polish Literature: 1863 to the Present. (3 cr) Reading and analysis of major works of Polish literature from 1863 to the present.

Plsh 5900. Topics. (1-4 cr) Topics specified in Class Schedule.

Plsh 5993. Directed Readings. (1-3 cr) Guided individual reading or study in Polish language, literature, and culture.

Political Science (Pol)

Department of Political Science

College of Liberal Arts


Pol 1015. Mass Politics in a Media Age. (3 cr) In a world of sound bites, soft news, and ubiquitous information/images, do we make rational voting decisions? Are we politically engaged? Do politicians, the media, and political institutions promote or obstruct our efforts to be good citizens? What does responsible citizenship entail? What can be done to enhance citizenship?


Pol 1025. Global Politics. (4 cr) Study of international relations and issues in contemporary world affairs. Forms of state interaction from violent conflict to cooperation and integration; activities of international institutions; transnational relations involving non-state actors such as international businesses, human rights networks, and environmental movements.

Pol 1026. We and They: U.S. Foreign Policy. (4 cr) Contemporary foreign policy issues; how the United States makes foreign policy in a global era; historical background. How two regions (such as the Middle East and China) affect and are affected by U.S. policy.

Pol 1054. Repression and Democracy Around the World. (4 cr) Introduction to political life in all its worldwide variety. Focus on repression, democracy, rights, corruption, gender, and political change. Guest lectures by political science professors who are experts on different parts of the world. Non-majors welcome.

Pol 1065. Government and Medicine. (3 cr) Why is the United States the only industrialized nation that lacks national health insurance? Should the government regulate health care? Who should address these issues? Introduction to American government. Health care policy, constitution, elections, congress, the presidency.

Pol 1201. Political Ideas and Ideologies. (4 cr) Analysis of key concepts and ideas (e.g., freedom, equality, democracy) as they are constructed by major theories and ideologies (liberalism, conservatism, socialism, etc.).

Pol 1902. Topics: Freshman Seminar. (3 cr; A-F only. Prereq–Fr or max 36 cr) Topics specified in Class Schedule.

Pol 1903. Freshman Seminar. (3 cr; A-F only) Topics specified in Class Schedule.

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

Pol 1909W. Topics: Freshman Seminar. (3 cr; A-F only. Prereq–Fr or max 36 cr) Topics specified in Class Schedule.

Pol 3051. Power and Choice: Who Gets What, When, and Why. (3 cr) Introduction to major concepts and issues in political science including political participation, policy making; justice, legitimacy, political development, and types of political systems. Explore empirical and normative problems and compare among major courses.

Pol 3070. Faculty-Supervised Individual Field Work. (1-13 cr [max 12 cr] A-F only. Prereq–#) Faculty-supervised research related to work in political or governmental organizations.

Pol 3080. Faculty-Supervised Individual Internships. (3-15 cr [max 15 cr] A-F only. Prereq–#) Internship with government or community organizations arranged by the department and awarded competitively each spring semester.

Pol 3085. Quantitative Analysis in Political Science. (4 cr; A-F only. Prereq–§9 cr in social sciences or #) Introduction to empirical research techniques, or how one tests a political hypothesis using data. Topics such as setting up a research question in political science, proper research design, and some basic techniques of data analysis.

Pol 3110H. Honors Thesis Credits. (1-4 cr [max 4 cr]; A-F only. Prereq–§3110; 3109; pol, honors) Individual research/writing of departmental honors thesis.

Pol 3210. Practicum. (1-3 cr [max 3 cr] Prereq–#) Offers different kinds of out-of-class opportunities to complement the readings, assignments, and objectives of a parent course in political science. Opportunities vary according to demands of the parent course.

Pol 3225. American Political Thought. (3 cr) Puritans. American Revolution, Constitution, pro- and anti-slavery arguments, civil war and reconstruction, industrialization, westward expansion, Native Americans, immigration, populism, socialism, socialism. Darwinism; women’s suffrage, red scares, Great Depression, United States as world power, free speech, pluralism and multiculturalism.

Pol 3235W. Democracy and Citizenship. (3-4 cr. Prereq–1201 recommended) Surveys models of democracy based on individual rights; pluralism; civic republicanism; community activism. Examines dilemmas of democratic government and citizenship in a race, class, and gender-stratified society; explores its possibilities in a changing world.


Pol 3252. Renaissance, Reform, and Revolution: Early Modern Political Thought. (3-4 cr. §5252) Thinkers, themes, and discourses from the Renaissance to the French Revolution. Renaissance Humanists; Machiavelli; More; Reformation; Luther; Calvin; Natural Law; Grotius; Divine Right; Common Law; Bacon; English Revolutionaries; Hobbes; Locke; Astell; Enlightenment; Rousseau; French Revolutionaries; Hume; Burke; Wollstonecraft.

Pol 3319. Education and the American Dream. (3 cr; A-F only) Introduction to politics and education in the United States. Equality of educational opportunity, educating democratic citizens, school finance, role of political institutions in making educational policy. Efforts to reform/revamp American education, including charter schools and private school vouchers.

Pol 3321. Issues in American Public Policy. (3 cr. Prereq–1001 or equiv or #) Analysis of the politics of the policy process including agenda formation, formulation, adoption, implementation, evaluation. Attention to selected policy areas.

For definitions of course numbers, symbols, and abbreviations, see page 300.
Course Descriptions

Pol 3323. Political Tolerance in the United States. (3-4 cr)
Political importance of civil liberties in American society. Tolerance as a political phenomenon. Issues such as free speech, privacy, religion, race, gender.

Pol 3441. Politics of Environmental Protection. (3 cr. Prereq–S5441; jr or sr social science major)
How the American political system deals with environmental issues, how third world countries deal with problems of environmental protection and economic growth, and the way the international community deals with global environmental problems.

Pol 3451W. Politics and Society in the New Europe. (3 cr. Prereq–3051 or Soc 1001 or #)
Explores the changing politics and society of the new Europe. Particular focus on generational change and values, political parties, welfare state, the future of European integration, and political stability and democratization.

Pol 3477. Political Development. (3-4 cr. Prereq–1054 or 3051 or #)
Political processes and problems associated with economic development; the political economy of underdevelopment and development; problems of state building and the development of political institutions.

Pol 3491. Film and the Study of Latin American Politics. (3 cr. Prereq–1054 recommended)
Introduction to using film to study Latin American politics. Hollywood films explore how the United States “sees” Latin America, its people, and its political problems; films from Latin America explore how Latin American popular culture reflects a country’s political issues. One feature film per week. Brief readings about issues raised by each film.

Pol 3701. American Indian Tribal Governments and Politics. (3 cr; A-F only. §Amin 3501)

Pol 3739. Politics of Race, Class, and Ethnicity. (3 cr. Prereq–6 cr in soc sci)
Introduction to how race, ethnicity, and class interact in political process. Focuses on political conflict through comparative analysis of United States, South Africa, and Brazil.

Pol 3766. Political Psychology of Mass Behavior. (3 cr. Prereq–1001 or equiv or #)
How political behavior of citizens and political elites is shaped by psychological factors, including personality, attitudes, values, emotions, and cognitive sophistication. Political activism/apathy, leadership charisma, mass media, group identifications, political culture.

Pol 3767. Political Psychology of Elite Behavior. (3 cr; A-F only)
Intersections of politics, personality, and social psychology. Focuses on political leaders and elites. Usefulness of psychological theories for conducting political analysis. Role of individual, of group processes, of political/social cognition, and of context in political decision-making.

Pol 3785. Persuasion and Political Propaganda. (3 cr; A-F only)
Introduction to persuasion and political propaganda. Persuasive theories relevant to designing effective political propaganda. Applying theories to analyze WWII/WWIII propaganda posters, films, and political campaign commercials. Use of fiction as propaganda tool.

Pol 3835. International Relations. (3 cr)
Introduction to the theoretical study of international relations. Emphasizes the role of democratic states in how the choice of theoretical perspectives shapes one’s understandings of the structure and practices of global politics.

Pol 3872W. Global Environmental Cooperation. (4 cr. §5872)
Emergence of the environment as a key aspect of the global political agenda. Non-governmental and governmental international organizations. Politics of protection of the atmosphere, rain forest, seas, and other selected issues. International security and the environment.

Pol 3873W. Global Citizenship and International Ethics. (3 cr)
Case studies of ethics in intervention, war, weapons, foreign aid, environmental practices, and human rights are used to examine the global ethical responsibilities of individual citizens and public officials; effectiveness of transnational social movements in influencing policy at domestic and international levels.

Pol 4210. Topics in Political Theory. (3-4 cr [max 8 cr]; A-F only. Prereq–1001)
Pol 4275. Contemporary Political Thought. (3 cr. Prereq–1201 recommended)
The 20th-century crisis of Western humanism in major works of contemporary political thought from World War II to the present. Relationships between force and freedom; ideology and truth; authority and resistance. Thinkers may include Arendt, Camus, Beauvoir, Paton, Foucault, Habermas, Rawls, Sartre, Said. Ideas may include communitarianism, feminism, postcolonialism, postmodernism, socialism.

Pol 4280. Topics in Political Theory. (3-4 cr [max 8 cr])
Topics in historical, analytical, or normative political theory. Topics vary.

Pol 4303. American Democracy in Crisis. (3 cr. Prereq–1001 or equiv, non-pol sci grad major or #)
Compare the performance of the American political system with the promises of democracy. Discuss a range of interpretations of democratic government and the American national governing process.

Pol 4306. Presidential Leadership and American Democracy. (3-4 cr. Prereq–1001 or equiv, non-pol sci grad major or #)
No single individual in the American political system is subject of such high expectations as the president. Examine whether the president’s political and constitutional powers are sufficient to satisfy the high expectations that Americans have of him. Should presidents be expected to dominate American politics?

Pol 4308. Congressional Politics and Institutions. (3-4 cr. Prereq–1001 or 1002; non-pol sci grad major or #)
Origin/development of U.S. congressional institutions, parties, committees, leaders, lobbying/ elections, and relations between Congress/executive branch. Relationship of campaigning/governing, nature of representation, biases of institutional arrangements.

Pol 4309. Justice in America. (3 cr. Prereq–1001 or 1002, non-pol sci grad major or equiv or #)
The American judiciary; the selection of judges and how and why these individuals and institutions behave the way they do. What influences judicial decisions? What impact do these decisions have? Why do people comply with them?

Pol 4310. Topics in American Politics. (3 cr [max 9 cr. Prereq–1001 or equiv or #]
See Class Schedule for description.

Pol 4315W. State Governments: Laboratories of Democracy. (4 cr. Prereq–1001 or equiv, non-pol sci grad major or #)
Political behavior, governmental institutions, and public policies in American states; comparison among states, between state and national government, with special attention given to Minnesota.

Pol 4322. Rethinking the Welfare State. (3-4 cr)
Discuss competing arguments about welfare states in advanced industrial countries; consequences of the result of sectional interests, class relations, or citizenship rights? Compare American social policy with policies in other western countries.

Pol 4327. The Politics of American Cities and Suburbs. (3 cr. Prereq–1001 or 1002, non-pol sci grad major or equiv or #)
Development and role of American local government; forms and structures; relationships with states and the federal government; local politics and patterns of power and influence.

Pol 4331. Thinking Strategically in Domestic Politics. (3-4 cr)
A survey of applications of rational-choice and game theories to important features of domestic politics in the United States and elsewhere.

Pol 4410. Topics in Comparative Politics. (3 cr)
Topics of current analytical or policy importance to comparative politics. Topics vary.

Pol 4461W. European Government and Politics. (4 cr. Prereq–Pol 1054 or 3051 or non-political science graduate student or #)
European political institutions in their social settings; power and responsibility; governmental stability; political decision making, government and economic order.

Pol 4473. Chinese Politics. (3 cr. §EAS 4473)
Focuses on fundamental conflicts in Chinese society; the democracy movement, human rights, class divisions, gender struggles, economic issues, and capitalist vs. socialist development strategies. Secondary topics include Chinese foreign relations and domestic and foreign political issues in Taiwan.

Pol 4477. Strategies and Issues in the Middle East. (4 cr. Prereq–1054 or 3051 or non-pol sci grad or #)
Turkey, Iran, Israel, and selected Arab states. Domestic politics of religious/secular, ethnic, economic, environmental, and other policy/identity issues. Regional politics of water access, Israeli/Palestinian/Arab world relationships, oil and the Persian/Arabian Gulf, and human rights.

Pol 4478. Contemporary Politics in Africa and the Colonial Legacy. (4 cr. Prereq–1054 or 3051 or non-pol sci grad or #)
Examines how current politics in mainly, though not exclusively, sub-Saharan Africa have been shaped by the pre-colonial and colonial processes. Reality of independence; recurrent political and economic crises, global context and prospects for effective democracy.

Pol 4479. Latin American Politics. (3 cr. §FAS 4479. Prereq–1054 or 3051 or non-pol sci grad or #)
An overview of Latin American politics and political economy focused on authoritarianism, human rights, and redemocratization; development and economic policy; social movements; ethnicity and race; religion; revolution; U.S. - Latin American relations.

Pol 4481. Governments and Markets. (3-4 cr. Prereq–1054 or 3051 or non-pol sci grad or #)
Study the connection between democracy and markets with attention to the experiences of countries in North America and Europe.

Pol 4485. Human Rights and Democracy in the World. (3 cr. Prereq–At least one 1xxx or 3xxx course in pol sci, non-pol sci major or #)
Examine the question of human rights and democracy rights in global and comparative perspectives. Explore the history of ideas about human rights and democracy and contrast economic, political, psychological, and ideological explanations for repression.

Pol 4487. The Struggle for Democratization and Citizenship. (4 cr. Prereq–Non-pol sci grad)
Traces the origins of the democratic process with particular emphasis on how the disenfranchised fought to become included. Begins with the history of the democratic movement from its earliest moments in human history to the present and attempts to draw a balance sheet.
Pol 4501. The Supreme Court and Constitutional Interpretation. (3 cr. Prereq—1001 or 1002 or equiv or [non-pol sci grad student or #]) Historical/analytical approaches to Court’s landmark decisions. Explores theory/techniques of judicial review. Relates Court’s authority to wider political/social context of American government.

Pol 4502. The Supreme Court, Civil Liberties, and Civil Rights. (3 cr. Prereq—1001 or 1002 or equiv or [non-pol sci grad major or #]) Supreme Court’s interpretation of Bill of Rights, 14th amendment. Focuses on freedom of speech, press, religion, criminal punishment; segregation, desegregation, affirmative action; abortion/privacy.

Pol 4525. Federal Indian Policy. (3 cr; A-F only. §Main 4525) Formulation, implementation, evolution, comparison of Indian policy from pre-colonial times to contemporary government-to-Indian approaches to federal Indian policy. Major federal Indian policies. Views/attitudes of policy-makers, reactions of indigenous nations to policies. Effect of bodies of literature on policies.

Pol 4561. Comparative Legal Systems. (3 cr. Prereq— jr or sr or non-pol sci grad student or #) Survey of the principal legal systems of the Western world. Examine the role of the legal system in relation to various political and economic systems and the contrast between the common law and civil law traditions.

Pol 4737. American Political Parties. (3-4 cr. Prereq—1001 or equiv or #) The American two-party system; party influence in legislatures and executives; decline of parties and their future.

Pol 4766. American Political Culture and Values. (3-4 cr. Prereq—1001 or equiv or non-pol sci grad major or #) Empirical analysis of basic political values—individualism, freedom, and equality; dominant beliefs about democratic principles, materialism, capitalism, citizenship, patriotism and heroism.

Pol 4767. Public Opinion and Voting Behavior. (3 cr. Prereq—1001 or equiv or #) Major factors influencing electoral decisions and political attitude formation/change. Data analysis lab required.

Pol 4771. Racial Attitudes and Intergroup Conflict. (3 cr. Prereq— jr or sr or non-pol sci grad major or #) Basic approaches, findings, and controversies in research on racial attitudes and intergroup relations, from perspective of political psychology. Approaches developed by researchers in political science, social psychology, and sociology. Contemporary issues/debates, historical development of research/theory.

Pol 4810. Topics in International Politics and Foreign Policy. (3-4 cr [max 8 cr]) Analysis of selected issues in contemporary international relations. Topics vary.


Pol 4881. International Law. (3 cr. Prereq—3835 or non-pol sci grad or #) How international law matters for world politics. Lectures, discussions, and simulations of cases examine key concepts and theories of international law. Topics include war crimes, human rights, law of the sea, the environment, and international crimes.

Pol 4883. Global Governance. (3 cr. Prereq—3835 or non-pol sci grad or #) Seminar discussions and class simulations examine the rise and role of inter-governmental organizations such as the United Nations and non-governmental organizations. Topics include peacekeeping, trade, development, human rights, security and arms control, self-determination, refugees, health, and the environment.

Pol 4885. International Conflict and Security. (3-4 cr) An examination of alternative theories of the sources of militarized international conflict. Apply these theories to one or more past conflicts and discuss their relevance to the present.

Pol 4889. Governments and Global Trade and Money. (3-4 cr. Prereq—3835 or non-pol sci grad or #) Study the politics of international trade and monetary affairs including north-south and east-west relations.

Pol 4900V. Honors: Senior Paper. (1-2 cr. A-F only. Prereq—Honors, pol sci grad major or #) Can be attached to any 3xxx or 4xxx course. A 10-15 page paper is submitted for evaluation/advice by instructor, then revised for final submission.

Pol 4906W. Senior Paper. (1 cr. A-F only. Prereq— Pol sci grad major or #) Can be attached to any 3xxx or 4xxx course (with the agreement of that course’s instructor). A 10-15 page paper is submitted for evaluation/advice by instructor, then revised for final submission.

Pol 4970. Individual Reading and Research. (1-4 cr [max 1 cr] Prereq—8, A, Q) Guided individual reading or study.

Pol 5210. Topics in Political Theory. (3 cr [max 9 cr] only. Prereq—only 4210. §Main 5210, A, grad) Thinks, themes, and discourses from the Renaissance to the French Revolution. Renaissance Humanists; Machiavelli; More; Reformulation; Luther; Calvin; Natural Law; Grotius; Divine Right; Common Law; Bacon; English Revolutionaries; Hobbes; Locke; Astell; Enlightenment; Rousseau; French Revolutionaries; Hume; Burke; Wollstonecraft.

Pol 5253. Modernity and its Discontents: Late Modern Political Thought. (4 cr. §3252) Theoretical responses to and rival interpretations of Western economy, society, politics, and democratic culture in the modern age; theories of history; class struggle; end of metaphysics and death of God; technology and bureaucracy. Psychology of culture in Hegel, Marx, Tocqueville, Mill, Nietzsche, Weber, Freud.

Pol 5275. Contemporary Political Thought. (3 cr. §4275. Prereq—student 1201 recommended) 20th-century crisis. Western humanism in major works of contemporary political thought from World War II to present. Force and freedom. Ideology and truth. Authority and resistance. Thinks may include Arendt, Camus, Beauvoir, Fanon, Foucault, Habermas, Rawls, Sartre, Said. Ideas may include communitarianism, feminism, postcolonialism, postmodernism, socialism.

Pol 5280. Topics in Political Theory. (3 cr [max 8 cr]. §4280. Prereq—Grad student) Topics in historical, analytical, or normative political theory. Topics vary, see Class Schedule.

Pol 5303. American Democracy in Crisis. (3-4 cr. §4303. Prereq—[1001 or equiv], [non-pol sci grad major or #]) Compares performance of American political system with promises of democracy. Interpretations of democratic government and American national governing process.

Pol 5306. Presidential Leadership and American Democracy. (3-4 cr. §4306. Prereq—[1001 or equiv], [non-pol sci grad major or #]) Examines whether president’s political and constitutional powers are sufficient to satisfy citizens’ high expectations and whether president should be expected to dominate American politics.
Course Descriptions

Pol 5478. Contemporary Politics in Africa and the Colonial Legacy. (4 cr. §4478. Prereq–1054 or 3051 or non-pol sci grad student or #) How current politics in mainly, though not exclusively, sub-Saharan Africa have been shaped by pre-colonial/colonial processes. Reality of independence, recurrent political/economic crises. Global context and prospects for effective democracy.


Pol 5481. Governments and Markets. (3-4 cr. §4481. Prereq–1054 or 3051 or non-pol sci grad student or #) Connection between democracy and markets. Focuses on countries in North America, Europe.

Pol 5485. Human Rights and Democracy in the World. (3 cr. §4485. Prereq–at least one 1xxx or 3xxx course in pol sci, non-pol sci major) or #) History of ideas about human rights and democracy. Economic, political, philosophical, and ideological explanations for repression.


Pol 5501. Supreme Court and Constitutional Interpretation. (3 cr. §4501. Prereq–1001 or 1002 or equiv or non-pol sci grad student or #) Historical/analytical approaches to Court’s landmark decisions. Theory/techniques of judicial review. Court’s authority related to wider political/social context of American government.

Pol 5525. Federal Indian Policy. (3 cr; A-F only: §§4525, §Amin 4525. Prereq–grad student) Formulation, implementation, evolution, comparison of Indian policy from pre-colonial times to self-governance of new millennium. Theoretical approaches to federal Indian policy. Major federal Indian policies. Views/attitudes of policy-makers, reactions of indigenous nations to policies. Effect of bodies of literature on policies.

Pol 5561. Comparative Legal Systems. (3 cr. §4561. Prereq–1001 or equiv or non-pol sci grad student) Survey of principal legal systems of Western world. Rationale of legal system in relation to various political/economic systems. Contrast between common law and civil law traditions.

Pol 5737. American Political Parties. (3-4 cr. §4737. Prereq–[1001 or equiv], grad student or #) American two-party system. Party influence in legislatures/executives. Decline of parties, their future.

Pol 5766. American Political Culture and Values. (3-4 cr. §4766. Prereq–1001 or equiv or non-pol sci grad student or #) Individualism, freedom, equality. Dominant beliefs about politics and government. Political participation, political careers, materialism, capitalism, citizenship, patriotism/heroism.

Pol 5767. Public Opinion and Voting Behavior. (3 cr. §4767. Prereq–[1001 or equiv], grad student or #) Major factors influencing electoral decisions. Political attitude formation/change. Data analysis lab required.

Pol 5810. Topics in International Politics and Foreign Policy. (3-4 cr [max 8 cr] §4810. Prereq–Grad student) Selected issues in contemporary international relations. Topics vary, see Class Schedule.


Pol 5881. International Law. (3 cr. §4881. Prereq–3835 or non-pol sci grad student or #) How international law matters for world politics. War crimes, human rights. Law of the sea and of the environment. International crime, Lectures, discussions, simulations of cases.

Pol 5883. Global Governance. (3 cr. §4883. Prereq–3835 or non-pol sci grad student or #) Rise and role of inter-governmental organizations such as United Nations, non-governmental organizations. Peacekeeping, trade, development, human rights, security and arms control, self-determination, refugees, health, environment. Seminar discussions, class simulations.


Pol 5889. Governments and Global Trade and Money. (3-4 cr. §3889. Prereq–Grad student) Study the politics of international trade and monetary affairs in the state of the world. Emphasis on the interactions between different states.

Pol 5970. Individual Reading and Research. (1-4 cr. [max 1 cr] Prereq–A, A-Q) Guided individual reading or study.

Portuguese (Port)

Department of Spanish and Portuguese Studies

College of Liberal Arts

Port 1101. Beginning Portuguese. (5 cr) Speaking and understanding Portuguese; pronunciation; introduction to writing and reading; basic grammar; cultural aspects of language and civilizations of Portuguese-speaking world.

Port 1102. Beginning Portuguese. (5 cr. §3889. Prereq–1101 or #) Speaking and understanding Portuguese; pronunciation; introduction to writing and reading; basic grammar; cultural aspects of language and civilizations of Portuguese-speaking world.


Port 3970. Directed Readings. (1-4 cr. §3870. Prereq–3501 or 3502 or 3503 or 3510) Guided individual reading or study.

Port 5520. Portuguese Literary and Cultural Studies. (3 cr. §max 3 cr. Prereq–#) Study of origins and development of modern Portuguese nation (late 16th to 20th century) using literature, cultural and literary criticism, history, sociology and various media (film, art, music, Internet). Main cultural problematics pertaining to Portugal as well as fundamental literary texts.

Port 5530. Brazilian Literary and Cultural Studies. (3 cr. §max 9 cr. Prereq–#) Study of origins and development of modern Brazilian society [late 16th to 20th century] using literature, cultural and literary criticism, history, sociology and various media (film, art, music, Internet). Main cultural problematics pertaining to Brazil as well as fundamental literary texts.

Port 5540. Literatures and Cultures of Lusophone Africa. (3 cr. §max 9 cr. Prereq–#) Origins of development of Lusophone Africa (Angola, Cape-Verde, Guinea-Bissau, Mozambique, Sao Tome/Principe) using literature, cultural/literary criticism, history, anthropology, and various media (film, art, music, Internet).

Port 5520. Foundations of Brazilian Culture. (3 cr. §max 9 cr. Prereq–#) Primarily on modern Brazilian society, History, culture (music, art, cinema, literature, intellectual thought, popular culture, media), and social problems (ethnically, tropical deforestation).

Port 3503W. Literatures and Cultures of Lusophone Africa. (3 cr. §3503) Origins/development of Lusophone Africa (Angola, Cape-Verde, Guinea-Bissau, Mozambique, Sao Tome/Principe) using literature, cultural/literary criticism, history, anthropology, and various media (film, art, music, Internet).

Port 3503. Portuguese-Speaking Cultures and Literatures in Translation. (3 cr. §max 3 cr. Prereq–#) Introduction to the Portuguese-speaking world using literature, history, anthropology, and film. Focuses on sociopolitical, cultural, and historical development of Brazil, Portugal, and Lusophone Africa (Angola, Mozambique, Cape-Verde, Guinea-Bissau, and Sao Tome and Principe).

Port 3800. Film Studies in Portuguese. (3 cr. [max 6 cr.] A-F only: §2003 or [A, #]) Films from Portuguese-speaking world in their historical, (geo)political, and socio-economic contexts. Films from Brazil, Portugal, or Lusophone Africa analyzed under interdisciplinary framework, noting aspects related to cinematography/historical.

Port 3910. Topics in Lusophone Literatures. (3 cr. §max 9 cr. Prereq–§3210, §3910) Critical reading of Lusophone literatures (Brazil, Portugal, Portuguese-speaking Africa) representing various genres (novel, short story, poetry). Terminology of criticism, literary problems, techniques.

Port 3920. Topics in Lusophone Cultures. (3 cr. §max 9 cr. Prereq–[1101, 1102, 1103, 1104] or [3001, 3003] or #) Critical studies of various aspects of Portuguese-speaking cultures (Portugal, Brazil, or Lusophone Africa). Topics may include (among others) popular music, visual/media culture, religion, diaspora, the Amazon.

Port 3970. Directed Readings. (1-4 cr. §max 9 cr. Prereq–3501 or 3502 or 3503 or 3510) Guided individual reading or study.

Port 3910. Topics in Lusophone Literatures. (3 cr. §max 9 cr. Prereq–[1101, 1102, 1103, 1104] or [3001, 3003] or #) Critical studies of various aspects of Portuguese-speaking cultures (Portugal, Brazil, or Lusophone Africa). Topics may include (among others) popular music, visual/media culture, religion, diaspora, the Amazon.

Port 3970. Directed Readings. (1-4 cr. §max 9 cr. Prereq–3501 or 3502 or 3503 or 3510) Guided individual reading or study.
Course Descriptions

Port 5920. Figures in Lusophone Literatures. (3 cr; [max 9 cr], Prereq–#)
One Portuguese, Brazilian, or other major Portuguese-speaking writer or group of writers whose work has had impact on thought, literature, or social problems (e.g., Machado de Assis, Fernando Pessoa, Clarice Lispector). Figures specified in Class Schedule.

Port 5930. Topics in Brazilian Literature. (3 cr; [max 9 cr], Prereq–#)
Major issues of Brazilian literature; focuses on important authors, movements, currents, genres. Problems, socioeconomic questions, literary techniques related to Brazilian themes. Topics specified in Class Schedule.

Port 5970. Directed Readings. (3 cr; [max 9 cr], Prereq–MA or PhD candidate, #, ∆, ▲)
Lasophone studies (Portuguese-speaking Africa, Brazil, Portugal). Areas not covered in other courses. Students submit reading plans for particular topics, figures, periods, or issues.

Port 5990. Directed Research. (1-4 cr; [max 9 cr], Prereq–#, #)
Graduate-level research in literatures and cultures of the Portuguese-speaking world. Topics vary.

Program For Individualized Learning (PIL)

College of Continuing Education

PIL 3200. Continuing Studies. (1 cr; S-N only. Prereq–PIL student, #)
Students complete work for another PIL course in which an incomplete was received. Registration allows students to access academic advising in PIL.

PIL 3211. Degree Planning. (8 cr; S-N only. Prereq–PIL student, #)
Students develop individualized curricular plans for their baccalaureate degrees.

PIL 3212. Degree Planning. (4 cr; S-N only. Prereq–PIL student, #)
Continuation or additional registration for degree planning.

PIL 3251. Individualized Study. (4 cr; S-N only. Prereq–PIL student, #)
Students develop a project proposal, identify objectives/resources, conduct research, accomplish an outcome, secure a narrative evaluation from a project adviser/evaluator.

PIL 3281. Major Project. (8 cr; S-N only. Prereq–PIL student, #)
Students complete a major project as partial fulfillment of criterion for Primary Area Studies in their degree plans.

PIL 3282. Major Project. (4 cr; S-N only. Prereq–PIL student, #)
Additional registration for students who need to complete their major projects.

PIL 3283. Major Project. (4 cr; S-N only. Prereq–PIL student, #)
Additional registration for students completing their major projects.

PIL 3291. Graduation Preparation. (8 cr; S-N only. Prereq–PIL student, #)
Students compile a graduation dossier for presentation to preliminary review committee. Dossier consists of criteria summary, introduction, transcripts, illustrative materials, project proposals, degree plan.

PIL 3292. Graduation Preparation. (4 cr; S-N only. Prereq–PIL student, #)
Students complete draft dossier.

PIL 3293. Graduation Preparation. (4 cr; [max 40 cr]; S-N only. Prereq–Admitted PIL student)
Students complete draft dossier.

PIL 4299. Graduation Review. (4 cr; S-N only. Prereq–PIL student, #)
Students revise graduation dossier, present it to graduation review committee for BA or BS degree recommendation.

Psychology (Psy)

Department of Psychology

College of Liberal Arts

Psy 1001. Introduction to Psychology. (4 cr; [GC 1281])
Scientific study of human behavior. Problems, methods, findings of modern psychology.

Psy 1905. Freshman Seminar. (3 cr; A-F only. Prereq–Fr or no more than 36 cr)
Topics specified in Class Schedule.

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

Psy 3005W. Introduction to Research Methods and Statistics. (3 cr; A-F only. Prereq–1001, #, or no more than 30 cr)
Topics specified in Class Schedule.

Psy 3005W. Undergraduate Field Study/Internship in Psychology. (3 cr; A-F only. Prereq–1001)
Individual empirical project leading to written report.

Psy 3011. Introduction to Learning and Behavior. (3 cr. Prereq–1001)
Basic methods and findings of research on learning and behavior change. Survey of 20th-century theoretical perspectives, including contemporary models. Emphasis on animal learning and behavioral psychology.

Psy 3031. Introduction to Sensation and Perception. (3 cr. Prereq–1001)
Psychological, biological, and physical bases of sensory experience in humans and animals. Emphasis on the senses of vision and hearing.

Psy 3031. Introduction to Cognitive Psychology. (3 cr. Prereq–1001)
Scientific study of the mind in terms of representation and processing of information. Research and theory on cognitive abilities such as perception, attention, memory, language, and reasoning. Aspects of computational modeling and neural systems.

Psy 3061. Introduction to Biological Psychology. (3 cr. Prereq–1001 or Biol 1009)

Psy 3011. Introduction to Personality. (3 cr. [GC 5101, Prereq–1001])
Major theories, issues, facts about personality and personality assessment. Review of important historical/contemporary perspectives (e.g., psychoanalysis, humanistic psychology, trait psychology, behaviorism, evolutionary psychology) on human nature/individuality.

Psy 3135. Introduction to Individual Differences. (3 cr. Prereq–1001)
Differential methods in studying human behavior. Psychological traits. Influence of age, sex, heredity, and environment in individual/group differences in ability, personality, interests, and social attitudes.

Psy 3201. Introduction to Social Psychology. (4 cr. Prereq–1001 or #)
Overview of theories/research in social psychology. Emphasizes attitudes/persuasion, social judgment, the self, social influence, aggression, prejudice, helping, and applications.

Psy 3301. Introduction to Cultural Psychology. (3 cr; A-F only. Prereq–[1001, 3005W] or #)
Theories/research on how culture influences basic psychological processes (e.g., emotion, cognition, psychopathology) in domains that span different areas of psychology (e.g., social, clinical, developmental, industrial/organizational) and of other disciplines (e.g., anthropology, public health, sociology).

Psy 3604. Introduction to Abnormal Psychology. (3 cr. Prereq–1001)
Diagnosis, classification, etiologies of behavioral disorders.

Psy 3617. Introduction to Clinical Psychology. (3 cr. Prereq–1004 or 5060H)

Psy 3666. Human Sexuality. (3 cr. Prereq–1001)
Overview of theories, research, and contemporary issues in human sexual behavior from an interdisciplinary perspective. Topics include sexual anatomy and physiology, hormones and sexual differentiation, cross-cultural perspectives on sexual development, social and health issues, and sexual dysfunction and therapy.

Psy 3711. Introduction to Industrial and Organizational Psychology. (3 cr. Prereq–[1000, 3005W or 4801 or equiv] or #)
Application of psychological theory and research to recruitment, personnel selection, training and development, job design, work group design, work motivation, leadership, performance assessment, and job satisfaction measurement.

Psy 3902W. Major Project in Psychology. (4 cr; A-F only. Prereq–3005W, #, or psychology major or sr psychology major)
Seminar for completing undergraduate major project paper.

Psy 3960. Undergraduate Seminar. (1-5 cr; [max 45 cr], Prereq–1001)
Current topics in psychology. Topics listed in psychology office.

Psy 3993. Directed Study. (1-6 cr; [max 24 cr], Prereq–#, #)
Independent reading leading to paper or to oral or written exam.

Psy 3994. Directed Research. (1-6 cr; [max 24 cr], Prereq–#, #)
Individual empirical project leading to written report.

Psy 3996. Undergraduate Field Study/Internship in Psychology. (1-6 cr; [max 12 cr], Prereq–1001, #, #)
Supervised field work/internship experiences in community or industry pertinent to formal academic training in psychology.

For definitions of course numbers, symbols, and abbreviations, see page 300.
Course Descriptions

Psy 4011. Applied Behavioral Psychology. (3 cr; Prereq- 3011 or #)
Fundamental concepts of behavioral psychology. Practical techniques of behavior modification with humans/animals. Emphasizes functional analyses of behavior deficits/excesses, development/implementation of programs to bring about meaningful behavioral change.

Psy 4012. Behavior Analysis and Autism. (4 cr; A-F only. Prereq- Reliable transportation, #)
Off-campus work with autistic children, under professional supervision. Professional ethics, social responsibility, methods, moral philosophy concerning children with autism. At least five hours per week, for 12 weeks, at service-learning site. One on-campus evening class meeting per week.

Psy 4036. Perceptual Issues in Visual Impairment. (3 cr; Prereq-1001 or #)
Contemporary knowledge on visual, tactile, and auditory perception informs us about the challenges and capabilities of people who are blind or have low vision. Topics include reading, space perception, mobility, the strengths and weaknesses of pertinent adaptive technology.

Psy 4133. Psychological Testing and Assessment. (3 cr. Prereq- 3005W)
Survey of psychological tests, assessment instruments. Methods for developing, administering, scoring. Criteria for evaluating test/assessment adequacy. Examples relevant to clinical psychology (e.g., abilities, personality, mental disorders). Hands-on opportunity to design/evaluate a psychological test. Small groups.

Psy 4501. Psychology of Women. (3 cr; Prereq- 1001 or #)
Survey of current theory and research regarding psychology of women and psychological sex differences including topics related uniquely to women (e.g., pregnancy) as well as sex differences in personality, abilities, somatic behavior.

Psy 4801. Introduction to Statistics. (3 cr. Prereq- 3005W, [honors student or #])
Descriptive/inferential statistics, hypothesis testing, correlation, regression.

Psy 4902V. Honors Project. (1-6 cr [max 5 cr]; A-F only. Prereq- Honors, #, A)
Culminating literature review or empirical study.

Psy 4960. Senior in Psychology. (1-4 cr [max 16 cr]. Prereq- 3001, [psych major or #])
Senior seminar on subjects of current interest in Psychology.

Psy 4993. Directed Study: Special Areas of Psychology and Related Sciences. (1-6 cr [max 16 cr]. Prereq- #)

Psy 4994V. Honors Research Practicum. (4 cr. Prereq- 3005W, honors psych)
Practical experience conducting psychological research. Preparation for completion of honors thesis. Research ethics, practical aspects of conducting psychological research, writing research reports. Students assist faculty and advanced graduate students in research.

Psy 4996H. Honors Internship/Externship. (1-6 cr; A-F only. Prereq- Honors, #, A, 24)
Supervised internship/externship experience in a community-service or industrial setting relevant to formal academic training/objects.

Psy 5012. Learning and Cognition in Animals. (4 cr. Prereq- 3011 or grad student or #)
Review/evaluation of key questions, methods, theories, and data about forms of learning and elementary cognitive processes. Emphasizes animal models. Implications for human learning/behavior.

Psy 5014. Psychology of Human Learning and Memory. (3 cr. Prereq- 3001 or 3051, except honors, grad)
Survey of basic methods and findings of research on human learning, memory, and cognition. Emphasis on major factors influencing human encoding or acquisition of information and skill, retention, and retrieval. Theoretical perspectives on underlying processes of encoding, retention, and retrieval.

Psy 5015. Cognition, Computation, and Brain. (3 cr. Prereq- 3051 [except for honors/graduate students])
Human cognitive abilities (perception, memory, attention) from different perspectives (e.g., cognitive/processing approaches). Cognitive neuroscience approach)

Psy 5018H. Mathematical Models of Human Behavior. (3 cr. Prereq- Math 1271 or #)
Mathematical models of complex human behavior including individual/group decision making, information processing, learning, perception, and overt action. Specific computational techniques and functional aspects of hearing, audition, vision, eye function, recognition, reading, and impaired vision.

Psy 5034. Psychobiology of Vision. (3 cr; Prereq- 3031 or 3051 or #)
Analysis of the properties and biological bases of visual perception in humans and animals. Emphasis on color vision, pattern vision, image formation in the eye, object recognition, reading, and impaired vision.

Psy 5036W. Computational Vision. (3 cr. Prereq- [3031 or 3051], Math 1272 or #)
Applications of psychology, neuroscience, computer science to design principles underlying visual perception, visual cognition, action. Compare/contrast biological/physical processing of images with respect to image formation, perceptual organization, object perception, recognition, navigation, motor control.

Psy 5037. Psychology of Hearing. (3 cr. Prereq- 3031 or #)
Biological/physical processing of sound, auditory psychophysics, theories and models of hearing, perception of complex sounds including music and speech, clinical, and other applications.

Psy 5038W. Introduction to Neural Networks. (3 cr; Prereq-[3061 or NCS 3102], Math 2243 or #)
Parallel distributed processing models in neural/ cognitive science. Linear models, Hebbian rules, self-organization, non-linear networks, optimization, representation of information. Applications to sensory processing, perception, learning, memory.

Psy 5051W. Psychology of Human-Machine Interaction. (3 cr; Prereq- 3051 or 3061 or #)
Psychological perspectives on human-machine interaction and factors that limit performance. Cognitive and perceptual aspects of computer, use, telepresence, and design and evaluation of sensory aids.

Psy 5054. Psychology of Language. (3 cr. Prereq- 3005W or honors or grad student or #)
Theories/experimental evidence in past/present conceptions of psychology of language.

Psy 5061. Neurobiology of Behavior. (3 cr; §3061. Prereq- 3005W or Biol 1009 or #)
Physiological/neuroanatomical mechanisms underlying behavior of animals, including humans. Neural basis of learning/memory, sleep, wakefulness, and attention processes. Effects of drugs on behavior.

Psy 5062. Cognitive Neuropsychology. (3 cr. Prereq- 3051 or 3061)

Psy 5064. Brain and Emotion. (3 cr; A-F only. Prereq- 3061 or 3061 or #)
Introduction to affective neuroscience. Focuses on how brain promotes emotional behavior in animals/humans. Biological theories of emotion reviewed in historical, current theoretical contexts. Research related to specific “basic” emotions, including brain substrates for fear, sadness, pleasure, attachment. Implications for understanding emotional development, vulnerability to psychiatric disorders.

Psy 5101. Personality Psychology. (3 cr §3101. Prereq- 3005W, [honors or grad student])
Theories and major issues/findings on personality functioning, personality structure, and personality assessment. Historically important and currently influential perspectives.

Psy 5135. Psychology of Individual Differences. (3 cr §3135. Prereq- 3005W or 3662 or equiv or #)
Differential methods in study of human behavior. Psychological traits. Influence of age, sex, heredity, and environment in individual/group differences in ability, personality, interests, and social attitudes.

Psy 5137. Introduction to Behavioral Genetics. (3 cr. Prereq- 3005W or equiv or #)

Psy 5138. Psychology of Aging. (3 cr. Prereq- 3005W or equiv)
Theories/findings concerning age-related changes in mental health, personality, cognitive functioning, productivity are reviewed/reinterpreted within context of multiple biological, social, and psychological changes that accompany age.

Psy 5202. Attitudes and Social Behavior. (3 cr. Prereq- 3201 or #)
Theory/research in social psychology, other fields in psychology of attitudes, beliefs, values. These fields’ relationship to social behavior. Principles/theories of persuasion.

Psy 5204. Psychology of Interpersonal Relationships. (3 cr; A-F only. Prereq- 3201 or honors or grad student or #)
Introduction to interpersonal relationship theory/ research findings. Emphasizes conceptual/methodological issues.

Psy 5205. Applied Social Psychology. (3 cr. Prereq- 3201 or grad student or #)
Applications of social psychology research/theory to domains such as physical/mental health, education, the media, desegregation, the legal system, energy conservation, public policy.

Psy 5206. Social Psychology and Health Behavior. (3 cr; A-F only. Prereq- 3201 or grad student or #)
Survey of social psychological theory/research pertaining to processes by which people develop beliefs about health/illness. Relationship between these beliefs, adoption of health-relevant behavior. Effect of psychological factors on physical health.

Psy 5207. Personality and Social Behavior. (3 cr; A-F only. Prereq- 3101 or 3201 or honors or grad student or #)
Conceptual/methodological strategies for scientific study of individuals and their social worlds. Applications of theory/research to issues of self, identity, and social interaction.

Psy 5501. Vocational and Occupational Health Psychology. (3 cr. Prereq- 3005 or #)
Survey of history, concepts, theories, methods, and findings of vocational/occupational health psychology. Burnout, personality, violence, stressors/stress-relations, counter productive behaviors, coping in workplace. Vocational development/assessment, career decision-making/counseling, person—environment fit.

Psy 5604H. Abnormal Psychology. (3 cr §3604. Prereq- honors or grad student or #)
Comprehensive review of psychopathological disorders. Etiology, diagnostic criteria, clinical research findings.
Public Affairs (PA)

Hubert H. Humphrey Institute of Public Affairs

PA 1490. Topics in Social Policy. [1-3 cr [max 9 cr]]
Topics in social policy.

PA 1907V. Freshman Seminar: Cultural Diversity. [1-3 cr [max 6 cr]. Prereq—Fr]
Reading, discussion, seminar, analysis, writing, Intensive, small-group setting.

PA 1961W. Personal Leadership in the University. (3 cr. Prereq—Fr or soph)
Introduction to leadership theory, personal development, interpersonal relations, leadership at University of Minnesota. Personal assessment, written/verbal presentation, resume writing, electronic communication, goal setting, coping with group dynamics.

PA 1990. General Topics in Public Policy. [1-3 cr [max 9 cr]]
General topics in public policy.

PA 3311W. Introduction to Public Policy Analysis. [3 cr; A-F only. Prereq—ApEc 1101 or Econ 1101]
Elements of public policy analysis, policy analysts' roles, market failure, public choice, bureaucratic decision making, welfare.

PA 3401. The Arts of Liberty: Educating for Democracy in Information Age. (3 cr)
“Hands-on” approach to education for democracy. Core concepts and their different meanings in American history, especially ideas of freedom, work, and democracy. Students participate in community projects, either through the Jane Addams School or as “democratic coaches” for teams of young people. Two essays and a journal.

PA 3961W. Leadership, You, and Your Community. (3 cr. Prereq—[1961 or EdPa 3301], [undergrad leadership minor or sr])

PA 3971. Leadership Minor Field Experience. (2 cr; A-F only. Prereq—[3961 or EdPa 3302] or undergrad leadership minor)
Core leadership course information applied to leadership situations. Settings include community or educational organizations, corporations, University student organizations, and formal internships. Students identify two leadership objectives from community projects, either through the Jane Addams School or as “democratic coaches” for teams of young people. Two essays and a journal.

PA 4590. Topics in Public and Nonprofit Leadership and Management. [3 cr [max 9 cr]]
Topics in public/nonprofit leadership/management.

PA 4800. Urban and Regional Planning. (3 cr)
Fundamental principles of urban/regional land-use planning. Introduction to planning theory and its applications. Political-economic context of urban/ regional planning.

PA 4820. Topics in Planning. [3-3 cr [max 12 cr]]
Topics in social policy.

PA 4421. Racial Inequality and Public Policy. (3 cr)
Historical roots of racial inequality in American society. Contemporary economic consequences. Public policy responses to racial inequality. Emphasizes thinking/analysis that is critical of strategies offered for reducing racial and economic inequality.

PA 4490. Topics in Social Policy. [1-3 cr [max 9 cr]]
Topics in social policy.

PA 5032. Intermediate Regression Analysis. (1-2 cr; A-F only. Prereq—[5031 or equiv], major in [public policy or [sci, tech, and environ policy]] or #). Bivariate/multivariate models of regression analysis, assumptions behind them. Problems using these models when such assumptions are not met.

PA 5033. Multivariate Techniques. (1-2 cr; A-F only. Prereq—[5031 or equiv], major in [public policy or [sci, tech, and environ policy]] or #, [5032 or equiv] recommended) Public affairs topics using maximum-likelihood estimation approaches.

PA 5034. Community Analysis and Planning Techniques. (1.5 cr [max 3 cr]. Prereq—[5031 or equiv], major in [public policy or [sci, tech, and environ policy] or urban/regional planning] or #) Data analysis techniques for practitioners in fields of planning, management, and policy analysis who work in community and regional levels. Population analysis and forecasting techniques relevant for small geographic areas. Techniques for regional/local economic analysis such as shift-share analysis, economic base, and location quotient analysis.

PA 5035. Survey Research and Data Collection. (1.5 cr; A-F only. Prereq—[5031 or equiv], major in [public policy or [sci, tech, and environ policy] or urban/regional planning] or #) Introduction to survey research methods. Emphasizes applications to policy and applied research. Research design choices (e.g., descriptive, experimental, case studies), sampling, variable specification, measurement. Conducting interviews, mailed questionnaires. Qualitative techniques.

PA 5101. Management and Governance of Nonprofit Organizations. (3 cr. Prereg—Grad or #) Draws on theories, concepts, and real world examples to explore critical managerial challenges. Governance systems, strategic management practices, offering different funding environments, management of multiple constituencies. Different types of nonprofits using economic/behavioral approaches.

PA 5102. Organization Design and Change. (1.5 cr. Prereq—Grad or #) Basic concepts related to organizational design decisions. Managerial challenges associated with organizational change in context of public sector agencies and nonprofit organizations. Major forces for change, kinds of change, management of change. Case-based analysis/discussion.


PA 5113. State and Local Public Finance. (3 cr. Prereq—Grad or #) Theory/practice of financing. Providing public services at state/local level of government. Emphasizes integrating theory/practice, applying materials to specific policy areas, and documenting wide range of institutional arrangements across within the 50 states.

PA 5122. Law and Public Affairs. (3 cr. Prereq—Grad or #) Overview of evolution of American legal system. Role of courts, legislatures, and political actors in changing law. How law is used to change public policy.


PA 5132. Mediation Training. (3 cr. Prereq—Grad student or #) Creating an arena for mediation. Skills/expectations needed to mediate disputes between individuals, among groups: balanced (peer or colleague), imbalanced (power differentials). Role playing, group debriefing, critique. Cases.


PA 5142. Public Issues Facilitation Strategies. (1 cr. Prereq—Grad student or #) Course equips facilitators with processes that encourage civic participation and effective, timely decision-making. Students identify and examine facilitation components and link them to public issues, examine one approach or theory of facilitation and apply it to a case study, and share experiences and cases with other learners.

PA 5143. Teaching Leadership for the Common Good. (1 cr. Prereq—Grad student or #, basic ability to use the Internet and Web browsers) Introduces learners to main concepts in “Leadership for the Common Good” framework. Offers a number of tools and exercises for applying these concepts, and prepares learners to teach others about leadership for the common good.

PA 5190. Topics in Public and Nonprofit Leadership and Management. (1.5-3 cr [max 3 cr]. Prereq—Grad student or #) Selected topics.


PA 5203W. Geographical Perspectives on Planning. (4 cr. Prereq—[Course in spatial analysis or work experience demonstrating knowledge of field], grad student or #) Physical/spatial basis for community/regional development. Role of public sector in guiding private development processes. Issues in design of settlements. Applied case studies examine public regulatory frameworks.


PA 5211. Private Sector Development. (3 cr. Prereq—Grad student or #) Roles of various participants in land development. Investment objectives, effects of regulation. Overview of development process from private/public perspective.


PA 5251. Strategic Planning and Management. (1.5 cr. Prereq—Grad student or #) Theory/practice of strategic planning/management for governments, public agencies, and nonprofit organizations. How to promote strategic thinking/acting by policy-making bodies and management teams. Determining what an organization should do, how it should do it, and why. Lectures, case discussions.

PA 5252. Strategy and Tactics in Project Planning and Management. (1.5 cr. Prereq—Grad student or #) Planning, analysis, evaluation, and implementation of short-term plans/projects. Technical analyses, interactional elements of completing projects within budget/time constraints. Strategic/tactical choices in planning. Case examples.

PA 5253. Designing Participation Processes. (1.5 cr. A-F only. Prereq—Grad student or #) Introduction to community-focused participation process design and approaches for addressing issues. Context, desired outcomes, power, authority, legitimacy, stakeholder expectations, democratic responsiveness, accountability, task design, resource requirements, facilitation, tools/techniques.

PA 5254. Strategic Planning Tools and Techniques. (1.5 cr; A-F only. Prereq—Grad student or #) Technices may include purpose expansions, competitive/collaborative analysis methods, core/distinctive competency identification, portfolio methods, logic and business process models, scenario construction, balanced scorecards, and related strategy mapping tools.
Course Descriptions

PA 5255. Stakeholder Identification, Analysis, and Influence Techniques. (1.5 cr; A-F only. Prereq–Grad student or #) Techniques include basic identification, power vs. interest grids, stakeholder influence diagrams, discerning the common good, support vs. opposition matrices, participation planning matrices, and ethical analysis.


PA 5290. Topics in Planning. (1.3 cr [max 9 cr]; Prereq–Grad student or #) Selected topics.


PA 5311. Program Evaluation. (3 cr. Prereq–Grad student or #) Principal methods, primary applications of evaluation research as applied to policies/programs in health/human services, education, or the environment. Conducting evaluations. Becoming a critical consumer of studies.

PA 5390. Topics in Advanced Policy Analysis Methods. (1-4 cr [max 9 cr]; Prereq–Grad student or #) Topics in advanced policy analysis methods.

PA 5401. Poverty, Inequality, and Public Policy. (3 cr. Prereq–Grad student or #) Nature/extent of poverty/inequality in the United States, causes/consequences, impact of government programs/policies. Extent/causes of poverty/inequality in other developed/developing countries.

PA 5411. Child Welfare Policy. (3 cr. Prereq–Grad student or #) Intersection of conceptual orientations of developmental psychology with policies that affect children/families. Demographic, historical, social trends that underlie assumptions driving policies directed at women/children. Proposals of future policies.

PA 5412. Aging and Disability Policy. (3 cr. Prereq–Grad student or #) Policy debates concerning populations that are aging or disabled. Students learn/practice analyses in context of important health, social, and economic policy debates. Readings on current theory/evidence.

PA 5421. Racial Inequality and Public Policy. (3 cr. Prereq–Grad student or #) Historical roots of racial inequality in American society. Contemporary economic consequences. Public policy responses to racial inequality. Emphasizes thinking/analysis that is critical of strategies offered for reducing racism and racial economic inequality.

PA 5431. Public Policies on Work and Pay. (3 cr. Prereq–[PA 5031 or equiv], grad student or #) Public policies affecting employment, hours of work, and institutions in labor markets. Public programs impacting wages, unemployment, training, collective bargaining, job security, and workplace governance. Policy implications of the changing nature of work.

PA 5441. Education Policy and the State Legislature. (3 cr. Prereq–Grad student or #) How Minnesota legislature decides K-12 issues. Implications for higher education. How to increase one’s influence in process. Discussions with persons who influence statewide educational policy. Presentations. Field trip to state legislature.

PA 5442. Policy Design for Education and Human Development. (3 cr. Prereq–Grad student or #) Designing effective/efficient policies. Using interdisciplinary approaches to identify/understand core variables (economic, psychological, etc.). Work on policy design.

PA 5451. Immigrant Health Issues. (3-4 cr. Prereq–Grad student or #) How to access demographic, health, background information on U.S. immigrants. Characteristics and health needs of immigrants. Designing culturally competent health programs. How to advocate for change to promote immigrant health. Community visits required. Online course.

PA 5480. Topics in Race, Ethnicity, and Public Policy. (1.3 cr [max 9 cr]; Prereq–Jr or Sr grad student or #) Link between race/ethnicity and public policy. How to identify/measure racial/ethnic disparities and their historical/cultural origins and policy impacts and to craft politically feasible remedies. Topics may include criminal justice, housing, child welfare, and education.

PA 5490. Topics in Social Policy. (1.4 cr [max 9 cr]; Prereq–Grad student or #) Selected topics.


PA 5521. Development Planning and Policy Analysis. (4 cr. Prereq–[5501 or equiv], [5502 or equiv], grad student or #) Techniques/assumptions of development planning and policy analysis at national, regional, and project levels. Direct/indirect effects of external shocks and government interventions on national/regional economies. Macroeconomic modeling, input-output analysis, social accounting matrices/multipliers, project appraisal/evaluation techniques.

PA 5522. Economic Development Policies in Latin America. (3 cr. Prereq–[5502 or equiv], [5502 or equiv], grad student or #) Evolution of economic development policies from import-substituting industrialization policies of 1950s/1960s through beginning of reform in 1970s, economic crisis of 1980s, and reform into 1990s. Emphasizes privatization, economic integration, exchange rate/trade, and domestic/adjustment policies.

PA 5531. Strategies for Sustainable Development: Theory and Practice. (2 cr. Prereq–[MICROecon course, grad student or #) Economic, environmental, and social aspects of sustainable development. Strategies, methods of implementation, and applications of sustainable development in different economic systems of industrialized/developing countries. Special attention to countries in transition.

PA 5590. Topics in Economic and Community Development. (1-3 cr [max 9 cr]; Prereq–Grad student or #) Selected topics.


PA 5690. Topics in Women and Public Policy. (1-3 cr [max 9 cr]; Prereq–Grad student or #) Selected topics.


PA 5711. Science and Technology Policy. (3 cr. Prereq–Grad student or #) Effect of science/technology on global economy, politics, environment, security. Role of national science/technology policies in development, diffusion, and adoption of technologies nationally/ internationally. Issues related to technology, technology policy, technological development, impact of technology, international cooperation.

PA 5712. Energy and Environmental Policy. (3 cr. Prereq–Grad student or #) Impact of energy/power/interfuel choices on environmental quality, sustainable development, and other economic/social goals. Emphasizes public policy choices for energy/environment, linkages between them.


PA 5790. Topics in Science, Technology, and Environmental Policy. (1-3 cr [max 9 cr]; Prereq–Grad or #) Selected topics.


PA 5812. Open Economy Models: an Assessment. (3 cr. Prereq–[Intermediate macroeconomics, trade theory, grad student or #) Open economics, implications for policy making/implementation. Issues at level of international/domestic economies.

PA 5890. Topics in Foreign Policy and International Affairs. (1-3 cr [max 9 cr]; Prereq–Grad student or #) Selected topics.

PA 5900. Computer Applications in Public Affairs (Summer). (0.5 cr [max 6 cr]; S-N only. Prereq–#) Introduction to basic computer systems/applications in public affairs practice (e.g., MS Windows, MS Word). Offered summer.
PA 5901. Computer Applications in Public Affairs. (3 cr. §3004; S-N only. Prereq–#) Introduction to computer systems/applications in public affairs practice.

PA 5902. Computer Applications in Public Affairs. (3 cr. §3004; S-N only) Introduction to computer systems/applications in public affairs practice.

PA 5903. Introduction to Computers and Applications at the Humphrey Institute. (2 cr. S-N only. Prereq–International HHF fellow) Computers/applications. Basic skills. Software such as MS Word, Excel, PowerPoint, Access. Using Internet, e-mail, search engines (for research), HTML (through Web page creation software).

PA 5910. Developing Your Public Service Career. (1 cr. S-N only. Prereq–Major in [public affairs or public policy or urban/regional planning or [science, technology/ environmental policy]] or #) Students investigate/analyze interests, skills, and abilities and combine them in a career plan. Students develop tools to demonstrate their abilities, document their experiences/knowledge, and explore public service career options.

PA 5931. Role of the Media in Public Affairs. (3 cr. Prereq–Grad student or #) Historical/contemporary role of news media in defining/shaping public opinion/policy, primarily in the United States. Emphasizes critical research, professional skills in three forms of journalism: hard news coverage, investigative reporting, documentaries. Field experience, practice in governmental public relations.

PA 5941. Leadership for the Common Good. (4 cr. Prereq–Grad student in public affairs or #) Personal, team, organizational, visionary, political and ethical aspects of leadership. Emphasizes building/experiencing a learning community.

PA 5951. Global Commons Seminar. (3 cr. §3004; S-N only. Prereq–International Hubert H. Humphrey Fellow) Meets specific needs of International Humphrey Fellows. Topics vary each year depending on the interests and needs of the fellows.

PA 5990. Topics: Public Affairs—Generic Topics. (1-2 cr. max 9 cr. Prereq–Grad student or #) General topics in public policy.

Public Health (PubH)

School of Public Health


PubH 3040. Dying and Death in Contemporary Society: Implications for Intervention. (2 cr. Prereq–Public Health science major or social work major or education major or mortuary science major or #) Basic background information on concepts, attitudes, ethics, and lifestyle management in relation to dying, death, grief, and bereavement. Emphasizes intervention/educational aspects of for community health and helping professionals and for educators.

PubH 3091. Practicum in Peer Education I. (2 cr. A-F only. Prereq–Upper div student with demonstrated hth sci or hth ed interests, 3001 or §3001 or 3004 or §3004, #) Multiple factors that influence health. Through various health promotion strategies, students build upon or gain skills such as public speaking, needs assessments, program planning, interpersonal communication, and program evaluation.

PubH 3092. Practicum in Peer Education II. (2 cr. A-F only. Prereq–Upper div student with demonstrated hth sci or hth ed interests, 3001 or §3001 or 3004 or §3004, #) Multiple factors that influence health. Through various health promotion strategies, students build upon or gain skills such as public speaking, needs assessments, program planning, interpersonal communication, and program evaluation.

PubH 3093. Directed Study: Public Health. (1-4 cr. max 4 cr. Prereq–#) Directed study in selected public health problems or current issues.

PubH 3201. Issues in Environmental and Occupational Health. (3 cr. §5201) Scope of the field of environmental health. Concepts upon which environmental interventions are based. Consulting literature to identify appropriate interventions for community environmental health problems. Online course.


PubH 3310. Epidemiology: Science, Methodology, and Application. (2 cr. Prereq–[ jr or sr or #]) Scientific work from perspective of epidemiology. Method of scientific inquiry. Methodology/problems of epidemiology.


PubH 5005. Topics: Community Health Education. (1-4 cr. max 20 cr.) Topics of interest in community health education.
PubH 5055. Social Inequalities in Health. (2 cr. Prereq—Hlth sci professional student or hlth sci or soc work or public health grad student or #) Extent/causes of social inequalities in health. Degree to which understanding of these inequalities is hampered by methodological limitations in health research. Focuses on individual, community, and policy approaches to reducing social inequalities in health.


PubH 5070. Alcohol and Other Drugs: Epidemiology, Prevention, and Control. (3 cr. Prereq—[Professional school student in PubH or CVM or Dent or Med or Pharm] or [grad student in biostatistics or environmental or epidemiology or health services research policy/administration or nursing] or #) Population patterns regarding who uses which drugs, why they use them, and health consequences of alcohol and other drug use. Does not focus on treatments, care, rehab, or exploration of personal attitudes, practices regarding alcohol or other drug use.

PubH 5074. Mass Communication and Public Health. (3 cr. Prereq—[One course in [behavioral or social science], [public health or journalism] [grad student]] or #) Overview of theory/research regarding intersection of information available via mass media outlets and various aspects of public health. Potential impact of media content on public health outcomes. Emphasizes planned/unplanned effects of mass media in various health-related situations.


PubH 5078. Public Health Policy as a Prevention Strategy. (2 cr. Prereq—CHE or MCH or PubH Nutr or EPI MPH or EPI grad student or #) Philosophical, ethical, economic, political, efficacy rationale for policy approach to prevention. Historical/current application of prevention policy to public health problems.

PubH 5080. Seminar: Policy, Politics, and Ethics of Public Health. (2 cr; S-N only. Prereq—2ndyr MPH or MS or PhD student in [CHE or EPI] or MPH or PubH nutr or clin research] or public affairs or MJS] or PHD] or 3rd yr law student) #) Political/ethical factors that decision-makers must consider as public health policy is debated, adopted, and implemented. Role of public health professional in policy making. Focuses on current topics such as tobacco, privacy, genetics, and health care financing.

PubH 5091. Independent Study: Community Health Education. (1-4 cr; max 20 cr) Prereq—CHE major. #) Independent study supervised by a community health education faculty member.

PubH 5094. Master’s Project: Community Health Education. (1-6 cr [max 6 cr]) Prereq—CHE major. #) Directed research towards completion of master’s project in community health education.

PubH 5096. Field Experience: Community Health Education. (1-6 cr [max 6 cr]) N-S only. Prereq—CHE major. #) Supervised community health education field study in health or public health setting under academic/professional supervision. Emphasizes application of acquired knowledge/skills to relevant issues/problems.

PubH 5100. Topics: Environmental and Occupational Health. (1-4 cr [max 20 cr]) New course offerings or topics of interest in environmental/occupational health.

PubH 5101. Master’s Project: Environmental Health. (1-3 cr [max 5 cr]) S-N only. Prereq—EH major. #) Directed research towards completion of the Master’s Project in Environmental Health.

PubH 5102. Field Experience: Environmental Health. (1-5 cr [max 5 cr]) S-N only. Prereq—EH major. #) Supervised environmental health field study in health or public health setting under academic/professional supervision. Emphasizes application of acquired knowledge/skills to relevant issues/problems.

PubH 5103. Exposure to Environmental Hazards. (2 cr; A-F only. Prereq—EH major or #) Concepts, assessment, and control of exposure to biological, physical, and chemical hazards in the environment. Environmental health as an essential component of public health.

PubH 5104. Environmental Health Effects: Introduction to Toxicology. (2 cr; A-F only) Identifying mechanisms/effects on human health of environmental agents. Chemical, biological, physical, and psychological agents.

PubH 5105. Environmental and Occupational Health Policy. (2 cr; A-F only. Prereq—Environmental health major or #) Environmental and occupational health policies, laws, concepts, and principles. Proposals/approaches for regulatory reform, approaches to policy analysis, phases/issues in policy-making process.

PubH 5111. Preventing Pollution: Innovative Approaches to Environmental Management. (3 cr. Prereq—Pub hlt or grad or honors undergrad student or #) Interdisciplinary approach to pollution problems, including sustainability, pollution prevention, risk assessment, regulatory reform, and strategic environmental management.

PubH 5112. Risk Analysis: Application to Risk-Based Decision Making. (3 cr. Prereq—Pub hlt or grad student or #) Introduction to risk in context of regulatory decision making.


PubH 5114. Foundation of Environmental and Worker Protection Law. (1 cr. Prereq—S110) Traditional/constitutions on law-making authority of courts, legislatures, and administrative agencies.


PubH 5116. Environmental Law. (1 cr. Prereq—S110) Prereq—S114) Several difficult legal questions that arise when pollution protection law conflicts with policy encouraging the use of natural resources. Conflict that arises when government restricts the use of property without compensating its owner. Increasing authority of government agencies to audit businesses to assure compliance.

PubH 5120. Injury Prevention in the Workplace, Community, and Home. (2 cr) Injury epidemiology: analyses of major injury problems affecting the workplace, community, and home using epidemiologic model and conceptual framework; emphasis on strategies/program development for prevention and control.

PubH 5121. Topics: Injury Prevention in the Workplace, Community, and Home. (1-2 cr [max 2 cr]) Prereq—[S120 or S191 or S130, #) Selected projects.


PubH 5123. Violence Prevention and Control: Theory, Research, and Application. (2 cr; A-F only. Prereq—Environmental health major or #) Analysis/critique of major theories and of epidemiological research pertinent to violence, including characteristics of violence and relevant risk factors, reporting/treatment protocols, and current/potential intervention efforts and prevention initiatives. Emphasizes interdisciplinary contributions to violence prevention/control.


PubH 5131. Working in Global Health. (1-2 cr) Introduction to key issues in global health: global burden of disease; cultural issues and health; nutrition; infectious diseases; environmental problems; women and children. Background for health professionals and for working overseas. Instructors have all had experience working in foreign countries.


PubH 5150. Interdisciplinary Evaluation of Occupational Health and Safety Field Problems. (3 cr. Prereq—EH major or #) Guided evaluation of potential health/safety problems at work site, recommendations and design criteria for correction/evaluation of occupational health/safety programs.

PubH 5160. Physiological Disposition of Xenobiotics. (3 cr. Prereq—1 course each in [biochemistry, pharmacokinetics]) Principles in toxicokinetics/toxicokinetics and xenobiotic metabolism. Mechanisms by which phase I and phase II enzymes bioactivate and detoxify xenobiotics. Implications of these biochemical reactions for human health.

PubH 5161. Regulatory Toxicology. (2 cr. Prereq—Some background in [toxicology or pharmacology or related field] is recommended) In-depth introduction to laws (and associated regulations) of U.S. federal regulatory agencies, such as CPSC, EPA, FDA, OSHA, and DOT, that require/use toxicological data/information in their mission of protecting human/environmental health.
Course Descriptions


PubH 5172. Industrial Hygiene Applications. (2 cr. Prereq—[Enrich major, 5170] or #) Recognition, evaluation, and control of occupational health/safety hazards. Practice application to specific industrial hygiene problems related to gases/vapors, aerosols, and physical agents.


PubH 5174. Control of Exposure to Physical and Chemical Hazards. (3 cr. Prereq—[Enrich major, [industrial hygiene specialty or equiv]] or #) Hierarchy of options for controlling human exposures to airborne contaminants, both gaseous and aerosol. Science/practice of process control and exhaust ventilation in workplaces and other indoor air spaces and in air cleaning. Control of emissions to ambient environment.

PubH 5175. Industrial Hygiene Measurements Laboratory. (2 cr. Prereq—5171 or #) Broad treatment of occupational health field. Role of industrial hygienist. Emphasizes practical application of industrial hygiene concepts/methods. Lectures/demonstrations, lab exercises, projects.

PubH 5176. Hazardous Materials and Waste Management. (2 cr. Prereq—[5170], [courses in chemistry, organic chemistry or equiv]] or #) Generation, control, and disposal of hazardous materials/wastes. Recognizing, evaluating, controlling, and disposing hazards from chemicals that threaten occupational/environmental health. Lectures, case studies, workshops, field trips.

PubH 5180. Environmental Microbiology. (3 cr. Prereq—Basic course in microbiology or #) Sources, monitoring, and control of microorganisms in the environment that are significant to human health.


PubH 5190. Environmental Chemistry. (3 cr. Prereq—1 course each in gen chem, org chem or #) Overview air, water, and soil chemistry; pertinent environmental problems; human and ecological multimedia exposures to chemicals in the environment.

PubH 5193. Directed Study: Environmental and Occupational Health. (1-4 cr; max 20 cr; S-N only. Prereq—#) Directed study in a topic agreed upon by student and faculty member.

PubH 5197. Air Pollution. (3 cr; A-F only. Prereq—[General, organic chemistry] or #) Overview of the facts of air pollution. Primary/secondary sources. Transport mechanisms, including meteorological effects, atmospheric transformations of pollutants, and deposition processes involved in removal of pollutants. Human/ecosystem health effects, nuisance effects. Regulations/standards in place and under review that affect air pollution management.

PubH 5200. Environmental Health. (2 cr) Principles of environmental health relating to macro-and micro-environments and to products consumed or used by people.


PubH 5281. Immigrant Health Issues. (3-4 cr. Prereq—Public health or grad student or #) How to access demographic, health, and background information on U.S. immigrants. Characteristics and health needs of immigrants. Designing culturally competent health programs. How to advocate for changes to promote immigrant health. Community visits required.

PubH 5290. Topics: Public Health Practice. (1-4 cr [max 20 cr]) New course offerings or topics of interest in public health practice.

PubH 5294. Master's Project: Public Health Practice. (1-3 cr [max 3 cr]; S-N only. Prereq—Public health MPH major, #) Directed field research. Original or secondary analysis of data sets related to public health practice.

PubH 5296. Field Experience: Public Health Practice. (1-3 cr [max 3 cr]; S-N only. Prereq—Public health MPH major, #) Directed field experience or clinical rotation/practicum in selected community or public health agencies/institutions. Integration of knowledge/skills in population science for public health.

PubH 5299. Public Health Practice: Introductory Seminar for Health and Human Resources Professionals. (1 cr [max 3 cr]; S-N only. Prereq—Baccalaureate degree or degree from a hith professional prep or grad student in [dentistry or nursing or pharmacy or public hith or vet med]) Science/art of public health. Emphasizes interdisciplinary linkages to practice communities. National/local priorities as outlined in “Healthy People 2010” serve as framework for presentations on current issues/trends by public health leaders.


PubH 5320. Fundamentals of Epidemiology. (3 cr. Prereq—Public hith [MPH or certificate] student or [environmental hith [MS or PhD] or hith journalism MA] major or #) Basic concepts and knowledge of epidemiology, a methodology used to study the etiology, distribution, and control of diseases in human populations.

PubH 5330. Epidemiology. (1-4 cr [max 4 cr. Prereq—[5180 or 5190], epidemiology [MPH or PhD] or clinical research MS] major or #) Epidemiologic principles applicable to infectious/non-infectious disease. Introduction to measures of disease frequency. Study designs (randomized trials, cohort, case-control, cross-sectional, and ecological studies). Issues of bias, confounding, and casual inference. Data analysis using tabular methods.


PubH 5334. Human Behavior II. (2 cr; A-F only. Prereq—[5333, Epi grad student in behavioral track] or #) Critical evaluation of major behavioral public health intervention research. Experience in research designs/methods in health behavior intervention.

PubH 5335. Epidemiology and Control of Infectious Diseases. (2 cr. Prereq—Epi major or #) Principles and methods. Strategies for disease control and prevention, including immunization. Relevance of modes of transmission of specific agents for disease spread and preventive public health consequences of infectious diseases at local, national, and international levels.

PubH 5336. Advanced Seminar in Infectious Disease Epidemiology. (1 cr [max 2 cr]); S-N only. Prereq—5330, 5335, #) How infectious disease epidemiologic principles are applied in the “real world” to contemporary or controversial issues, including development of prevention and control strategies.

PubH 5337. Analysis of Infectious Disease Data. (2 cr; A-F only. Prereq—5330, 5340, 5335, [EPI or MPH or EPI] grad student, #) Methods to analyze/model infectious disease data. Emphasizes critical understanding of methods, statistical analysis specific to infectious disease areas. Infection models, surveillance/epidemic modeling, transmission models, pathogenesis models.


PubH 5345. Epi Methods: Data Collection. (2 cr. Prereq—5330, 5450, [Epi MPH or clin research student] or #) Methods/techniques for collecting/managing epidemiologic research data. Practical aspects of sampling, response rates/bias, forms design, selecting/training interviewers. Data preparation, entry, cleaning, management. Ethical issues in research.

PubH 5348. Writing Research Grants. (2 or 5-S only. Prereq—5330, 5450, [Epi MPH or clinical research MS student] or #) Focuses on NIH-type grants. Mechanisms of grant development/writing, principles of informed consent, budget development, grant-review process, identifying funding sources.

PubH 5351. Molecular Epidemiology. (2 cr; A-F only. Prereq—5330, at least one college-level general biology course, [Epi MPH or Epi grad student or #]) Introduction to molecular epidemiology. Sample collection, processing, methodology. Biomarkers used in cancer, cardiovascular disease, and infectious epidemiologic studies.


PubH 5363. Design and Analysis of Group-Randomized Trials in Epidemiology. (3 cr. Prereq—5340, 5452, [EPI MPH or EPI] grad student, #) Community, school-based, and work-site trials. Trials involving randomization of other identifiable groups to study conditions. Experimental/quasi-experimental designs and threats to their validity.