463 Atmospheric Chemistry (3)
Prereq: CHEM 153, PHYS 253. Homogeneous chemistry of the lower and middle atmosphere, emphasizing processes by which human activity influences the environment. 3 lec.

477 Introduction to Polymer Synthesis (3)
Prereq: 306 or CHEM 454. Polymer structure, reaction mechanisms, kinetics, reactors, processing, and properties. 3 lec.

481 Biochemical Engineering (3)
Prereq: 347, 457, or perm. Study of processes in chemical engineering that depend on biological systems. Overview of biological basics, enzyme kinetics, major metabolic pathways, cell growth characteristics, essentials of recombinant DNA technology, bioreactor design and control, and an introduction of purification methods. 3 lec.

482 Topics in Bioseparations (3)
Prereq: CHEM, CHEMIV, Life Sci sr, or perm. Basic techniques, such as cell disruption, centrifugation, precipitation, micro- and ultrafiltration, various forms of chromatography for the separations of biomolecules, especially proteins, will be introduced. Some emphasis will be placed on preparative and large scale applications. 3 lec.

483 Biomedical Engineering (3)
Prereq: jr. in engineering, chem, physics, bio. Biomedical engineering with an emphasis on cell and tissue engineering.

492 Special Investigations (1–3, max 9)
Prereq: perm. Individual or small-group work, under staff guidance, in research or advanced study in particular field of chemical engineering. (Only three hours of special investigations in any area can be counted towards the CHE technical elective requirement.)

493 Intercollegiate Design Competition (1–3, max 9)
Individual or small group participation, under faculty guidance, in regional or national student design competition. (A maximum of three credit hours may be applied toward the CHE technical elective requirement.)

499 Chemical Engineering Senior Assessment (1)
Prereq: 443. Assessment of skills, behaviors, and attitudes of students graduating in chemical engineering. Examination of retention from prerequisite courses. Readings and discussion of professional and ethical responsibility, the impact of engineering education in a global and societal context, the need for lifelong learning, and knowledge of contemporary issues. 2 rec.

Engineering, Civil (CE)

200 Civil Engineering Fundamentals (1)
(spring) Overview of civil engineering profession and specialization areas, value of professional organizations and lifelong learning, introduction to departmental facilities, description of curriculum, and advising responsibilities. 1 lec.

201 Civil Engineering Computational Techniques (3)
Prereq: MATH 263A or concurrent. (spring) Introduction to methods of problem solving, use of computers for calculations, applications or problem solving to civil engineering. 3 lec.

210 Plane Surveying (4)
Prereq: MATH 163 or MATH 263, or perm. (fall, spring) Basic theory and field practice in measurement of distance, elevation, and angle; introduction to GPS and photogrammetry. 3 lec, 1 lab.

220 Statics (4)
Prereq: MATH 263C, PHYS 251. (fall, winter, spring) Laws of equilibrium of forces, friction, centroids, and moment of inertia. 4 lec.

222 Strength of Materials (4)
Prereq: grade of C or better in 220. (fall, winter, spring) Simple stresses and strains, bending, torsion, beam deflection, columns, and combined stresses. 4 lec.

223 Strength of Materials Laboratory (1)
Prereq: 222 or with 222. (fall, winter, spring) Testing of various materials under axial compression, tension, flexure, torsion, impact, fatigue. Use of electrical, mechanical, and photoelastic strain measuring equipment. 2 lab.

311 Route Engineering (3)
Prereq: 210. (winter) Horizontal and vertical curves; geometric design of highways; earth-work distribution. 3 lec.

316 Construction Engineering and Management (3)
Prereq: Jr, (fall). Overview of construction engineering and management, project funding, bidding and selection process, design and construction interface, competitive and negotiated contracts, planning and scheduling, estimation, equipment productivity and safety. 3 lec.

330 Structural Theory I (5)
Prereq: C or better in 222. (fall) Determinacy requirements; analysis of statically determinate structures; influence lines; deflections, introduction to analysis of statically indeterminate structures. 5 lec.

331 Structural Theory II (3)
Prereq: C or better in 330. (winter) Indeterminacy conditions for structures, slope deflection method; moment distribution method; influence lines; introduction to computer methods. 3 lec.

340 Fluid Mechanics (4)
Prereq: C or better in MATH 222. (fall, winter, spring) Statics and dynamics of viscous and non viscous fluids, dimensional analysis and similarity, pipe flow, principles of lift and drag, introduction to boundary layers. 4 lec.

341 Fluid Mechanics Laboratory (1)
Prereq: 340 or with 340. (fall, winter, spring) Lab techniques, calibration principles, fluid and flow measurements. 2 lab.

342 Applied Hydraulics (3)
Prereq: C or better in 340. (spring) Flow and pressure distribution in multiloop networks, dynamics of flow in pumps and turbines, uniform and nonuniform flow in open channels, culvert hydraulics, hydraulic transient. 3 lec.

343 Hydrology (3)
Prereq: 340, ISE 304 or with ISE 304. (spring) Hydrologic cycle. Precipitation and runoff data; groundwater hydraulics; infiltration; peak runoff calculations, application to water resource problems. 3 lec.

353 Basics of Environmental Engineering (3)
Prereq: Jr. (spring) Engineering concepts, theory, design, and practice as applied to solution of problems of environmental technologies, waste management, drainage, and control of water, soil, and atmospheric pollution; social and environmental impact of these solutions. 3 lec.

361 Transportation Engineering (3)
Prereq: 311. (spring) Introduction to Transportation Engineering with emphasis on transportation planning concepts and multi-modal design elements. 3 lec.

370 Geotechnical Engineering (4)
Prereq: 222, 240, GEOL 283, or concurrent with 340. (winter) Soil compositions, physical and chemical properties, and classification; water movement and seepage problems; consolidation and shear strength; applications to earth structures containing of earth, concrete, walls, slope stability, bearing capacity, and settlement. May be taken as 570 for grad credit except by civil engineers. 4 lec.

371 Soil Engineering Laboratory (1)
Prereq: 370 or concurrent with 370. (winter) Classification of soils and determination of their properties through tests; grain size analysis, Atterberg limits, relative density, Proctor testing, permeability, direct shear, and consolidation. 2 lab.

380 Civil Engineering Materials (3)
Prereq: 222. (spring) Engineering properties of materials used in civil engineering applications including metals, concrete, timber, and composites. 3 lec.

400 Societal Concerns in Civil Engineering (2)
Prereq: senior. (fall) Engineering economy, codes, variances, alternative designs, and public meetings.

410 Applied Property Surveying (3)
Prereq: 210. (spring) Triangulation, astronomical observations, land surveying, instrument adjustments, special topics. 2 lec, 3 lab.

415 Geodetic Surveying (3)
Prereq: 210 or perm. (winter) Equipment and methods used in aerial photography and land measurement. 2 lec, 2 lab.

423 Continuum Mechanics (4)
Prereq: perm. (winter) Matrix methods in mechanics and structures; laws of dynamics; mechanical properties of solids and fluids; basic theories of continuum mechanics. Grad course open to selected undergrads. 4 lec.

424 Strength of Materials II (3)
Prereq: C or better in 222. (fall) Geometrical bending, shear centers, columns, energy, and continuation of basic topics usually taught in Strength of Materials I. 3 lec.

427 Experimental Stress Analysis (3)
Prereq: 424, (spring) Experimental methods of stress determination including photoelasticity, stress coat, and electric strain gauge techniques; stress analyses; strain rosettes for combined stress determinations. Grad course open to selected undergrads. 2 lec, 1 lab.

431 Experimental Methods in Structural Dynamics (3)
Prereq: perm. Modal analysis of structural models to identify their vibration characteristics. Frequency response functions using dual-channel signal analyzers. Mobility measurement techniques. Modal parameter extraction techniques. Computer-aided structural dynamics. Grad course open to selected undergrads. 2 lec, 1 lab.

432 Structural Design in Concrete (4)
Prereq: C or better in 330. (winter) Materials and properties; design methods, strength of rectangular sections subject to bending moments, axial loads, and shear forces either separately or in combination; continuity in concrete construction; design of one-way slabs; design of T-sections in bending deflection calculations; footing design. 4 lec.

433 Structural Design in Steel (4)
Prereq: C or better in 330. (spring) Materials and properties; design methods, design of tension members; structural fasteners; design of compression members, beams, trusses, and frames. 4 lec.

434 Advanced Structural Design (3)
Prereq: 432 or 433, or perm. (spring) Design of complete structures or major components of structures. 3 lec.

437 Timber Design (3)

438 Prestressed Concrete Design (3)

439 Computer-Aided Structural Design (3)
Prereq: 432 and 433, or perm. Analysis and design of complete structural systems constructed from reinforced concrete, structural steel, and/or other applicable materials by using computers. Material reports and cost estimation of projects. 1 lec, 4 lab.
Courses / Engineering

445 Flow Routing (3)
Prereq: 342 or perm. (winter) Gradually varied flow computation, the use of computer software programs for flow routing, and their engineering applications.

450 Water Treatment (3)
Prereq: 342, 343, CHEM 123. (fall) Sources and collection of public water supplies; principles of treatment processes. 3 lec.

451 Wastewater Treatment (3)
Prereq: 342, 343, CHEM 123. (winter) Quantities and collection of municipal wastewater; principles of treatment processes. 3 lec.

452 Water and Wastewater Analysis (3)
Prereq: CHEM 123. (fall) Lab methods and interpretation of results for chemical and bacteriological examination of water and wastewater. 2 lec, 3 lab.

453 Solid/Hazardous Waste Management (3)
Prereq: Sr, perm. (fall) Identification, classification, and study of methods of characterization, handling, treating, managing, and disposal of solid/hazardous wastes regulated under federal and state guidelines and legislation.

457 Water Resources Engineering (3)
Prereq: 343 or perm. (winter) Elective sr civil engineering course designed to provide integrated treatment of water resources engineering, including hydrological measurements, runoff, groundwater, water law, reservoir design, frequency analysis, planning, flood control. Systems approach to multipurpose water resource projects emphasized. 3 lec.

458 Water Quality Engineering (3)
Prereq: perm. (demand) Natural and man-made characteristics of water quality, changes in quality resulting from use, criteria for control of stream pollution, methods of improving water quality, also legal, economic, and institutional aspects. Grad course open to selected undergrads. 3 lec.

462 Traffic Engineering (3)
Prereq: 361; major or perm. (winter) Traffic parameters, traffic data collection, capacity analysis of freeways, signalized intersection design. 3 lec.

471 Foundation Engineering (3)
Prereq: 370. (fall) Design and construction problems in soil engineering; subsurface investigation; foundation selection and design criteria; principles of design of shallow and deep foundations; site improvement. 3 lec.

474 Soil Mechanics Laboratory (1)
Prereq: perm. (spring) Advanced techniques for measurement of soil engineering properties. Grad course open to selected undergrads. 3 lab.

481 Paving Materials and Mixtures (3)
Prereq: perm. (fall) Types, constituents, chemical behavior, tests, specifications, and uses of bituminous materials, Portland cements, and aggregates in pavements. Design and manufacture of paving mixtures and construction of pavements. Grad course open to selected undergrads. 2 lec, 3 lab.

483 Principles of Pavement Design (3)
Prereq: perm. (spring) Fundamentals of wheel-loads and stresses in pavements. Properties in pavement components and design tests. Design methods and evaluations. 3 lec.

490 Special Investigations (1–5)
Prereq: sr or perm. Special investigation or problems not covered by formal courses. Permits well-qualified student to pursue individual study under direction of faculty member.

491A Senior Design—Land Development (4)
Prereq: 343, 361, or perm. (fall) An advanced applied engineering course utilizing multiple fundamental civil engineering courses as applied to land development.

491B Senior Design—Environmental/Water Resources (4)
Prereq: 450, with 451. or perm. (winter) An advanced applied engineering course utilizing combinations of water resources engineering, water treatment and hydraulics/hydrology courses as applied to society’s needs.

491C Senior Design—Structures and Foundations (4)
Prereq: 370 and 432, or perm. (spring) A civil engineering design elective integrating fundamental civil engineering courses for foundation and structural design, analysis, and drawing.

491D Senior Design—Special Project (4)
Prereq: sr and perm. An advanced applied engineering course integrating several major disciplines of civil engineering in a design project.

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Engineering, Electrical (EE)

101 Introduction to Electrical Engineering (4) (2A)
Prereq: MATH 113 or placement level 2. (fall, winter) The goal of this course is to introduce students to the professional field of electrical engineering. Students will develop a knowledge of key technical concepts of electricity: voltage, current, resistance, power. In addition, students will study the history, professional values, and methods of electrical engineering. Lab work provides hands-on experience with electrical systems. 3 lec, 2 lab.

102 Introduction to Computer Engineering (4)
Prereq: MATH 113 or placement level 2. (fall, winter) The goal of this course is to introduce students to the field of computer engineering. Students will develop a knowledge of the fundamentals of Boolean algebra, binary arithmetic, characteristics of logic gates, and flip-flops. Lab work provides hands-on experience with digital systems. 3 lec, 2 lab.

103 Introduction to Electrical and Computer Engineering Design (4)
Prereq: EE 101, 102, and CS 210, or 230, or 240A, or ET 181. (fall, spring) The goal of this course is to introduce students to design in electrical engineering. Students will develop an understanding of engineering design principles. Students will also develop a knowledge of microcomputerization and an ability to perform assembly language programming. Lab work provides students an opportunity to apply design principles on a major project. 3 lec, 2 lab.

210 Foundations of Electrical and Computer Engineering I (4)
Prereq: 101 and MATH 263A. (fall, winter) Basic concepts and definitions, units, DC circuit analysis, Kirchhoff’s laws, source transformations, nodal and mesh analysis, network theorems, inductance and capacitance, and simple RC and RL circuits with an emphasis on developing problem-solving skills. Students will be expected to have, and be able to demonstrate, a firm “understanding” of the topics as well as a mastery of basic problem-solving skills. In addition, there will be an emphasis on being able to make an effective technical presentation.

211 Foundations of Electrical and Computer Engineering II (4)
Prereq: C or better in 210 and MATH 263B. (winter, spring) Continuation of 210. RC and RL circuits, Transforms, State-Variables, Fourier Analysis, AC circuit analysis, and the frequency domain, with an emphasis on strengthening problem-solving skills. Students will be expected to have, and to demonstrate, a thorough understanding of the frequency domain and how DC circuits, transient circuits, Fourier circuits, and AC circuits are all represented in the s-domain. They will also need to demonstrate a mastery of advanced problem-solving skills. In addition, students will need to effectively communicate, in written form, advanced technical concepts and problems.

212 Foundations of Electrical and Computer Engineering III (4)
Prereq: 103, 211, 221. (fall, spring) Advanced AC circuits, phase coupled circuits, magnetically coupled circuits, frequency response and filters, two-port circuits, and simple electronic circuits. Students will need to have, and demonstrate, a thorough understanding of the basic fundamentals of electrical and computer engineering and how they relate to more advanced subjects, such as those covered in this class. Students also need to demonstrate a facility with advanced problem-solving techniques. There will be a design project to be performed in the laboratory. 3 lec, 2 lab.

221 Instrumentation Laboratory (4)
Prereq: 210, with 211. This course is designed to give students a proficiency in using electrical instruments. Emphasis will be on learning how to use instruments, understanding the fundamental technique, and knowing the limitations of various laboratory equipment. Emphasis will also be placed on the proper acquisition, recording, analysis, and reporting of data. Format will include classroom instruction and laboratory work. 2 lec, 4 lab.

224 Introduction to Digital Circuits and Computer Architecture (4)
Prereq: 103, 211. (spring, fall) Microprocessor components, information representation, analysis and synthesis of combinational and sequential circuits, data paths, pipelining, instruction sequencing and interpretations, instruction set architectures and FPGAs.

304 Basic Electrical Laboratory I (1)
Prereq: 313 or with 313. Lab supplement to 313. Basic instruments and circuit measurements. Not open for credit to electrical engineering majors.

305 Basic Electrical Laboratory II (1)
Prereq: 304 and/or with 314. Lab supplement to 314. Operation of semiconductor devices, amplifier design, oscillators and digital circuits design. Not open for credit to electrical engineering majors.

313 Basic Electrical Engineering I (3)
Prereq: 313. (winter) DC circuits, single-phase steady state AC circuits, and the frequency and transient responses of energy-storage networks. Not open for credit to electrical engineering majors.

314 Basic Electrical Engineering II (3)
Prereq: 313. (winter) Semiconductor devices, small signal analysis, amplifiers and oscillator circuits, pulse and digital circuits. Not open for credit to electrical engineering majors.

315 Basic Electrical Engineering III (3)
Prereq: 313. (spring) Transforms, direct current machines, polyphase induction and synchronous, rotating machines, including equivalent circuits and steady state performance prediction. Not open for credit to electrical engineering majors.

321 Electromagnetics and Materials I (4)
Prereq: 212, MATH 440. (winter, spring) Designed to develop in students an understanding of Maxwell’s equations through an overview of properties of materials, electrostatics, magnetostatics and electrostatics, and magnetostatics and electrodynamics.

322 Electromagnetics and Materials II (5)
Prereq: 321 (fall) Continuation of 321. Discussion of time-varying, electromagnetic fields. Application of field theory to solution of problems from various branches of electrical and electronic engineering with emphasis upon physical interpretation. Included are relation of field theory to circuit theory, Poynting’s theorem, and power flow, complex fields and power, TEM waves, uniform plane wave, wave reflection and refraction. Theory and applications of transmission lines.

333 Intermediate Electrical Engineering I (4)
Prereq: 211. (fall, winter) Develop an understanding of the relationship between signals and systems. Includes a continuation of the Laplace and Fourier analysis started in EE.
211 and modeling of high-order electrical and mechanical systems. Frequency response, Bode plots, and systems design using poles and zeros will be addressed, as well as state equations representation and analysis. Students will also develop an awareness of discrete time systems, difference equations, 2 transforms, sampling, and digital filters.

334 Intermediate Electrical Engineering II (4) Prereq: 212, 333. (winter, spring) Develop an understanding of electronic devices including diodes, bipolar transistors, and FETs. Students will also develop an awareness of semiconductor properties and operations, and use this knowledge to design analog circuits. Course includes computer-aided analysis and design.


351 Intermediate Computer Engineering I (4) Prereq: 212, 224 (fall, winter) Fundamental knowledge and skills for the study and practice of computer engineering. Utilize assembly language loops, tables and indices as well as microprocessor I/O with the PIC microprocessor. Discrete-time signals and systems including convolution, Z-transforms and frequency response.

352 Intermediate Computer Engineering II (4) Prereq: 351, 371. (winter, spring) Theoretical framework for information processing technology concentrating on hardware design and continuous-time signals and data by digital systems and computers. A continuation of EE 351.

371 Applied Probability and Statistics for Electrical Engineers (4) Prereq: 212, or MATH 263D with CS 361. (fall, spring). Fundamentals of statistics and probability and the ability to apply them to problems in electrical engineering.

395A Intermediate Electrical and Computer Engineering Design Experience (4) Prereq: 102 and CS 240A and junior standing. Enhances the laboratory skills of students and to reinforce an understanding of the fundamentals necessary for the execution of successful experimentation. Students will develop a greater awareness of specific topics in electronics, systems, energy conversion devices, power distribution, communications, and electromagnetics. 2lec, 4lab.

395B Intermediate Electrical and Computer Engineering Design Experience (4) Prereq: 395A. Continuation of EE 395A. 1lec, 6lab.

395C Intermediate Electrical and Computer Engineering Design Experience (4) Prereq: 395B. Continuation of EE 395B. 8lab.

401 Advanced Laboratory I (1) Prereq: perm. (fall, winter, spring) Advanced lab format follows that of intermediate lab. Student-proposed projects are designed research-oriented and directed by faculty member specializing in area of investigation. Portion of this lab required in conjunction with certain electrical engineering 400-level lecture courses.

402 Advanced Laboratory II (1) Prereq: perm. (fall, winter, spring) See 401 for description.

403 Library Research (1) Prereq: perm. (fall, winter, spring) Library research under the supervision of a faculty member. Prior approval required. See departmental office for regulations.


410 Semiconductor Principles I (3) Prereq: 405. (spring, on demand) Continuation of 405. Application of semiconductor theory to solid state devices: diodes, transistors, FETs and Gunn effect devices. Charge control analysis; Ebers-Moll equations; electro-optical effects.

414 VHDL Design (4) Prereq: perm. (fall) Application of very high speed hardware description languages (VHDL) for digital design, simulation, verification, and specification. Structural design concepts, design tools, VHDL language, operators, objects, statement control, concurrent statements, functions, and procedures. VHDL modeling techniques, algorithmic, RTL, and gate level designs. Design synthesis. 3lec, 2lab.

415 VLSI Design I (4) Prereq: 334. (winter) Introduction to very large scale integration (VLSI) technology and design of CMOS integrated circuits. VLSI fabrication process, design rules, design logic, design performance estimation, chip engineering, and computer aids to VLSI design. Students may register for 2 hours of senior lab (401, 402) credit for the VLSI lab work. 3lec, 2lab.

416 VLSI Design II (4) Prereq: 415. Systematic design cycle, clock generation and clocking disciplines, design validation, schematic capture, computer aided design, operator control statements, concurrent statements, functions, and procedures. VHDL modeling techniques, algorithmic, RTL, and gate level designs. Design synthesis. 3lec, 2lab.

425 Control Theory I (3) Prereq: 333. (winter) Formulation of models for lumped parameter systems, fundamental principles of closed loop control, signal flow graphs, stability, Routh-Hurwitz criteria, root loci construction, specifications, and design via root locus.

426 Control Theory II (3) Prereq: 425. (spring) Simulation, Bode plots, frequency response performance specifications and relationship to time domain specifications, Nyquist criterion, relative stability measures, closed loop frequency response, analytical design of lead, lag, lag-lead, and PID compensators.

427 Control Theory III (3) Prereq: 426. Sampling and data reconstruction, discrete-time systems, z-transform, sampled data systems, frequency response, analytical design of lead, lag, lag-lead, and PID compensators.

428 State Variable Methods in Control (3) Prereq: 425. (fall, on demand). Basic state variable concepts, writing state equations, time-domain solution of the state equation and the matrix exponential, relations to transfer functions, controllability and observability, stability, state variable methods of design including state feedback and state estimation.

429 Mechanics and Control of Robotic Manipulators (4) Prereq: or (spring) Classification and applications for mechanical manipulator systems. Manipulator motion description, forward kinematics transformations, and solution of inverse kinematics equations. Velocity kinematics and manipulator dynamics equations. Trajectory generation and control schemes including sensory feedback. Lab exercises to augment lecture material. Co-listed with ME 429.

431 Optoelectronics and Photonics I (3) Prereq: 321. (winter) Introduction to important modern optical devices and lasers and their applications. Emphasizes basic physical theory needed to understand lasers, their construction, and their applications. Detailed discussion of various types of lasers and their characterization.


440 Microwave Theory and Devices (3) Prereq: 432. (offered every other year) Wave propagation, transmission lines, Smith chart, impedance matching, waveguides, and survey of devices (microwave generators, semiconductor devices, etc.)

441 Antennas (3) Prereq: 322. (winter) Fundamental concepts and definitions, radiation integrals and potential functions, linear wire antennas, loops, arrays, and personal computer applications.

443 Electromagnetics I (3) Prereq: 322. (offered every other year.) Mathematical review of vector operations in Cartesian and curvilinear coordinates. Solution of wave equation in Cartesian coordinates and application to wave reflection from interfaces between general media. Decomposition of wave solutions into TE, TM, and TEM waves, with application to waveguides and transmission lines; solution of wave equation in cylindrical coordinates, with application to circular waveguide, radiation from line sources, and scattering from cylindrical objects.

454 Power Electronics (3) Prereq: 334. (winter) Introduces senior to power electronics. Covers most uses of semiconductor devices for the conversion and control of electric power: AC to DC, AC to AC, DC to DC, DC to AC conversions, and DC and AC motor and semiconductor device characteristics (particularly those characteristics not stressed in 340 and 341) and device protection conclude the offering.

455 Introduction to Electric Power System Engineering and Analysis I (3) Prereq: 335. Includes power system representation, computer methods, symmetry components, protection methods, and stability.

456 Introduction to Electric Power System Engineering and Analysis II (3) Prereq: 455. Continuation of 455. See 455 for description.

Courses / Engineering

461 Digital Systems I (3) Prereq: 352. (winter) Postulates and fundamental theorems of Boolean algebra; algebraic and map methods for design of combinational logic and sequential circuits; clocking and reset considerations; introduction to system design using shift registers, counters, etc.

462 Digital Systems II (3) Prereq: 461. (spring) Basic concepts from theory of finite state machines, analysis and synthesis of sequential circuits, study of state assignment, synchronous and asynchronous machines, and typical design examples; application to sampled data systems.

463 Digital Systems III (3) Prereq: 462. (spring) Synthesis of sequential circuits using ROMs and RAMs for control logic. Introduction to computer organization and design, including selection of instruction set, register and bus organization and implementation of control logic with microprogrammed control.

467 Advanced Microprocessors (3) Prereq: 367. (winter) Organization of 16- and 32-bit microprocessors. Particular attention given to a specific microprocessor family (such as the Motorola 68000X series) regarding instruction set, assembly language programming, arithmetic operations, I/O, etc.

468 Microcomputers II (3) Prereq: 467. (fall or spring) Design, implementation, and application of microcontroller or microprocessor based systems. Microcontroller and digital computer instruction set architectures (e.g., PIC Micro), functional subset of certain systems. Other topics may include but are not limited to hardware interface to external components, serial and parallel input/output (I/O), networks of microcontrollers and embedded microprocessors (e.g., CAN, I2C, TTP, SPI, Ethernet), motor and actuator control. Computer projects emphasize the design and implementation of microcontroller-based systems.

470 Communication Engineering (3) Prereq: 333. (fall) Unified approach to communications stressing principles common to all transmission systems. Review of Fourier series, Fourier integral and complex frequency techniques with emphasis on communication networks, time response and convolution, measurement of information, amplitude modulation (double and single side-band techniques), frequency modulation, sampling theory, pulse modulation and digital communications systems, fundamentals of random signal theory and its application to communication systems, noise and system noise effect on conventional modulation systems; noise figure, noise suppression techniques, and other related topics.

471 Stochastic Processes in Electrical Engineering (3) Prereq: 371. (winter) Brief review of probability concepts, including densities, moments, etc. Random process fundamentals (ensembles and realizations), stationarity concepts, 2nd-order statistics, Gaussian processes, random signal through linear systems, Markov chains.

472 Introduction to Digital Communications (3) Prereq: 470, 471. (spring) Summary review of deterministic and stochastic signal and system characterizations, sampling quantization, basic pulse signaling and the matched filter. Introduction to signal spaces and distance concepts. Bandpass modulations and their performance in AWGN. Link budget analysis, synchronization overview.

478 Introduction to Digital Signal Processing (3) Prereq: 333, 371. (on demand) Discrete time signals and systems review. Continuous-time Fourier transform, z-transform, canonical filter representations, windowing, and FFT.

481 Professional Experience in Electrical Engineering (1) Prereq: 361; perm. Supervised work-study program in an electrical engineering profession.

Engineering, Industrial and Systems (ISE)

304 Applied Engineering Statistics (3) Prereq: MATH 163B or MATH 263B. (fall, winter) Introduction to efficient methods for data collection and analysis. Application of basic statistical tests, techniques, and experimental design concepts to engineering and science data problems. Not for IDE undergrad majors. 3 lec.

305 Engineering Statistics I (4) Prereq: MATH 263C. (spring, winter) Introduction to probability, concept of random variables, discrete and continuous probability distributions, and expectation.

306 Engineering Statistics II (4) Prereq: 305. Math 211 or concurrent. (fall, spring) Functions of random variables, sampling distributions, estimation theory, hypothesis testing, and statistical prediction.

330 Engineering Economy (3) (fall, winter, spring) Provides knowledge of the economic consequences of engineering decision processes, and methods for evaluation of engineering design alternatives in terms of costs and benefits. Topics include time equivalence of money, annual cost method, present worth method, rate of return, sensitivity analysis, benefit/cost, break-even analysis, income taxes, equipment replacement and risk.

333 Work Design (5) Prereq: 304 or 305; IT 110. (spring, summer) Design of work systems and measurement of work. Topics include job methods, operation analysis, charting techniques and schematic models, stop-watch time study, work sampling, predetermined time systems, standard data, incentive wage systems, and learning curves. 4 lec, 2 lab. 381 Internship in Industrial and Systems Engineering (1–3) Prereq: jr. Supervised work-study program, in industrial and systems engineering profession, in established industrial or government environment. Credit dependent upon advance registration and mutual agreement between faculty supervisor and participating company. Course may be repeated; however, hours applied for graduation limited by dept.

402 Manufacturing Systems (4) Prereq: or in ENT. (winter) Applications of industrial and systems engineering techniques, principles, practices, and methodologies as they relate to the operation, analysis, management, planning, and design of manufacturing systems.

403 Material Handling Systems Engineering (4) Prereq: 333. (winter) Provides a broad understanding of materials handling engineering from a system design and application engineering point of view. Instruction in the engineering principles, design criteria, operating parameters, performance requirements, evaluation of resources, and applications of engineering practices involved in the planning, design, and operation of materials handling systems for manufacturing, physical distribution, and government operations. A materials handling system design project is a required part of the course.

407 Introduction to Designed Experiments (3) Prereq: 304 or 306 or equiv. (spring) Design and analysis of engineering experiments approached from linear statistical model point of view. Blocking designs, full and fractional factorial designs, analysis of variance, and introduction to response surface methodology. 3 lec.

415 Introduction to Systems Engineering (3) Prereq: 305. MATH 346, ET 240. Introduction to systems engineering concepts. Continuous time and discrete time methods for modeling of systems. Systems structure, open-loop and closed-loop systems, positive and negative feedback. State and transition equations. Applications to modeling in manufacturing, production and inventory systems, service industries, physical and biological systems.


427 Manufacturing Data Systems (3) Prereq: ET 181. (winter) Overview of manufacturing software tools, techniques, and applications. Data base architecture, internal
442 Storage and Retrieval (3) Prereq: 330 or 333. (spring) Environments and techniques for storage and retrieval of information. Topics include database management systems, search strategies, and information retrieval systems. 3 lec.

443 Project Management (3) Prereq: 306 or 409. (winter) Application of project management techniques to the design of complex systems. Topics include scheduling, cost estimation, risk analysis, and project control. 3 lec.

444 Engineering Design (3) Prereq: 330 or 333; junior or senior standing. (fall) Design of mechanical systems. Topics include design fundamentals, optimization, and the use of computer-aided design software. 3 lec.

445A Systems Design I (3) Prereq: 330, 333, 337, 342, ENG 305J. (winter) Design and analysis of mechanical systems. Topics include system design principles, optimization, and the use of computer-aided design software. 3 lec.

445B Systems Design II (3) Prereq: 445A. Individual or small-group project design project continued from 445A. 3 lec.

448 Human-Machine Systems (3) Prereq: 409 or 444. (fall) Design principles for information displays, equipment controls, workplace environments, and life support systems. 3 lec.

489 Special Problems 1 (1–6) Prereq: perm. Individual study of special problems involving use of digital computers. 1–6 cr.

490 Advanced Problems in Computer Applications 1 (1–6) Prereq: perm. Individual study of special problems involving use of digital computers. 1–6 cr.

Engineering, Mechanical (ME)

100 Introduction to Mechanical Engineering (4) Prereq: 330, 333, 337, 342. (fall) Fundamentals of mechanical engineering. Topics include statics, dynamics, and mechanics of materials. 4 lec.

224 Dynamics (4) Prereq: PHYS 251, C or better in CE 220. (fall, winter, spring) Motion of particles and rigid bodies, work and energy, impulse and momentum. 4 lec.

301 Kinematics and Dynamics of Machines (4) Prereq: 224. (fall, winter) Kinematics and dynamics of mechanisms. Topics include kinematics, mechanics of metal forming, and metal cutting. 4 lec.

313 Metal Processing (3) Prereq: 224. (fall, winter) Structure of metals, mechanics of metal forming, and metal cutting. 3 lec.

321 Introduction to Thermodynamics (4) Prereq: PHYS 252, MATH 263C. (fall, winter, spring) Basic concepts of thermodynamics. 4 lec.

328 Applied Thermodynamics (4) Prereq: 321. Nonreactive and reactive mixtures, thermodynamics, analytical studies of gas and vapor power cycles, and refrigeration. 4 lec.

350 Introduction to CAD (3) Prereq: 321. (fall) Introduction to computer-aided design and drafting. 3 lec.

398 Junior Laboratory (3) Prereq: EE 304. (fall, winter) Introduction to measurement of various phenomena frequently encountered in mechanical engineering, e.g., strain, temperature, pressure, flow rate, displacement, and acceleration. Emphasis given to interpretation of data and preparation of laboratory reports. 3 lec.

400 Heating, Ventilation, and Air Conditioning (3) Prereq: 321, 330, 331. (fall) Basic concepts of building thermal and air conditioning. 3 lec.


407 Fundamentals of Nuclear Engineering (4) Prereq: 321. (on demand) Nuclear engineering, including reactor physics, radiation detection and measurement, reactor control, radiation shielding, design of radiation materials, and materials processing. 4 lec.

408 Nonlinear Vibrations (3) Prereq: 407. Qualitative and numerical study of nonlinear vibrations and chaos in mechanical systems. Applications of nonlinear engineering problems, solutions techniques, and stability analysis.

409 Advanced Engineering Dynamics (4) Prereq: 408. Nonlinear and chaotic behavior of mechanical systems. 4 lec.

412 Heat Transfer (4) Prereq: MATH 340, 341, C or better in 321 and CE 340. (spring) Basic concepts of conduction in 1 or more dimensions, steady and transient modes. Radiation, fundamentals of conduction in various modes, heat exchanger design. 4 lec.


416 Combustion (3) Prereq: 328 or 412. (on demand) Introduction to fundamentals of combustion, variables to students to analyze complex combustion processes in constructive manner. Modern diagnostic techniques of combustion, and evaluation of pollution potential of different combustion processes.
417 Design of Thermal Systems (4)
Prereq: 328, 412. (on demand) Design of systems in which thermodynamics, transport behavior, and optimization techniques are major considerations. Emphasis on total design approach including factors such as cost and reliability. Typical systems include power, propulsion, environmental, and cryogenic engineering. Design project and report required.

418 Mechanical Engineering Experimentation (1)
Prereq: ME sr or grad. (on demand) Instruction in experimental procedure and experience in designing and executing lab experiments. Students plan and execute their own experiments to acquire answers to assigned problems. Variety of areas covered including control systems, energy conversion, fluid flow, heat transfer, motion measurements, stress-strain. Instructional guidance provided by the mechanical engineering staff. Provides familiarity with variety of instrumentation and procedures. Three-quarter sequence with experimental subjects phased with prerequisites.

419 Mechanical Engineering Experimentation (1)
Prereq: ME sr or grad. (on demand) Continuation of 418. See 418 for description.

420 Mechanical Engineering Experimentation (1)
Prereq: ME sr or grad. Continuation of 419. See 418 for description.

421 Stirling Cycle Machine Analysis (3)
Prereq: ET 240, 328, CE 340, with 412. (on demand) Analysis and simulation of Stirling cycle machines, in which the single phase working gas operates in a closed thermal power cycle. Development and use of computer simulation techniques to model the nonsteady flow conditions including thermodynamics, heat transfer, and fluid flow friction effects.

422 Gas Dynamics I (3)

425 Propulsion Systems Analysis (4)
Prereq: 424. (on demand) Applications of basic engineering disciplines to design and analysis of vehicle propulsion systems. Extensive use of digital computers. Term report required.

427 Power Station Engineering (3)
Prereq: 328 and 412. (on demand) Fuels, principles of combustion, stationary boilers, grates, stokers, furnaces, coal pulverizers, economizers, preheaters, superheaters, stacks, forced and induced draft, boiler-feed pumps, heat balances, and hydro power. 3 lec.

429 Mechanics and Control of Robotic Manipulators (4)
Prereq: sr. (on demand) Classification and applications for mechanical manipulator systems. Manipulator motion description, forward kinematics transformations, and solution of inverse kinematics equations. Velocity kinematics and manipulator dynamics equations. Trajectory generation and control schemes including sensory feedback. Laboratory exercises to augment lecture material. Co-listed with EE 429.

431 Atmospheric Pollution Control (4)
Prereq: CHE 307, or ME 321 and CE 340, or perm. (on demand) Sources of air pollution from major industries, internal combustion engines, and other sources. Techniques for measuring particulate and gaseous pollutants in atmosphere and at their source. Current techniques and future possibilities for control of air pollution. Bases for air pollution legislation.

434 Fundamentals of Aerosol Behavior (4)
Prereq: 328 or 412. (on demand) Characterization transport properties, convective and inertial deposition, light scattering and visibility, experimental methods, coagulation, gas to particle conversion, general dynamic equation for aerosols.

435 Energy Engineering and Management (3)
Prereq: 328, 403. (fall) This course is the first of a three course sequence that will provide a comprehensive, capstone, senior design experience for mechanical engineering majors. Course includes studies in the analytical techniques of design, as well as the design, construction, and evaluation of performance of an actual engineering system. ME 470, 471, and 472 must be taken consecutively. 2 lec, 2 lab.

471 Mechanical Engineering Design II (4)
Prereq: 470 (winter) This course is a continuation of ME 470 and must be taken in the quarter following the successful completion of ME 470. 2 lec, 2 lab.

472 Mechanical Engineering Design III (4)
Prereq: 471 (spring) This course is a continuation of ME 471 and must be taken in the quarter following the successful completion of ME 471. 2 lec, 2 lab.

475 Solar Design (3)
Prereq: (on demand) General principles of solar energy systems. Topics covered include principles of radiation; heating load computation; air and liquid, flat-plate collectors; concentrating collectors; energy storage; photovoltaic conversion; economic analysis.

480 Colloquium (1)
Prereq: sr. (on demand) Open presentation of individual engineering analysis or design effort. Requires demonstration of individual analytical or design ability, knowledge of engineering fundamentals (including passing a mini–fundamentals of engineering test), and satisfactory oral presentation techniques.

484 Projects in Thermal Machinery (3)
Prereq: 476 (on demand) Research in thermal machines. Individual work on experimental or analytical project involving current problems. Training in use of library, theory and use of instruments, error analysis, planning of experiments, effective report writing. Students should take two-term sequence to allow adequate time for completion of meaningful project. Report required.

485 Projects in Thermal Machinery (3)
Continuation of 484. See 484 for description.

486 Projects in Thermal Machinery (3)
Continuation of 484–485. See 484 for description.

489 Special Investigations (1-6)
Prereq: perm.

491 Mechanical Vibrations I (4)
Prereq: C or better in 224, MATH 340, ET 240. (fall) Characteristic phenomena of mechanical vibrations encountered in machines and structures (of 1 degree of freedom) and their quantitative investigation. Simple harmonic motion; free, transient, and forced vibrations; and damped effects.

492 Mechanical Vibrations II (4)
Prereq: C or better in 491. (spring) Application of matrix methods; 2 degrees of freedom systems; lumped mass systems with several degrees of freedom, and methods for normal mode determination. 4 lec.

493 Lubrication and Bearing Analysis (3)

494 Advanced Machine Design (3)
(on demand) Advanced considerations in design analysis of machine members, strength under combined stress, thermal stress, fatigue in metals, and design using plastics. 3 lec.

495 Introduction to Kinetic Theory and Statistical Thermodynamics (4)
Prereq: Kinetic theory. Continuation of quantum statistical mechanics with applications to engineering devices. 3 lec.
276 Methods of Engineering Analysis I (4)
Prereq: MATH 340. (on demand) Applications of matrices, Fourier series, partial differential equations, and Bessel functions.

278 Senior Laboratory (3)
Prereq: 398, 412, 403 or concurrent. (fall, spring) Mechanical engineering experiments. Measurement of the behavior of more complex systems encountered in mechanical engineering. Equal emphasis given to mechanical systems and thermal and fluid systems. Engines, vibrating systems, wind-tunnel experiments, refrigeration systems, fatigue, multidimensional stresses, and combustion are typical subjects for investigation.

279 Senior Design Project I (4)
Prereq: 404 or 417, and 416 (fall, spring) Capstone design project in mechanical engineering. Self-directed or group project which requires typical design activities such as decision making, feasibility evaluation, technical analysis, performance summary, technical report preparation, and oral technical presentation. Projects may be individually arranged with a faculty member in mechanical engineering or a group project (current examples are the Mini Baja Vehicle Contest or the Walking Robot Contest). Subject matter can be mechanisms, thermal/fluid systems, control systems, etc. Oral final presentation to senior class and panel of faculty required.

Engineering and Technology (ET)

181 Computer Methods in Engineering I (4)
Prereq: MATH 263A or 163A, preference given to ET or pre-engineering majors. Introduction to application of digital computer for solution of engineering problems, with emphasis on methodology and organization. Program formulation and solution in terms of an object oriented programming approach using the C++ language in an interactive network environment.

190 Cooperative Education Field Experience I (1)
Prereq: perm. Required of, and limited to, students on approved co-op work assignments. Prior approval before a student registers. Credit earned is not applicable toward specific degree requirements, but will accumulate in the student's academic credit total. In addition to continual monitoring of student's progress by the cooperative education coordinator and the faculty advisor, participating students are required to submit a final report of their activities.

240 Computer Methods in Engineering II (4)
Prereq: ET 181, CS 210, CS 230, or CS 240A, and MATH 340. Introduction to application of digital computer techniques to engineering problems including applied numerical methods. Study and use of the MATLAB programming language as an analytical tool.

280 Engineering and Technology—Overview (4) (2A)
Intended for students of all majors; non-Engineering Technology students are encouraged. Provides an overview of engineering and technology, to place the profession in a historical context, to examine the views of supporters and detractors, to examine moral and ethical issues associated with the profession in society, and to develop an appreciation for the manner in which engineering and technological work is conducted. Emphasizes a "problem-solving" approach to questions of all kinds, but more specifically to technological ones.

290 Cooperative Education Field Experience II (1)
Prereq: perm. See 190.

320 History of Western Technology (3) (2A)
Survey of significant technological innovations of Western civilization from Greco-Roman period into 20th century. Interrelationships, in history, between technology and society. Background in technology or science not required.

322 Introduction to Materials Behavior (3)
Introductory materials science course covering behavior of metals, polymers, and ceramics for non-technical majors.

325 Pollution Solutions I (3)
Understanding current air pollution problems, their causes, effects, and possible solutions and impact of those solutions on society.

326 Pollution Solutions II (3)
Same course description as 325, introducing different aspects and topics. Not a continuation of 325.

331 Fluid Dynamics for Nonengineers (3)
Prereq: Jr. Not open to engineering students. Physical, not mathematical, introduction to principles controlling fluid motion in our environment. Study of weather, flood circulation, aerodynamics, river hydraulics, and rocketry through design of golf balls and plumbing systems included. Introduction to mechanics, fluid properties, fluids at rest and in motion. Lectures and reading assignments supplemented with films.

334 Water Pollution Control (3)
Prereq: soph, nonengineering students. Designed for student with limited technical background but who is interested in problems of water pollution. Deals with nature of water, source and character of pollutants, technology of wastewater renovation, ecology of water pollution, and legal, economic, and administrative constraints.

337 Transportation Today (3)
Prereq: Jr or perm, not open to civil engineering majors. Designed for student with limited technical background who is interested in gaining knowledge about in area of highways and transportation planning and design. Major topics include geometric factors, traffic studies, modes of transportation, human equation, and planning strategies.

350 Engineering and the Technological Society (3) (2A)
Prereq: Jr or Sr. Technical inventions and social inventions, impact and social consequences of engineering public policy issues, ethical considerations, and some exploration of alternative futures. Discussion and lecture format used.

390 Cooperative Education Field Experience III (1)
Prereq: perm. See 190.

400 Professional Engineering Fundamentals Review (2)
Prereq: Sr. Review of basic engineering principles. Provides a compact review of basic engineering principles and illustrated by practical solutions.

445 Advanced Numerical Methods (4)
Prereq: ME 497 or equiv., (winter) Numerical methods for solution of ordinary and partial differential equations, stability considerations and error estimates, application to variety of engineering problems and numerical method of lines and integration procedures for stiff ODE systems.

470 Energy and the Environment (3) (2A) (on demand) Technical, economic, political, and environmental factors in energy production. Conventional, gasification, fission, fusion, solar, wind, and possible future conversion techniques. Course designed to provide understanding needed for intelligent participation in societal decisions related to energy issues. (Equip to MATH 445.)

490 Cooperative Education Field Experience IV (1)
Prereq: perm. See 190.

495 Leadership Seminar (4)
Prereq: ET major, perm. Through selected readings, class presentations, discussions, and case studies, students will seek an understanding of leadership and its importance and effectiveness in achieving goals with followers. Successful leaders in engineering and other fields will visit the class and share their knowledge of leadership. Several written reports and oral presentations on leadership case studies will be required during the term.

English (ENG)

150 Developmental Writing Skills (4)
Prereq: placement or recommendation. Credit for 150 may not be given if the student has already passed any other English course. Develops skills through attention to coherence, mechanics, syntax, and writing conventions. Does not satisfy Tier I or Arts and Sciences humanities requirement. (Nonnative speakers take 150A.)

151 Writing and Rhetoric I (5) (1E)
Prereq: fr or soph only; 150, or 151 placement into required course within earlier quarter or 152,3. Practice in composing and revising expository essays which are well organized, logically coherent, and effective for their purpose and audience. Topics from personal experience or fiction reading. (Nonnative speakers take 151A.)

152 Writing and Reading (5) (1E)
Prereq: fr and soph only. Same as 151, except that topics are developed from reading and discussion of fiction, poetry, and drama.

153 Writing and Reading: Special Topics (5) (1E)
Prereq: fr and soph only. Similar in structure, genres, and purposes to 152, but each section uses readings and/or clips focused on a specific theme chosen by the instructor. Recent themes include the environment, the Viet-Nam war, the social outsider, The Brothers Karamazov, and popular culture.

153A Writing and Reading: Gender (5) (1E)
Prereq: fr and soph only. Same as 152 except that topics are developed from readings depicting women and men in literature. Students examine and write about how, in both literature and life, women and men see themselves and each other, how people learn what society expects of them, and about such topics as sexuality, marriage, friendship, and rebellion against culturally imposed sexual roles.

153B Writing and Reading: African American Experiences (5) (1E)
Prereq: fr and soph only. Same as 152, except that topics are developed from readings examining various experiential by African-American who has already passed any other English course. Develops skills through attention to coherence, mechanics, syntax, and writing conventions. Does not satisfy Tier I or Arts and Sciences humanities requirement. (Nonnative speakers take 151A.)

200 Introduction to Literature (4) (2H)
Prereq: 151 or 152 or 153 or 153/AB. Approaches to reading and interpreting fiction, poetry, and drama using skills, techniques, and language of interpretation. Intended for nonmajors.

201 Critical Approaches to Fiction (4)
Close textual analysis of fiction, development of vocabulary, and introduction to the variety of current methods of responding to literature. Intended for majors.

202 Critical Approaches to Poetry (4)
Close textual analysis of poetry, development of vocabulary, and introduction to the variety of current methods of responding to literature. Intended for majors.
203 Critical Approaches to Drama (4)
Close textual analysis of drama, development of critical vocabulary, and introduction to the variety of current methods of responding to literature. Intended for majors.

203A Interpretation of Drama (Film) (4)
Prereq: 151 or 152 or 153 or 153A/B. Critical study of film and literature, e.g., film adaptations of literary classics, films made by literary authors, etc. May not be taken to fulfill major requirement of two courses from 201, 202, 203.

204 Introduction to International Literature I: The Classical Tradition (4) (2H)
Prereq: one course above 199. Texts which exemplify the classical sensibility in Western literature.

205 Introduction to International Literature II: Romantic Tradition (4) (2H)
Prereq: one course above 199. Texts which exemplify the Romantic tradition in Western literature.

261 Critical Approaches to Popular Literature (4)
Prereq: one course above 150. Introduction to techniques and criticism in works where serious and popular literature meet, e.g., mysteries, science fiction, westerns.

250 Principles of Textual Analysis (4)
Offers undergraduates considering the English major a thorough grounding in textual analysis and critical terminology. Emphasis on generalizable reading strategies rather than investigation of a particular topic.

270 Special Studies: Individual or Comparative Authors (2–3)
Prereq: one course above 150. Intensive study of individual or comparative authors: (A) Medieval, (B) Renaissance, (C) Restoration and 18th-century, (D) 19th-century American, (E) 19th-century British, (F) 20th-century American, (G) 20th-century British, (H) Continental.

271 Special Studies: Selected Themes or Topics in Literature (2–3)
Prereq: one course above 150. Intensive study of selected theme or topic: (A) poetry, (B) fiction, (C) drama, (D) comparative genres, (E) language, (F) stylistics and rhetoric, (G) literature and film, (H) gay and lesbian, (I) man and books.

277 English Tutorial (1–10)
Prereq: approval from Department of English tutorial director; arts and sciences major. Fall quarter, first year.

278 English Tutorial (1–11)
Prereq: approval from Department of English tutorial director; arts and sciences major. Winter quarter, first year.

280 Expository Writing and the Research Paper (4)
Prereq: one course above 150. Practice in library research, techniques of documentation, and writing research papers.

297T English Tutorial (1–15)
Prereq: HTC student. Fall quarter, first-year course in two-year tutorial sequence.

298T English Tutorial (1–15)
Prereq: HTC student. Winter quarter, first-year course in two-year tutorial sequence.

299T English Tutorial (1–15)
Prereq: HTC student. Summer quarter, first-year course in two-year tutorial sequence.

301 Shakespeare: The Histories (4)
Prereq: two courses from 201, 202, 203 or jr or sr.

302 Shakespeare: The Comedies (4)
Prereq: two courses from 201, 202, 203 or jr or sr.

303 Shakespeare: The Tragedies (4)
Prereq: two courses from 201, 202, 203 or jr or sr.

304 English Bible (4)
Prereq: one course above 150. Selected prose and poetry of the Hebrew and Christian scriptures.

305J Technical Writing (4) (1J)
Prereq: jr and completion of first-year composition. Preparing clear, functional reports; presenting data for experts and other specialized audiences. Documents include, but are not limited to, proposals; information reports (progress, trouble, technical completion); and descriptions of mechanisms and technical processes.

306J Women and Writing (4) (1J)
Prereq: jr and completion of first-year composition. Practice in developing essays on women and their interests, on women and writing, and on gender issues.

307J Writing and Research in English Studies (4) (1J)
Prereq: jr or sr. Two courses from 201, 202, 203. Scholarly writing in English studies: research reports, integration of primary and secondary texts, library resources, and MLA/Chicago documentation. Prerequisite for ENG 339, which is required of all English majors.

308J Writing and Rhetoric II (4) (1J)
Prereq: jr or sr and completion of first-year composition. Focuses on skills in writing expository prose, with regular practice and evaluation supplemented by attention to published prose and concepts of rhetoric and style.

Note: Majors must complete 307J before taking more than two of the following eight survey courses:

311 English Literature to 1500 (4)
Prereq: two courses from 201, 202, 203. Authors, works, and genres of Old and Middle English literature.

312 English Literature: 1500–1660 (4)
Prereq: two courses from 201, 202, 203. Authors, works, and genres of Renaissance English literature.

313 English Literature: 1660–1800 (4)
Prereq: two courses from 201, 202, 203. Authors, works, and genres of Restoration and 18th-century English literature.

314 English Literature: 1800–1900 (4)
Prereq: two courses from 201, 202, 203. Authors, works, and genres of Romantic and Victorian English literature.

315 English Literature: 1900 to Present (4)
Prereq: two courses from 201, 202, 203. Authors, works, and genres of British literature from 1900 to the present.

321 American Literature to 1865 (4)
Prereq: two courses from 201, 202, 203. Authors, works, and genres of American literature from the colonial period through the Civil War.

322 American Literature: 1865–1918 (4)
Prereq: two courses from 201, 202, 203. Authors, works, and genres of American literature from the end of the Civil War to the end of World War I.

323 American Literature: 1918 to Present (4)
Prereq: two courses from 201, 202, 203. Authors, works, and genres of American literature from the end of World War I to the present.

325 Women and Literature (4)
Prereq: one course above 199 and jr or sr. Surveys work of significant women writers.

326 Lesbian and Gay Literature (4)
Prereq: one course above English 150. Surveys lesbian, gay, bisexual, and transgendered (LGBT) literature with an emphasis on how LGBT identities and experiences have been represented in post-1900 literary discourse.

327 African American Fiction (4)
Prereq: one course above 150. A selection of major fiction by African American authors.

328 African American Poetry (4)
Prereq: one course above 150. A selection of major poetry by African American authors.

329 African American Drama (4)
Prereq: one course above 150. A chronological survey of major drama by African American authors.

331 Studies in Asian Literature (4) (2C)
(fall) Introduction to cultural background of Asian literature.

332 Studies in Asian Literature (4) (2C)
(winter) Continuation of 331. Study of classical Asian literature.

333 Studies in Asian Literature (4) (2C)
(spring) Continuation of 332. Study of modern Asian literature.

335 The Ohio University Writers (4)
Faculty writers at OU visit classrooms to read and discuss their works.

336 McGuffey Lectureship in Literature (1–4)
Prereq: one course above 150. Special series of lectures by current McGuffey Visiting Professor of English. Lectures offered determine credit hrs assigned.

342 English and Continental Literature (4)
Prereq: one course above 150. Authors, themes, and genres in English and European literature.

349 History of Books and Printing (4)
Prereq: one course above 150. Introduction to history of the book and its place in development of Western culture from ancient world to present. Approach is primarily historical, cultural, and aesthetic.

350 Traditional Grammar, Mechanics, and Usage (4)
Prereq: one course above 150. Grammatical understanding and awareness of relationships in sentence structure, usage, and punctuation.

351 The History of the English Language (4)
Prereq: jr or sr. Course examines changes affecting English; sound patterns, grammatical forms, vocabulary, and semantic values.

352 The Development of American English (4)
Prereq: jr or sr. Regional and social varieties of American English.

353 The Structure of American English (4)
Prereq: jr or sr. Study of English grammar using a linguistic model chosen from contemporary linguistic theories.

356 Young Adult Literature (4)
Prereq: two courses from 201, 202, 203. Historical development, and philosophical and aesthetic bases of literature for young adults.

361 Creative Writing: Fiction (4)
Prereq: 200 or 201. Beginning course in writing short fiction with emphasis on invention, craft, and critical evaluation of student writing and published fiction.

362 Creative Writing: Poetry (4)
Prereq: 200 or 202. Beginning course in writing poetry with emphasis on invention, craft, and critical evaluation of student writing and published poetry.

363 Creative Writing: Nonfiction (4)
Prereq: 200 or 201. Beginning course in writing nonfiction with emphasis on invention, craft,
and criticism of student writing and published
nonfiction.

377T  English Tutorial (1–10)
Prereq: approval from Department of
English tutorial director; arts and sciences major. Spring
quarter, first year.

378T  English Tutorial (1–10)
Prereq: approval from Department of
English tutorial director; arts and sciences major. Fall
quarter, second year.

393  Creative Writing Workshop:
Short Story (4)
Prereq: 361. Instruction and practice in fiction
writing, concentrating on narrative, character,
and setting.

394  Creative Writing Workshop: Poetry
(4)
Prereq: 362. Instruction and practice in poetry
writing.

395  Creative Writing Workshop:
Nonfiction (4)
Prereq: 363. Instruction and practice in writing
nonfiction, with attention to fictionalized
biography and literary essays.

397T  English Tutorial (1–15)
Prereq: HTC student. Fall quarter. Second-year
course in two-year tutorial sequence.

398T  English Tutorial (1–15)
Prereq: HTC student. Winter quarter. Second-year
course in two-year tutorial sequence.

399  Literary Theory (4)
Prereq: Two courses from 201, 202, 203; two
courses from 310–323. Required of majors
before 460, 464, 465, and 466. Recent issues in
literary theory and the study of literary texts.

399T  English Tutorial (1–15)
Prereq: HTC student. Spring quarter. Second-year
course in two-year tutorial sequence.

400  American Literature (3)
Prereq: enrollment in Inst. Amer. Cult. Modern
and contemporary American literature as part of
the annual summer institute in American culture
for Austrian students and teachers.

441  Colloquium (4)
Prereq: sr. (Fall) Specific interdisciplinary problems
to be assigned each quarter.

442  Colloquium (4)
Prereq: sr. (Winter)

443  Colloquium (4)
Prereq: sr. (Spring)

445  Special Studies (4)
Prereq: sr.

447  Studies in Criticism (4)
Prereq: sr. Problems in critical theory.

451  Teaching Language and Composition
(3)
Prereq: sr, advanced standing in professional
education. Content and methods of presentation
for teaching language and composition in
high school. Not applicable to Arts and Sciences
200-level requirement.

451L  Field Experience in Secondary
English/Language and Composition (1)
Prereq: sr; concurrent with 451. Field experience
in the practical application of materials,
methods, and techniques of language instruction
as appropriate in various educational settings.
Students will observe classroom teachers and carry out various instructional tasks as the
cooperating teachers deem appropriate.

452  Teaching Literature (3)
Prereq: sr, advanced standing in professional
education. Content and methods of presentation
for teaching literature in high school. Not applicable to Arts and Sciences 200-level requirement.

452L  Field Experience in Secondary
English/Literature (1)
Prereq: sr; concurrent with 452. Field experience
in the practical application of materials,
methods, and techniques of literature instruction
as appropriate in various educational settings.
Students will observe classroom teachers and carry out various instructional tasks as the
cooperating teachers deem appropriate.

453  Studies in World Literature (4)
Prereq: 399. Examines contemporary world
literature with an emphasis on non-Western texts
(i.e., African, Indian, Latin American, Eastern
European, etc.) to let students explore a variety
of cultural values. Investigates cultural diversity
through close analysis of texts. Addresses
transcultural discussions on decolonization,
the postcolonial condition, eurocentrism,
displacement, and multiculturalism. Intended for
students in secondary education program.

455  English Education Workshop (1–5)
Prereq: teaching certificate or equiv, or perm.
Studies in principles, problems, approaches,
and issues in teaching English from elementary
school to post-secondary. Topics vary.

456  Readings in Children’s Literature (4)
Prereq: one course above 199. Development of children’s literature,
philosophical and aesthetic bases.

457  Readings in English Education (4)
Prereq: jr or sr. Recent developments in English
education and application to teaching of jr
and sr high school English.

460  Literary Topics (4)
Prereq: 399 and sr. Concentrated attention to
one literary topic, e.g., a genre, theme,
rhetoric, or literary theory. Topics are
announced quarterly in the departmental
course description booklet available in Ellis Hall.

464  Major English Authors (4)
Prereq: 399 and sr. Authors to be studied
are announced quarterly at preregistration in
the departmental course description booklet available in Ellis Hall.

465  Major American Authors (4)
Prereq: 399 and sr. Authors to be studied
are announced quarterly at preregistration in
the departmental course description booklet available in Ellis Hall.

466  Major International Authors (4)
Prereq: 399 and sr. Authors to be studied
are announced quarterly at preregistration in
the departmental course description booklet available in Ellis Hall.

477T  English Tutorial (1–10)
Prereq: approval from Department of English
tutorial director; arts and sciences major. Winter
quarter, second year.

478T  English Tutorial (1–10)
Prereq: approval from Department of English
tutorial director; arts and sciences major. Spring
quarter, second year.

481  Form and Theory of Literary Genres:
Fiction (4)
Prereq: 8 hrs creative writing. Theoretical
considerations of fiction.

482  Form and Theory of Literary Genres:
Poetry (4)
Prereq: 8 hrs creative writing. Theoretical
considerations of poetry.

483  Form and Theory of Literary Genres:
Nonfiction (4)
Prereq: 363, 395, and perm. Theoretical
considerations of nonfiction.

486 Advance Workshop in Fiction (4)
Prereq: 393 and perm in advance.

487 Advance Workshop in Poetry (4)
Prereq: 394 and perm in advance.

490  Independent Reading (1–15)
Prereq: perm. Directed individual reading
and research.

497T  English Tutorial (1–15)
Prereq: HTC student. (Fall) Thesis.

498T  English Tutorial (1–15)

499H  Honors Project (5–15)
Prereq: perm. Completion of individual writing project for A.B. with honors in English.

499T  English Tutorial (1–15)
Prereq: HTC student. (Spring) Thesis.

Humanities (HUM)

107  Humanities—Great Books (4) (2H)
Prereq: fr and soph only. (Fall) Ancient classics of Western civilization (Greek, Roman, Biblical)
leading toward understanding of cultural
heritage. Guidance in critical thinking, reading,
and writing about those works.

108  Humanities—Great Books (4) (2H)
Prereq: fr and soph only. (Winter) Medieval
and Renaissance classics of Western civilization.
See 107 for further description.

119  Humanities—Great Books of
the Orient (4) (2H)
Prereq: fr and soph only, Masterpieces (both ancient
and modern) of India, China, and Japan, leading
toward understanding of Oriental culture.

307  Humanities—Great Books (4)
Prereq: jr and sr only. (Fall) Ancient classics of Western civilization (Greek, Roman, Biblical)
leading toward understanding of cultural
heritage. Guidance in critical thinking, reading,
and writing about those works. (Credit not
allowed for both 107 and 307.)

308  Humanities—Great Books (4)
Prereq: jr and sr only. (Spring) Modern classics of Western civilization (18th–20th
centuries). See 107 for further description.

309  Humanities—Great Books (4)
Prereq: jr and sr only. (Spring) Modern classics of Western civilization (18th–20th
centuries). See 307 for further description. (Credit not
allowed for both 108 and 308.)

Environmental and Plant
Biology (PBIO)

100  The World of Plants (4) (2N)
(fall, winter) A. Trese. For nonscience majors.
Survey of variety of plants and how they affect
and are affected by humans. 4 lec.

100L  The World of Plants
with Laboratory (5) (2N)
(fall, winter) A. Trese. Same lecture as 100
with additional laboratory to provide practical
experience with plants and topics discussed in
lecture. 4 lec, 2 lab.

102  Plant Biology (5) (2N)
(fall, winter) For nonscience majors. Not offered
on the Athens campus. Structure of seed plants
as related to function. Survey of plants, with
emphasis on life histories, reproduction, and
relationships of selected plant groups. Credit
not allowed for both 102 and 111. 4 lec, 2 lab.

103  Plants and People (2A)
Interrelationships of plants and humans from
both historical and modern points of view,
origins of agriculture and civilization, tropical
and temperate seed plants, medicinal plants,
drug plants, destruction of environment, and its
ultimate effect on food plants. 3 lec, 1 disc.
110 Americans and their Forests: Ecology, Conservation and Policy (4) (2N)
(fall, spring) G. Matlack, K. Brown. The course provides an understanding of modern forests encompassing both recent and long-term effects arising from natural and human causes. The pattern and character of forest utilization will be interpreted in terms of varied cultural experiences in different regions and times. 4 lec.

114 Cellular Foundations of Plant Biology (5) (2N)
(fall) S. Wyatt. The course is an introduction to the concepts of plant physiology and cellular and molecular biology that are the foundation of all biological processes. Topics include structure, function, and development, growth, and reproductive biology of plants with emphasis on flowering plants. No credit if PBIO 102 or 111. 3 lec, 2 lab.

205 Plant Ecology (4) (2N)
(winter) J. McCarthy. Basic concepts, theory, and applied aspects of plant ecology. Focus on the interactions of plants with their environment (biotic and abiotic) over a range of spatial and temporal scales. No credit if PBIO 425. 4 lec.

210 Plant Physiology (4)
 prereq: PBIO 110 or 114 or BIOS 170; PBIO 111 or 115 (winter) J. Smith. The regulation of plant growth and development by internal and external factors, the acquisition of water and nutrients by plants, and the movement of water and solutes through plants. No credit if PBIO 424. 3 lec, 2 lab.

211 Diversity of Life (5)
 prereq: PBIO 110 or 114 or BIOS 170 or BIOL 101 (winter) P. Cantino. For plant biology and other science majors, preprofessional students and science liberal arts students. Introduction to structure, growth, development, and reproductive biology of plants with emphasis on flowering plants. No credit if PBIO 102 or 111. 3 lec, 2 lab.

220 Woody Plants (4)
(summer) Not intended for plant biology majors. Introduction to identification of common woody plants, and to the use of keys in plant identification. Credit not allowed if 248 completed. 2 lec, 4 lab.

225 Flowers (4)
(summer) Not intended for plant biology majors. Identification of local flowers and discussion of the role of flowers in their natural environments. Credit not allowed if 309 completed. 2 lec, 4 lab.

248 Trees and Shrubs (Dendrology) (4)
(fall) J. McCarthy. Identification, nutrition, growth, classification, ecological relationships, and importance to humans of native and introduced woody plants. 2 lec, 4 lab, supplementary field trips.

297T Plant Biology Tutorial (1–15)
Prereq: Tutorial college. (fall)

298T Plant Biology Tutorial (1–15)
Prereq: Tutorial college. (winter)

299T Plant Biology Tutorial (1–15)
Prereq: Tutorial college. (spring)

307 Morphology of Algae and Bryophytes (6)
 prereq: 111 or 211 (spring, even years) M. Vis-Chiozzi. Comparative studies of structure, evolutionary relationships, life histories, and reproduction of selected representatives of major groups of algae and bryophytes. 4 lec, 4 lab.

308 Morphology of Vascular Plants (6)
 prereq: 111 or (115 and 211). (fall) G. Rothwell. Diversity of vascular plants as reflected by structural, developmental, and reproductive features of major categories emphasizing evolution of diversity through systematically significant adaptations. 3 lec, 6 lab.

309 Plant Systematics and Ohio Flora (6)
 prereq: 111 or 211, (spring) P. Cantino. Principles and methods of systematics and taxonomy; classification, floral biology, and evolution of flowering plants. Lab: identification and classification of spring flora. 3 lec, 6 lab, field trips.

310 Biology of Fungi (5)
 prereq: 111 or 211. (fall) Morphology and life history studies of selected fungi of major groups; collection, isolation, identification, and study of fungal activities. 4 lec, 2 lab.

313 Special Topics in Plant Biology (1–6)
Current and/or special topics in plant biology. 3 lec.

313B Supervised Study (1–3)
Prepr: plant biology majors.

322 Tropical Plant Ecology (4)
 prereq: PBIO 209 or 425 or BIOS 375. (fall) G. Matlack. Tropical rainforest studies around the world, including basic plant ecology, conservation, and management. 4 lec.

331 Plant Genetics (5)
 prereq: 110 or 114 or BIOS 170. (spring) A. Trese. Basic principles and techniques as they relate to plants, including transmission, expression, and evolution of genetic materials. 5 lec.

335 Plant Developmental Physiology (4)
 prereq: 110 or 114 or BIOS 170. (spring) S. Wyatt. Growth and development in flowering plants. Topics include cell growth and differentiation in developing meristems, tissue and organ development; in culture, dormancy and germination, flower induction, seed formation, growth regulators, and senescence. 4 lec.

397T Plant Biology Tutorial (1–15)
Prepr: Tutorial college. (fall)

398T Plant Biology Tutorial (1–15)
Prepr: Tutorial college. (winter)

399T Plant Biology Tutorial (1–15)
Prepr: Tutorial college. (spring)

404 Undergraduate Research (2–6, max 12)
 prereq: 17 hrs plant biology and jr standing. Independent research under supervision of faculty member.

410 Plants and Soil (4)
 prereq: 111 or 211; 2 qtrs chemistry. Soil as environment for plant growth; interrelationships between plant and soil; role of soil organisms in cyclic processes; building and maintenance of soil fertility; relationships between soil and health of plants, animals, and humans. 3 lec, 2 lab.

412 Plant Pathology (5)
 prereq: 111 or 211 (fall, odd years). A. Trese. Diseases of plants; history, types of pathogens and disease cycles; cereal and turfgrasses; disease control strategies. Isolation and identification of pathogens. 3 lec, 4 lab.

415 Quantitative Methods in Plant Biology (5)
 prereq: PSY 221; 24 hrs of PBIO courses. (winter) B. McCarthy. Lecture: biostatistics and applications in the plant sciences; scientific method, hypothesis testing, and data analysis; regression and correlation, analysis of variance, and parametric and nonparametric statistics. Lab: microcomputer applications in spreadsheet analysis, statistics, and graphics. 4 lec, 2 lab.

418 Writing in the Plant Sciences (4)
 prereq: Jr, 15 hrs PBIO or BIOS (spring) S. Wyatt. Current research and public controversy dealing with topics in biology and plant science will provide students with opportunities to practice and master skills needed for successful written communication in the fields of plant science and biology. No credit toward major. 4 lec.

420 Physiological Plant Ecology (5)
 prereq: 111 or 211. (spring, odd years). M. Vis-Chiozzi. Taxonomy and ecology of marine and freshwater algae, with emphasis on identification and distribution of common or representative genera. 3 lec, 4 lab.

424 Plant Physiology (6)
 prereq: 111 or 102; organic chemistry recommended. (spring) Basic chemical and physical aspects of plant processes; photosynthesis, mineral nutrition, transport, nitrogen metabolism, water relations, and growth. 3 lec, 4 lab.

426 Physiological Plant Ecology (5)
 prereq: 209 or 425. (spring, odd years) K. Brown. A survey of the complexity of plant physiological and structural adaptations that relate to their ecological performance. Comparisons of plant characteristics from many biomes. Emphasis on marine, terrestrial, and aquatic systems. Labs feature hands-on learning of micrometeorological techniques, physiological protocols, synthesis and interpretation of data. 3 lec, 4 lab, 1 Saturday field trip.

427 Molecular Genetics (3)
 prereq: 331 or 431 or BIOS 325; organic chemistry. (spring) A. Showalter. Genetic fine structure and function at the molecular and cellular level; physical aspects of heredity in micro-organisms, plants, and animals; recombinant DNA and genetic engineering. 3 lec.

431 Cell Biology (5)
 prereq: 110 or 114 or BIOS 170. (fall, even years) Structure and function of cells, organelles, and cellular inclusions. 3 lec, 4 lab.

435 Plant Population Biology (5)
 prereq: PBIO 209 or 425 or BIOS 375 (winter) G. Matlack. Accumulation of basic demographic processes as experienced by plant populations; 2) explore the demographic implications of a range of plant growth forms and life histories; 3) present the material in the context of a variety of models. The course will develop general field methods of vegetation analysis and environmental assessment. 3 lec, 4 lab.

436 Plant Community Ecology (5)
 prereq: PBIO 209 or 425 or BIOS 375; PSY 221 (fall) B. McCarthy. Advanced concepts and theory of plant community ecology. Concepts will be placed in the interplay between theory and empirical studies. Classic literature will be reviewed and case studies developed from the modern literature to explore current ideas of theory, approach, and experimentation. Laboratories will emphasize modern field methods of vegetation analysis and environmental assessment. 3 lec, 4 lab.

437 Ecosystem Ecology (4)
 prereq: CHEM 122 or 152; PBIO 209 or BIOS 375 (spring, even years) K. Brown. Analysis of the composition, functioning, and biodiversity of ecosystems. Topics include: atmospheric, climate and regional controls on ecosystem function, comparisons of aquatic and terrestrial ecosystems, ecosystem production, nutrient cycling and trophic dynamics. Synthesis with evaluation of human impacts on ecosystems, locally and globally. 4 lec.

442 Experimental Anatomy of Plant Development (5)
 prereq: PBIO 210 or 424 (winter) S. Wyatt and G. Rothwell. Concepts of plant development have been integrated with the descriptive assessment of cell, tissue, and organ types that are the mainstay of plant anatomy to provide an exciting opportunity for all plant biologists. The course is grounded in experimentation and includes cutting edge methodologies. 3 lec, 4 lab.

450 Biotechnology and Genetic Engineering (4)
 prereq: 110 or 114 or BIOS 170. (fall) A. Showalter. For upper level undergraduate students. Introduction to basic molecular
biological concepts and techniques in biotechnology and genetic engineering, including discussion of current experiment-mentation and progress in these fields. 4 lec.

460 Paleobotany (6) Prereq: 111 or 211. General morphology and evolution of representative fossil plant groups. 3 lec, 6 lab.

475 Plant Speciation and Evolution (3) Prereq: jr or sr majors in PBIO, BIOS. (winter, even years) H. Ballard. Principles of speciation of plants and current topics in evolutionary biology. 3 lec.

480 Molecular Approaches in Plant Systematics, Ecology and Evolution (5) Prereq: 111 or 211 or BIOS 170 (winter, odd years) H. Ballard. Overview of comparative molecular approaches used to infer relationships in plants at levels of populations, species and lineages. 3 lec, 4 lab.

490 Internship (max 10) Prereq: permission. Provides students with credit for work experience in various applied fields of botany and environmental biology. Overseen by a faculty member and evaluated by the on-the-job supervisor. Report culminates experience.

497T Plant Biology Tutorial (1–15) Prereq: Tutorial college. (fall)

498T Plant Biology Tutorial (1–15) Prereq: Tutorial college. (winter)

499T Plant Biology Tutorial (1–15) Prereq: Tutorial college. (spring)

Environmental Engineering Technology (EVT)

The following courses for the A.A.S. in environmental engineering technology are available only on the Chillicothe campus:

100 Introduction to Environmental Engineering Technology (3) Topics include toxicology, air pollution, groundwater contamination, transportation of hazardous materials, waste characterization, waste management, and waste treatment and disposal, with discussion of how regulations affect each.

110 Computational Methods in Environmental Engineering Technology (3) Emphasizes the principles of data treatment, including experimental error recognition, statistical analysis, and graphical data techniques using up-to-date computer software. Computers and programming will be required for writing lab reports. 3 lec, 2 lab.

115 Legal Aspects of Environmental Engineering (2) Introduction to legal aspects of the rights and duties of the individual, business, and society with regard to the environment, and the consequences of future environmental legislation. Investigates environmental legislation and regulations and examines case studies highlighting the existing laws.

120 Introduction to Environmental Chemistry (3) Prereq: CHEM 121 or 151. Environmental chemistry as applied to aquatic, atmospheric, soil, and hazardous waste systems. Topics include environmental chemical cycles; aquatic, atmo-spheric, and soil chemistry; environmental chemistry of hazardous wastes; and toxicology. 2 lec, 2 lab.

125 HAZWOPER Training (3) Provides the information required to work on a majority of environmental cleanup sites. Covers regulatory obligations, handling hazardous materials, personal protective equipment, monitoring and reporting, emergency response, site control, medical assessment, confined space entry, and respiratory protection. 3 lec, 2 lab.

125L HAZWOPER Training Laboratory (1) Emphasizes handling hazardous materials with use of personal protective equipment, instrumentation, and equipment. Outdoor simulations and demonstrations included. 3 lab.

140 Introduction to Air Pollution (3) Prereq: 110; CHEM 121 or 151. Principal sources; dispersion; effects; and physical, economic, and legal aspects of controlling atmospheric pollutants. Emphasizes atmospheric chemical reactions due to air pollutant emissions.

150 Instrumentation in Environmental Analysis (3) Prereq: 110; CHEM 121 or 151. Provides foundation for understanding principles behind instrumentation used for environmental analysis. Gas chromatographs, mass spectrometers, infrared spectrophotometers, FID's, and PID's are studied. 3 lec, 3 lab.

190 Internship/Practicum/Cooperative Education (1, max 20) Required for students on approved work assignments. Must submit final report on work activities. Credit is not applicable toward specific degree requirements but will accumulate in academic credit total.

198A–Z Special Topics (1–5, max 20) Provides an opportunity to complete individual projects that involve special topics concerning environmental engineering technology problems.

200 Site Investigation, Sampling, and Monitoring (3) Prereq: 110. Field-oriented course involving hazardous materials site investigation, characterization, and cleanup. Topics are planning and organization, training and medical programs, site assessment, sampling and monitoring, site control, hazardous materials handling, and emergency response.

200L Site Investigation, Sampling, and Monitoring Laboratory (1) Prereq: 110. Field-oriented course involving hazardous materials site investigation, characterization, and cleanup. Topics are planning and organization, training and medical programs, site assessment, sampling and monitoring, site control, hazardous materials handling, and emergency response. 3 lab.

210 Introduction to Health Physics (3) Addresses fundamental principles of health physics and radiation protection. Topics include atomic structure, types of radiation, radioactive decay, methods of radiation detection, dosimetry, biological effects, and radiation protection.

210L Health Physics Laboratory (1) Emphasizes use of health physics instrumentation including rate meters, scintillation cells, radon detection, and gamma spectrometry as they apply to personal and environmental monitoring. 3 lab.

220 Fluid Mechanics (3) Prereq: 110. Fundamentals of fluid mechanics as applied to surface and groundwater, wastewater, and air emissions management. Topics include basic hydraulics, friction loss, pressure, flow measurement, pump types and characteristics, and schematic interpretation.

240 Air Sampling and Analysis (3) Prereq: 110, 140. Provides practical field experience in air sampling. Instruments are used to provide real-time data collection and analysis. Emphasis on methods that determine the concentration of normally encountered air pollutants.

240L Air Sampling and Analysis Laboratory (1) Prereq: 110, 140. Emphasizes air flow measurements using devices that demonstrate volumetric displacement, velocity impact, viscosity, and pressure. Provides techniques for determining accuracy, precision or repeatability, and calibration. 3 lab.

245 Wastewater Treatment (3) Prereq: 110, 120. Introduction to wastewater treatment technologies. Covers regulations and phases of treatment for wastewater treatment systems, liquid and solid waste streams, and basic system process control.

250 Analysis of Environmental Pollutants (3) Prereq: CHEM 121 and 152, or 151 and 152. Covers important techniques necessary for analyzing environmental samples. Methods established by EPA are used to analyze samples for heavy metals, volatiles, and semi-volatiles.

250L Analysis of Environmental Pollutants Laboratory (1) Prereq: CHEM 121 and 122, or 151 and 152. Emphasizes laboratory techniques such as GC/MS, AA, and IR spectrophotometer. Lab reports required from the analysis of soil and water samples. 3 lab.

260 Environmental Risk Assessment (3) Analyzes risk assessment process applied to environmental problems. Uncertainty factors, risk analysis, and exposure characterization, fate, and transport models will be addressed.

290 Internship/Practicum/Cooperative Education (1, max 20) Required for students on approved work assignments. Must submit final report on work activities. Credit is not applicable toward specific degree requirements but will accumulate in academic credit total.

298A–Z Special Topics (1–5, max 20) Provides an opportunity to complete individual projects that involve special topics concerning environmental engineering technology problems.

Equine Studies (EQU)

The following courses for the A.A.S. in equine studies are available only on the Southern campus:

101 Introduction to Equine Studies (4) Overview of the history of the horse, evaluation, selection, breeds, equipment, nutritional requirements, safe handling of horses, shoeing, equine reproduction, and career and leadership opportunities in the horse industry.

110 Equine Nutrition (4) Study of the equine digestive system, nutrient requirements of horses at various levels of performance, and problems associated with feeding and feeding practices.

120 Equine Anatomy and Physiology (4) Prereq: BIOL 101. Study of the structure and functions of the horse through the various anatomical systems.

125 Equine First Aid and Preventive Medicine (5) First aid and emergency treatment, preventive medicine, diseases, and parasitism in horses.


200 Equine Reproduction (4) Prereq: 101. Comprehensive study of equine reproduction stressing the anatomy and physiology of the stallion and mare and methods of breeding, including artificial insemination, and foaling.

215 Equine Business Management (4) Prereq: CS 120. Study and practice of basic concepts, techniques, procedures of accounting involved in keeping and analyzing equine records from the management viewpoint. Designed to integrate general business concepts with common practices in the horse industry. Topics include general business laws, equine law, accounting, insurance, bookkeeping, contracts, taxes, and starting and maintaining a horse operation.
Courses / Equine Studies

220 Farm and Stable Management (4)
Study of the management of a working horse farm. Topics include scheduling, budgeting, equipment use and maintenance, land management, facilities management, site selection and design, and safety.

225 Equestrian Teaching Techniques (3)
Study of the methods of teaching riding. Emphasis on the abilities and skills a good instructor must possess to teach riding as well as the safety, care, and evaluation of school horses. Students will develop and implement teaching plans for riders at the beginning level.

230 Comprehensive and Competitive Equestrian Judging (3)
Prereq: 130. Continuation of 130. Activity through which students can put assimilated knowledge to practical application and assess knowledge competing on the OU Horse Judging Team. Travel required. Written and oral defense also required.

235 Horse Show and Event Management (3)
Designed to provide students with the necessary tools to organize any show, event, or clinic related to the equine industry. Major topics include planning, fund raising, financing, insurance, record keeping, and advertising. Utilization of principles to plan and operate a horse show and/or clinic for OU-Southern or associated organization.

240 Basic Horse Shoeing (3)
Shoeing and balancing of pleasure and performance horses, corrective trimming, hoof health, anatomy of the leg and foot, and blacksmithing as a business.

250 Harnessing and Driving (1)
Knowledge and fundamental skills used in line driving, lunging, harnessing, and pleasure driving.

280 Fundamentals of Starting the Young Horse (2)
Prereq: ED 168, 172, 173, 176, 177, or 180. Development of advanced riding skills including handling, gentling, saddling, and riding a green-broke horse applying basic horsemanship skills.

281 Fundamentals of Starting the Young Horse II (2)
Prereq: 280. Continuing to develop advanced riding skills necessary to train a green broke horse by understanding and implementing specific standard training procedures. Student will have responsibility for an assigned young horse, teaching that horse to walk, trot, lope, back, and turn around under saddle. Horses will be trained according to their intended use.

282 Therapeutic Riding (3)
Study of the fundamental knowledge and skills related to the therapeutic riding concept. Topics include evaluating and training a horse for therapeutic riding activities, basic state and federal laws addressing people with disabilities, and behavioral concerns with identification of alternative approaches. A supervised experience in therapeutic riding techniques is part of the course.

283 Therapeutic Facility Design and Management (3)
This course makes students aware of the difficulties therapeutic riding clients face in day to day life. Through careful design and identification, management, clients can ride safely and care for program horses.

284 Techniques for Teaching the Therapeutic Rider (4)
This course encourages students to understand and work with riders with disabilities and challenges. It is essential for instructors to research and know the issues these riders face and formulate lesson plans according to individual needs and goals.

285 Preparation for Therapeutic Riding Instructor Certification (3)
Designed to prepare students for the Registered Level Therapeutic Riding Exam offered by the North American Riding for the Handicapped Association. The course covers all components of the test and provides lecture and active experience with immediate evaluation and feedback.

286 Administrative Aspects of Therapeutic Riding (3)
Provides information on administrative issues and aspects of therapeutic riding, the riding center, and overall management. The course includes goal setting, strategic planning, legal issues, and working with boards.

287 Evaluation and Training of the Therapy Horse (2)
This course rounds out the therapeutic riding student's education by evaluating the horse and training of horses brought into a therapy program. This knowledge and awareness increases the safety and therapeutic value of the sessions for the therapeutic riding client.

290 Equine Field Experience (1–6)
Field experience which might include trips to horse farms, race tracks, veterinary clinics, museums, horse shows or events, or seminars offered through recognized organizations or individuals.

295 Equine Internship (1–6)
Practicum experience in a specific area of equine studies pertinent to the individual's interests. Examples include working with breeders, trainers, farm and stable managers, riding instructors, breed or international associations or organizations, veterinarians, and related equine agencies.

299 Studies in Equine Issues (1-4)
Study of topics of current interest in the horse industry.

Film (FILM)

201 Introduction to Film I (4) (2H)
Prereq: soph. (fall) Studies in the history of world cinema, from 1895 to the present. Weekly screenings of silent and sound, American and international films.

202 Introduction to Film II (4) (2H)
Prereq: soph. (winter) Introduction to film analysis, with emphasis on formal aspects of film art such as sound, lighting, mise-en-scene, etc. Weekly screenings.

203 Introduction to Film III (4) (2H)
Prereq: soph. (spring) Special topics in film style, genres, movement, and forms. Weekly screenings.

238 Studies in the Documentary Film (3)
Prereq: 203. (winter) Special topics in the history, theory, and criticism of documentary film and video. Weekly screenings.

330 Film Techniques (4)
Prereq: 201. Introduction to motion picture production techniques. Students will design, shoot, and edit their own projects.

343 Scriptwriting (4)
Prereq: 201 or 202. Introduction to craft of developing narrative play. Workshop-tutorial approach to study of screenplay structure, format, dialogue, and theory culminating in a 20- to 30-minute completed script.

344J The Practice of Film Criticism (4) (1J)

421 International Film I (4)
Prereq: 201. Analysis of the relationship between film and culture, with emphasis on how cultural meanings influence film aesthetics and the critical assessment of the medium. Films of several film-making nations such as Brazil, China, India, Sweden, and the United States will be screened for study.

422 International Film II (4)
Prereq: 201. The development of a nation's or cultural region's films is traced, with emphasis on contemporary works. Cultures under study will vary quarterly and may include the films of Brazil, China, Germany, Eastern Europe, Italy, Southeast Asia, etc.

423 International Film III (4)
Prereq: 201. The aesthetics and uses of film and related technologies in the study of both Western and non-Western peoples is studied, with emphasis on the ethnographic and documentary film. Assignments include field exercises with image-making equipment.

431 Film History I (4)

432 Film History II (4)

433 Film History III (4)

444 Media Certs Management (4)
Practical assignments in association with the Athens International Film and Video Festival.

451 Film Theory and Criticism I (4)
Prereq: 203. (fall) Introduction to survey of classical and contemporary approaches to film theory and criticism. Weekly screenings.

452 Film Theory and Criticism II (4)

453 Film Theory and Criticism III (4)
Prereq: 452. (spring) Special topics in film theory and criticism, including auteursm, structuralism, formalism, and feminism. Weekly screenings.

461 Motion Picture Production I (5)
Prereq: Honors Tutorial College Film major. (fall) Professional 16mm film production. Instruction in basic camera and lighting technique, elementary film structure, and bench editing leading to production of individual silent film projects.

462 Motion Picture Production II (5)
Prereq: Honors Tutorial College Film major. (winter) Continuation of 461 introducing sound motion picture shooting and editing techniques, A and B roll preparation.

463 Motion Picture Production III (5)
Prereq: Honors Tutorial College Film major. (spring) Continuation of 462. Advanced sound motion picture production techniques.

471 Film Topics Seminar (1-5)
Prereq. perm. (fall) Investigation of selected motion picture topic announced in advance of registration. Focus may be scholarly/critical, industry related, or aspect of motion picture production or screenwriting. Topics and credit hours vary.

472 Film Topics Seminar (1-5)
Prereq. perm. (winter) See 471 for description.

473 Film Topics Seminar (1-5)
Prereq. perm. (spring) See 471 for description.

490 Individual Production Problems (1-5)
Prereq: perm. Individual production of motion picture. May be repeated.

491 Individual Readings (1-5)
Prereq: perm. Readings and reports on works related to motion pictures. Reading list is selected by student in consultation with faculty member. May be repeated.

492 Independent Study (1-5, max 10)
Prereq: perm. Advanced individual creative or scholarly work in film.

497T Film Tutorial (1-15)
Prereq: Honors Tutorial College Film Major
Finance (FIN)

102 Personal Money Management (4)
Prereq: f/soph only. How to live better financially. Relation of personal goals to money management in terms of expenditures, savings, and tax considerations. Financial media that serve the individual such as life insurance, savings, securities, and consumer and mortgage credit.

238 Internship (1)
Prereq: perm. Internship experience that provides on-site exposure to general business operations and procedures. Intended for experiences following the freshman year.

301 Introduction to Finance (4)
Prereq: ACCT 102 and QBA 201 or PSY 221 or ECON 381 or COMS 301 or GEOG 271 or MATH 251; no credit for COB students. Problems in managing personal finances. Budgeting expenditures and savings. Planning life insurance program, investment in savings accounts, securities, and real property; and of other financial assets. Use of consumer and mortgage credit. Personal taxes.

325 Foundations of Finance (4)
Prereq: COB and ACCT 102; QBA 201 or PSY 120, 121, or 221 or ECON 381 or COMS 301 or GEOG 271; jr. Role of financial management in business enterprise; financial analysis; planning needs for short-term and long-term funds; planning for profits; capital budgeting; internal management of working capital and income; raising funds to finance growth of business enterprises.

327 Financial Markets and Institutions (4)
Prereq: FIN 325, jr and perm. Flow of funds and interest-price movements in money and capital markets. Supply of loanable funds and demand for funds in mortgage loan market, consumer credit market, corporate securities markets, and markets for government securities and municipal obligations. Consideration of effects on financial markets of Federal Reserve and Treasury policies.

331 Risk and Insurance (4)
Prereq: jr or sr and perm. Social importance of risk and its place in personal, business, and national life, including principles and methods of handling risk. Special interest in technique of insurance.

341 Investments (4)

398 Internship (1–4)
Prereq: perm. Internship experience that provides opportunities to learn by participation in day-to-day activities of a business concern for at least four consecutive weeks. Intended for experience following the sophomore year.

410 Personal Financial Planning (4)
Prereq: 325. Introduction to financial planning for individuals. This course will survey the topics of money management, insurance planning, investment planning, retirement planning, and estate planning.

420 Financial Banking Law (4)
Prereq: jr. This course is designed for students seeking to understand the law and policy of banking and financial institutions (bank, thrift, and credit union). The course emphasizes the economic, historical, and legal background of financial institutions; the financial institution regulatory process; and consumer laws.

428 Management of Financial Institutions (4)
Prereq: 327 or perm. Analysis of objectives, functions, practices, and problems of financial institutions as viewed by management of these institutions.

436 Life Insurance (4)
Prereq: 331, perm. Fundamental economics of life insurance. Principles and practices of life insurance including types of contracts, group and individual policies, and annuities.

437 Personal and Business Financial Planning (4)
Prereq: jr, 331. Basics of IRS as it applies to personal and corporate taxes, as well as completion of Form 1040. Information required on advising clients, as well as personal, concerning estate planning, taxes, trusts, gifts, etc., and how to gather information.

440 Group Insurance and Employee Benefits (4)
Prereq: FIN 331. The study of group life insurance, health insurance and pensions; application to special tax treatment of employee benefits; and exposure to guest speakers from the insurance and securities industry.

441 Business Insurance and Estate Cases (4)
Prereq: two from among 436, 437, 439, and 440. A summary course for students in the risk and insurance field. New cases assigned each week requiring presentations in class and written recommendations on selected case studies presented by small student groups. Lectures by practicing professionals from related disciplines (law, accounting, trusts, employee benefits) are scheduled to demonstrate the broad nature of estate planning practice.

442 Security Analysis (4)
Prereq: FIN 341. Equity security analysis using various quantitative and qualitative methods.

444 Risk Management (4)
Prereq: 327 or perm. Description of derivatives markets, trading, and institutions. Text is supplemented by current readings and derivatives trading simulations.

445 Portfolio Management (4)

450 Credit and Lending Principles of Financial Institutions (4)
Prereq: 325. Provides examination of basic functions involved in supplying credit to borrowers by financial institutions. Organizational framework and division aspects of process studied. Significant policy issues and implications covered.

452 Small Business Finance (4)
Prereq: 325. Application of basic financial management techniques to small business environment (100 or fewer employees). Problems faced by persons who start small business and recommendations for alternative solutions to most commonly discovered problems. Micro view, nuts-and-bolts approach used throughout course, but consistent with broad macro overview set of company objectives.

455 International Finance (4)
Prereq: 325. Problems in international finance. Financing international trade and other transactions; foreign exchange market, exchange market, and exchange rates; international payments systems; foreign central banking and current development of international financial cooperation.

461 Financial Management and Policy (4)

463 Capital Allocation (4)

465 Mathematical Analysis of Financial Decisions (4)
Prereq: 325, perm. Application of quantitative methods to financial management, with special emphasis on systems approach to evaluating proposed financial decisions.

491 Seminar (3, 4, or 5)
Prereq: perm. Selected topics of current interest in finance area.

497 Independent Research (1–4)
Prereq: perm. Research in selected fields of finance under direction of faculty member.

498 Internship (1–4)
Prereq: perm.
Courses / Foreign Languages and Literatures

112 Elementary French (4)
Prereq: 111. Continuation of 111. Basic text, workbook, and readings used. Lab required. No credit if 119.

113 Elementary French (4)
Prereq: 112. Continuation of 112. Basic text, workbook, and readings used. Lab required. No credit if 119.

199 French for Review (4)
No CR if 111, 112 or 113. (Fall) Preparation for FR 211 for students with some high school French. Review of grammar and vocabulary with intensive practice adapted to college-level expectations and instructional techniques. Emphasis on speaking, listening, reading, and writing. Does not satisfy language or humanities requirements in Arts and Sciences.

211 Intermediate French (4) (2C)
Prereq: 113 or 2 or 3 yrs h.s. French. 1st course of 3-qtr intermediate-level sequence. Intensive review of grammar. Additional readings with discussion in French. Supplemental cultural material.

212 Intermediate French (4) (2C)
Prereq: 211 or perm. Continuation of 211.

213 Intermediate French (4) (2C)
Prereq: 211 or 4-5 yrs h.s. French. Reading and discussion of selected modern works. Completion of 213 fulfills foreign language requirement of College of Arts and Sciences.

298 Independent Study in French (1-2, max 6)
Prereq: 213 or perm. Reading and discussion of assigned materials (books, periodicals, films, tapes) on specific topics involving French language. Does not count toward major or minor. Does not satisfy language requirement.

341 Advanced Conversation and Composition (4)
Prereq: 213 or perm. Speaking and writing based on readings and assigned topics. Grammar review.

342 Advanced Conversation and Composition (4)
Prereq: 341 or perm. Continuation of 341.

343 Advanced Conversation and Composition (4)
Prereq: 342 or perm. Continuation of 342.

345 French for Business (4)
Prereq: 343. Profession-oriented language and culture training in French. Reading, writing, listening, and speaking skills are emphasized in a business context.

348 French Civilization and Culture (4)
Prereq: 341 or 342 or 343. Social, political, and cultural history of France from Middle Ages to Revolution. Readings, discussions, class reports, and short papers.

349 French Civilization and Culture (4)
Prereq: 341 or 342 or 343. (spring) Continuation of 348, covering 1799 to present. France in the 19th century.

354 Introduction to Reading French Literature (4)
Prereq: 341 or 342 or 343. Designed to prepare students to meet the challenges of advanced literature courses. Close reading techniques will enable students to read modern French works with speed and comprehension. Basic aspects of literary analysis and theory will be emphasized.

355 Introduction to Prose (4)
Prereq: 345. Reading and discussion of French novels, short stories, and other narrative genres representing various literary traditions.

356 Introduction to Drama and Poetry (4)
Prereq: 345. Reading and discussion of French drama, as literary text and theatrical performance, and lyric poetry from several historical periods.

369 Internship in French (1-5)
Prereq: perm of internship director. Practice using the language in a work environment. Does not count for major.

415 French Literature of the Renaissance (4)
Prereq: 354 or 355. Major 16th-century poets, including Du Bellay and Ronnard.

416 French Literature of the Renaissance (4)
Prereq: 354; 355 or 356. Major 16th-century prose writers, including Rabelais and Montaigne.

418 17th-Century French Literature (4)
Prereq: 354; 355 or 356. Works by numerous authors, including at least some of following: Descartes, Pascal, La Fontaine, La Rochefoucauld, La Bruyère, La Fontaine, and Boileau.

419 17th-Century French Literature (4)
Prereq: 354; 355 or 356. Major plays of Corneille, Racine, and Molière.

423 18th Century (4)
Prereq: 354; 356. French literature and thought in Age of Enlightenment.

424 18th Century (4)
Prereq: 354; 355. Continuation of 423.

425 Romanticism (4)
Prereq: 354 or 356. Romanticism in drama, poetry, and fiction of first half of 19th century.

426 Realism and Naturalism (4)
Prereq: 354; 355 or 356. Major fictional works of 19th century.

427 French Poetry in the Second Half of the 19th Century (4)
Prereq: 354; 355 or 356. Poetry of Baudelaire, Verlaine, Rimbaud, Mallarmé, and others.

429 20th-Century French Literature I (4)
Prereq: 354; 355 or 356. French prose before WWI.

431 20th-Century French Literature II (4)
Prereq: 354 or 356. French prose fiction since WWI.

433 20th-Century French Literature III (4)
Prereq: 354; 355 or 356. French drama of the 20th century.

434 French Through Film (4)
Prereq: 342. Early development of the French cinema and its more recent filmmakers, actors, and actresses. Films are studied in their cultural and historical contexts. Students increase their French proficiency through listening, speaking, reading, and writing.

435 Proseminar (1-4, max 12)
Prereq: 354 or 356 or 355. Subject will vary. May be repeated when subject changes.

437 Applied Phonetics (4)
Prereq: 343 or perm. (fall) Systematic study of segmental and prosodic elements of French pronunciation including extensive oral practice.

439 Modern French Usage (4)
Prereq: 342 or perm. (winter) Fine points of grammar. Practice in composition and analysis of texts.

440 Teaching French: Theory and Practice (4)
Prereq: 343. Prereq: 341. Introduction to current issues about teaching and learning modern foreign languages, with a focus on the particulars of teaching the French language and cultures; opportunities to apply that theoretical knowledge to classroom teaching; and opportunities to develop a deeper knowledge of and more proficiency in French language and cultures. Does not count for major.

441 Stylistics and Criticism (4)

454 Francophone Literature of Sub-Saharan Africa, Maghreb, and the Caribbean (4)
Prereq: 355 or 356. Representative works by 20th century Francophone Sub-Saharan, Maghreb, and Caribbean writers, including at least, but not limited to, Malika Mokkeddem, Leopold Senghor, Ferdinand Oyono, Maylis de Kerangon, and Simone Schwartz-Bart. Works are studied in their historical and cultural contexts. Readings, lectures, films, and discussions.

489 Independent Study in French (1-2, max 4)
Prereq: 8 credits at 300 level or perm of dept chair. Directed individual readings, discussion, and reports in language at advanced level. Does not count toward 400-level hrs required for major. Maximum of two credits may count toward minor.

German (Germanic) (GER)

111 Elementary German (4)
Introduction to pronunciation and basic grammar. Development of comprehension and speaking skills. Lab required. Beginning course of 3-3qtr 1st-yr sequence.

112 Elementary German (4)
Prereq: 111. Continuation of 111. Lab required.

113 Elementary German (4)
Prereq: 112. Continuation of 112. Continued development of skills of oral and written production and comprehension. Lab required.

211 Intermediate German (4) (2C)
Prereq: 113 or 2 or 3 yrs h.s. German. Continued development of listening comprehension, reading, writing, and speaking skills. Grammar review. Lab required. 1st course of 3-qtr intermediate-level sequence.

212 Intermediate German (4) (2C)
Prereq: 211 or perm. Continuation of 211. Emphasis on discussion of modern texts. Continued development of listening comprehension and speaking and writing skills. Lab required.

213 Intermediate German (4) (2C)
Prereq: 212 or 4-5 yrs h.s. German. Modern German texts are read and form basis for discussions and written assignments. Completion of 213 fulfills foreign language requirement of College of Arts and Sciences.

235 German Drama on Stage (1-4)
(winter) Presentation of German drama on stage. Private coaching in pronunciation and inflection of German. Credit varies according to role of student. May be repeated for credit with perm.

298 Independent Study in German (1-2, max 6)
Prereq: 213 or perm. Private coaching in pronunciation and inflection of assigned materials (books, periodicals, films, tapes) on specific topics involving German language. Does not count toward major or minor. Does not satisfy language requirement.

341 Advanced Conversation and Composition (4)
Prereq: 213 or perm.

342 Advanced Conversation and Composition (4)
Prereq: 341 or perm.

343 Advanced Conversation and Composition (4)
Prereq: 342 or perm.

345 Business German (4)
Prereq: 342. Business German with emphasis on oral presentation. Does not count toward major or minor. Does not satisfy language requirement.

431 Francophone Literature of Quebec (4)
Prereq: 355 or 356. Representative works by 20th century Quebec writers including at least, but not limited to, Anne Hebert, Jean-François Carrier, Michel Tremblay, Marie-Claire Blais, and Yves Beauchemin. Works are studied in their historical and cultural contexts. Readings, lectures, films, and discussions.
### Courses / International Literatures in English

#### Prereq: 112. Continuation of 111–112. See 111 for

- **Greek Grammar, vocabulary, and reading of ancient Greek. Students will be introduced to Ionic, Attic, and Koine (New Testament) dialects.**
- **Beginning Greek (4)**
  - Prereq: 111. Continuation of 111. See 111 for description.
  - Prereq: 112. Continuation of 111–112. See 111 for description.

#### Prereq: 111. Continuation of 111. See 111 for

- **Greek Continuation of 111.**
  - Prereq: 213 or perm. Continuation of 348.

#### Introduction to German Language (4)
- Prereq: 213. Study of major literary works, with emphasis on 18th and 19th centuries.
- **Beginning German (4)**
  - Prereq: 211 or equiv. (fall) Beginning course of 3-qtr 1st-yr sequence.
  - Prereq: 212. Continuation of 211–212. See 211 for description.
  - Prereq: 219. Study of major literary works of 20th century.
  - Prereq: 355 and 356. Continuation of 453 and 455 for description.
  - Prereq: perm. Intensive analysis of major author, literary genre, or theme. When subject is changed, student may re-enroll.
  - Prereq: 343 or perm. Advanced writing and stylistic analysis. Practice in variety of fiction prose techniques.
  - Prereq: 355 and 356. Major works of Lessing, Schiller, and Goethe.
  - Prereq: 8 credits at 300 level or perm of dept chair. Directed individual readings, discussion, and reports in language at advanced level. Does not count toward 400-level hrs required for major. Maximum of two credits may count toward minor.

#### Intermediate Indonesian (2C)
- Prereq: 211 or equiv. Survey of modern literature of Southeast Asia (3)
- Prereq: 211 or perm. (winter) Survey of modern literature of Southeast Asia in English.

#### Prereq: 211 or perm. Continuation of 348.

### International Literatures in English (ILL/ILML)

**The lectures and readings for these courses are in English and are aimed at the entire University community. While they do not fulfill requirements toward any of the majors in foreign language, these courses will count toward the humanities area requirements of the College of Arts and Sciences. No credit is counted toward the foreign language requirement.**

#### International Literature: Linguistics (ILL)

- **Traditional Literature of Southeast Asia (3)**
  - Prereq: 211. Continuation of 211. See 211 for description.
  - Prereq: 212. Continuation of 211–212. See 211 for description.

#### International Literature: Modern Languages (ILML)

- **Portuguese and Brazilian Literature in English (4)**
  - Literature of Portugal or literature of Brazil in English translation. See schedule of classes for topics each quarter.

#### International Literature: Modern Languages (ILML)

- **German Prose and Poetry (4) (2H)**
  - Prereq: 113. Review of language principles. Readings adapted to needs and interests.
  - Prereq: 211. Continuation of 211. See 211 for description.
  - Prereq: 212. Continuation of 211–212. See 211 for description.

#### International Literature: Linguistics (ILL)

- **Intermediate Indonesian/ Malaysian (4)**
  - Prereq: 111 or equiv. (fall) 1st course of 3-qtr intermediate-level sequence.
  - Prereq: 112 or equiv. (spring) Continuation of 111.

#### International Literature: Modern Languages (ILML)

- **Intermediate Indonesian/ Malaysian (4)/(2C)**
  - Prereq: 113 or equiv. (fall) 1st course of 3-qtr intermediate-level sequence.
  - Prereq: 211 or equiv. (fall) Beginning of advanced-level sequence.
  - Prereq: 212 or equiv. (spring) Continuation of 211.
  - Prereq: 213 or equiv. (fall) Beginning of advanced-level sequence.
  - Prereq: 212 or equiv. (spring) Continuation of 212.
  - Prereq: 213 or equiv. (fall) Beginning of advanced-level sequence.
  - Prereq: 212 or equiv. (spring) Continuation of 213.

#### International Literature: Modern Languages (ILML)

- **Langaues (ILML)**

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**Courses / International Literatures in English**

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