Engineering Courses

**ENGR110 - Engineering Orientation** 110-1 Engineering Orientation. Orientation for first year, engineering students. Course is designed to increase students' understanding of engineering as a field of study and as a profession. Emphasis is placed upon becoming a team player in engineering and developing an effective strategy for academic success in mathematics, science and engineering courses. Restricted to first year engineering students or consent of instructor.

**ENGR111A - Engr Learning Skills** 111A-1 to 3 Engineering Learning Skills. Special approval needed from an Engineering Academic Advisor.

**ENGR111B - Engr Learning Skills** 111B-1 to 3 Engineering Learning Skills. Special approval needed from an Engineering Academic Advisor.

**ENGR111C - Engr Learning Skills** 111C-1 to 3 Engineering Learning Skills. Special approval needed from an Engineering Academic Advisor.

**ENGR222 - Comp Methods-Engr, Tech** 222-2 Computational Methods for Engineers and Technologists. Introduces the student to the use of digital computers in the solution of technical problems that are specifically designed for the engineering and technology student. Problem analysis, flowcharting, coding, diagnostics, execution, and solution verification are discussed. Programs written in C++ language. Prerequisite: Mathematics 111 or equivalent with C or better.

**ENGR250 - Statics** 250-3 Statics. Principles of statics; force systems; equilibrium of particles and rigid bodies; trusses; frames; 2-D centroids; friction; moments of inertia; distributed loads; 3-D centroids; internal forces; shear and bending moment diagrams. Mass moment of inertia. Prerequisite: MATH 150, prior or concurrent enrollment in PHYS 205A and PHYS 255A, all with a grade of C or better.

**ENGR261 - Dynamics** 261-3 Dynamics. Fundamentals of particle and rigid body dynamics, kinematics and kinetics of a single particle and system of particles, application of Newton's laws and energy and moment principles in solving problems involving particles or rigid bodies in planar motion. Introduction to kinetics of rigid bodies in three dimensions. Prerequisites: MATH 250, ENGR 250, and PHYS 205A, all with C or better.

**ENGR296 - Software Tools for Engineers** 296-2 Software Tools for Engineers. Engineers are problem solvers. Various tools and software are being used increasingly in both academia and industry for solving technologically challenging problems. The objective of this course is to i) introduce undergraduate students to a set of technical software that prove useful (and in many occasions essential) in many courses and projects at junior and senior levels, and ii) enhance students' problem-solving skills. Prerequisite: MATH 250.

**ENGR301I - Humans & Their Environment** 301I-3 Humans and Their Environment. (University Core Curriculum: Students with a catalog year prior to Summer, 2012 only) [IAI Course: L1 905] An introduction to the study of the relationship between humans, resource consumption, pollution and the resulting environment, the effects of current human pollution and resource consumption on the environmental quality of the future, the interrelation of human population resource consumption and pollution, methods of minimizing resource consumption and human pollution through both technological controls and changes in human behavior. Prerequisite: high school chemistry or equivalent.
ENGR304I - Social History of American Technology. (University Core Curriculum) Survey of some key technological transformations and their related social developments in the United States from colonial times to the present with emphasis on unequal effects on cultural groups defined by race, gender, and ethnicity.

ENGR305 - Archaeo-Engineering. Archaeologists have discovered marvelous inventions from the ancient world, long before engineering was considered to have been founded as the profession it is today. How did ancient people measure time and location, travel, communicate, shelter, obtain food and water, or wage war? What propelled inventiveness? Some canonical discoveries have much to teach in terms of humanities and history as well as science and engineering. Using modern tools, feats of ancient engineering will be studied and modeled digitally or physically. Important engineering projects or inventions of the past covered such as sun dials, Stonehenge, Antikythera, Roman roads, siege machines and aqueducts. Lab fee of $15 to help defray cost of expendables and software licenses used in modeling project.

ENGR335 - Electric Circuits. [IAI Course: EGR 931] Foundation course in electric circuits. Basic laws and concepts of linear circuits, analysis of AC and DC circuits by mesh and nodal methods, Thevenin's and Norton's theorems, superposition principle, and phasor notation, and transients. Prerequisite: Mathematics 250 with C or better.

ENGR350A - Mechanics of Materials. Introduction to the mechanics of deformable bodies. Stress and strain, torsion, stresses and deflections in beams and columns, influence lines, statically indeterminate beams. Prerequisites: ENGR 250, MATH 250, PHYS 205A, PHYS 255A, all with C or better. Lab fee: $30.

ENGR350B - Mechanics of Materials. Laboratory only. For transfer students who have satisfied the lecture but not the laboratory component of the 350A requirement. Prerequisite: ENGR 350C with C or better. Lab fee: $30.

ENGR350C - Mechanics of Materials-Course Only Articulation. For transfer students articulation only. This course is used to designate that a student has completed ENGR 350A without a laboratory.

ENGR351 - Numerical Methods. Overview of numerical procedures such as root finding, curve fitting, integration, solutions of simultaneous equations, and solutions of ordinary differential equations. Emphasis will be on applications of these techniques to problems in civil, environmental and mechanical engineering. Prerequisite: concurrent enrollment in or completion of MATH 305.

ENGR370A - Fluid Mechanics. Fluid properties, fluid statics, fluid flow, governing equations, dimensional analysis and model-prototype relationships, closed conduit flow, open-channel flow. Introduction to numerical modeling. Prerequisite: ENGR 261 with C or better. Lab fee: $30.

ENGR370B - Fluid Mechanics-Laboratory Only. For transfer students who have satisfied the lecture but not the laboratory component of the ENGR 370A requirement. Prerequisite: ENGR 370C with C or better. Lab fee: $30.

ENGR370C - Fluid Mechanics-Course Only Articulation. For transfer students articulation only. This course is used to designate that a student has completed the lecture component of ENGR 370A without a laboratory.

ENGR492 - Special Investigations in Engineering. Individual projects and problems selected by student or instructor. Open to seniors only. Not for graduate credit. Special approval needed from the instructor.

ENGR521 - Probability and Stochastic Processes. (Same as ECE 551) Axioms of probability, random variables and vectors, joint distributions, correlation, conditional statistics, sequences of random variables, stochastic convergence, central limit theorem, stochastic processes, stationarity, ergodicity, spectral analysis, and Markov processes. Restricted to graduate student status. Project-based fee: $20 to help defray cost of software licenses.
ENGR522 - Intel Prop & Commercial 522-3 Intellectual Property and Commercialization. (Same as BA 537, LAW 633) Course teaches substance & practice of commercializing products of scientific & technical research. Provides a basic understanding of intellectual property laws in commercialization context & how those laws are applied in various fields of technology. Will learn how to value intangible assets, taking into account their commercial potential & legal status. Course will consider the legal & business issues surrounding marketing of products of research. Will prepare & negotiate license agreements. Will analyze legal & business issues surrounding whether & how to enforce intellectual property rights. Content & methods of course delivery & evaluation has been approved for provision by distance education.

ENGR530 - Engineering Data Acquisition 530-3 Engineering Data Acquisition: Theory and Practice. (Same as ECE 530) Theory of data acquisition and measurement systems. Criteria for selection of data acquisition hardware and software, instruments, sensors and other components for scientific and engineering experimentation. Methods for sampled data acquisition, signal conditioning, interpretation, analysis, and error estimation. Lab fee: $60 to help defray cost of software licenses and equipment.

ENGR540 - Design Engr Experiments 540-3 Design of Engineering Experiments. Planning of experiments for laboratory and field studies, factorial designs, factorial designs at two levels, fractional factorial designs, response surface methods, mixture designs. Prerequisite: MNGE 417, or MATH 483, or equivalent, or consent of instructor.

ENGR545 - Adv Numerical Methods 545-3 Advanced Numerical Methods in Engineering. Engineering applications of linear and nonlinear equations, eigenvalue problems, interpolation and approximating functions and sets of data, numerical solutions of ordinary and partial differential equations. Prerequisite: ENGR 222 or equivalent, ENGR 351 or equivalent, and MATH 305 or consent of instructor.

ENGR580 - Seminar 580-1 Seminar. Study and presentation of research topics from students' own specialty areas within engineering and science. Graded S/U only. Restricted to enrollment in the Ph.D. in engineering science program or consent of instructor.

ENGR590 - Spec Inves Engr Science 590-1 to 3 Special Investigations in Engineering Science. Investigation of individual advanced projects and problems selected by student or instructor. Restricted to admission into Ph.D. program in engineering science.

ENGR592 - Engineering Co-op 592-1 to 3 Engineering Cooperative Education. Supervised work experience in industry, government or in a professional organization. Work must be directly related to student's program of study. Student works with on-site supervisor and faculty advisor. Activity report is required from the student and performance report is required from the employer. Enrollment requires Chair's approval. Hours do not count toward degree requirements. Mandatory Pass/Fail. Restricted to graduate standing.

ENGR593 - Special Topics in Engineering 593-3 Special Topics in Engineering. Studies of various special topics in the area of engineering science. Special approval needed from the instructor.

ENGR600 - Doctoral Dissertation 600-1 to 24 (1 to 16 per semester) Doctoral Dissertation. Dissertation research. Hours and credit to be arranged by director of graduate studies. Graded S/U only. Restricted to admission to Ph.D. in engineering science program.

ENGR601 - Continuing Enrollment 601-1 per semester Continuing Enrollment. For those graduate students who have not finished their degree programs and who are in the process of working on their dissertation, thesis, or research paper. The student must have completed a minimum of 24 hours of dissertation research, or the minimum thesis, or research hours before being eligible to register for this course. Concurrent enrollment in any other course is not permitted. Graded S/U or DEF only.

ENGR699 - Postdoctoral Research 699-1 Postdoctoral Research. Must be a Postdoctoral Fellow. Concurrent enrollment in any other course is not permitted.
Catalog Year Statement:
Students starting their collegiate training during the period of time covered by this catalog (see bottom of this page) are subject to the curricular requirements as specified herein. The requirements herein will extend for a seven calendar-year period from the date of entry for baccalaureate programs and three years for associate programs. Should the University change the course requirements contained herein subsequently, students are assured that necessary adjustments will be made so that no additional time is required of them.