

# Engineering

## Engineering Courses

**ENGR110 - 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 - Engineering Learning Skills** Special approval needed from an Engineering Academic Advisor.

**ENGR111B - Engineering Learning Skills** Special approval needed from an Engineering Academic Advisor.

**ENGR111C - Engineering Learning Skills** Special approval needed from an Engineering Academic Advisor.

**ENGR222 - 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** 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. Prerequisites: MATH 150, PHYS 205A and PHYS 255A, all with a grade of C or better.

**ENGR261 - 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 and Robotics for Engineers** Introduction to interpreted programming languages and programming principles. Introduction to programming microcontrollers. Covered materials will have an emphasis on their relationship to aspects of robotics. Prerequisite: MATH 111 with a grade of C or better.

**ENGR3011 - 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.

**ENGR3041 - 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 - Archae-Engineering** (University Core Curriculum) 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 I** [IAI Course: EGR 931] Basic concepts: voltage, current, power, energy, Ohm's law and Kirchhoff's laws. Resistor circuits: Parallel and series resistors, nodal and mesh analysis; independent and dependent sources, Thevenin's theorem, Norton's theorem and superposition. RLC circuits: The voltage and current relationship in capacitors and inductors, natural and forced response of a first order, RL or RC, circuit. General case of RLC circuits. Sinusoidal steady state analysis; phasors and phasor diagrams, impedance, nodal, and mesh equations in sinusoidal steady state. Operational Amplifiers and their applications, complex power. Students who have taken ECE 235 cannot receive credit for this course. Prerequisites: MATH 251, PHYS 205B, PHYS 255B with grades of 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 and MATH 250, both 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 in Engineering** 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, completion of/concurrent enrollment in ENGR 351 preferred. 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.

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