

ENGINEERING (ENGR)

ENGR 101 Engineering Drawing I (2 credits)

The fundamental principles of the graphic language are presented. Students acquire the necessary drafting skills to produce technical drawings. Topics include lettering, geometric construction, sketching, multiview projection, sectional views, auxiliary views, dimensioning and tolerancing. Usually offered in fall semester.

ENGR 103 Introduction to Engineering Design (4 credits)

This course provides an introduction to engineering and an overview and application of the basic tools and techniques of engineering design and graphic communications. The fundamentals of engineering design, engineering drawing, AutoCAD, Excel spreadsheet, an introduction to MATLAB, and ethics in engineering are presented in this course. Students work on a team to use these tools on a design project with related modules in electrical/mechanical/structural topics. This course meets for 45 lecture hours and 45 laboratory hours.

Prerequisite(s): Accuplacer College Math with a score of 045 or (Next Gen AAF with a score of 237) or (MATH 026) or (MATH 101) or (MATH 103) or (MATH 109) or (MATH 203) or (SAT Mathematics with a score of 530) or (PARCC Algebra II with a score of 750)

ENGR 104 Statics (3 credits)

Using the vector approach and free body diagrams, this course deals with formulation and application of the laws governing the equilibrium of physical objects under the influence of general forces. The major topics include application of vector diagrams, equilibrium force systems, analysis of frames and trusses, internal forces in beams, friction, centroids, moments of inertia and fluid statics.

Prerequisite(s): (ENGR 103 and MATH 203 (may be taken concurrently))

ENGR 201 Dynamics (3 credits)

Students learn to formulate and apply the laws governing the motion of physical objects under the influence of general forces. Topics are Newton's laws of motion; multidimensional motion of particles and rigid bodies; kinematics and kinetics of particles, energy and momentum methods for particles; and mechanical vibrations. Offered only in the fall semester.

Prerequisite(s): (ENGR 104 and PHYS 203 or PHYS 201)

ENGR 202 Mechanics of Materials (3 credits)

The fundamentals of strength and deformation of various materials are presented in this course. The main topics covered are axial stress and deformation of bars, strains and generalized Hooke's law, torsional stress and deformation in shafts, stress and deformation in beams, compound stresses, pressure vessels, statically indeterminate problems, and columns. Offered only in the spring semester.

Prerequisite(s): (ENGR 104 and MATH 204)

ENGR 204 Basic Circuit Analysis (4 credits)

This course is intended for electrical engineering majors. It presents the fundamentals of circuit analysis and introduces the students to basic electronic equipment and measurement techniques, including simulation, construction, and testing of basic analog circuits. Topics include basic circuit elements, such as resistors, capacitors, inductors, sources, transformers, and operational amplifiers; V-I laws for RLC elements; response of RC, LC and RLC circuits; steady state analysis of DC and AC circuits. Students apply Ohm's Law and Kirchhoff's Laws, apply analysis techniques including phasor, nodal and mesh analysis and Thevenin and Norton's Theorems, and perform transient analysis for first and second-order circuits. This course includes a design project and presentation. This course meets 45 lecture/discussion hours and 45 laboratory hours. Offered only in the spring semester. PHYS 204 may be taken at the same time. Course fee.

Prerequisite(s): (MATH 204 and PHYS 204 (may be taken concurrently))

ENGR 206 Digital Logic Design (4 credits)

This course serves as an introduction to the concepts, principles and design elements governing the behavior of digital circuits. Topics include number systems, Boolean algebra, logic functions and gates, decoders and encoders, Karnaugh map, flip-flops, counters and shift registers, arithmetic and logical operations, binary codes and codes circuits, combinational and sequential logic systems and design, state diagrams, memory architecture, and programmable logic devices. This course includes laboratory projects with design elements. This course meets for 45 lecture/discussion and 30 laboratory hours. Offered only in the fall semester. Corequisite CSI 131 (or demonstration of programming ability) or equivalent. Course fee.

Prerequisite(s): (ENGR 103) and (CSI 131 (may be taken concurrently))

ENGR 207 Scientific and Engineering Computation (3 credits)

This course is an introduction to the fundamental methods of numerical analysis. Topics include roots of equations, matrix algebra and systems, interpolation and curve fitting, error analysis, numerical integration, and numerical methods for ordinary differential equations. Use of a Computer Algebra System is integrated throughout the course. This course meets 30 lecture/discussion and 30 laboratory hours. Course fee.

Prerequisite(s): (MATH 203 and MATH 204 (may be taken concurrently))

ENGR 210 Signals and Systems (4 credits)

This course presents an overview of signals and systems. Topics include continuous-time signals and linear time-invariant systems; singularity functions, differential equations and continuous convolution; Fourier series and Fourier transforms; Laplace transforms, state variables; frequency analysis. Students will apply the application of theory to problems in electrical engineering. This course meets for 60 lecture/discussion hours.

Prerequisite(s): (MATH 208 and ENGR 204 and ENGR 206)

ENGR 213 Engineering Design with 3D CAD (3 credits)

This course gives students a fundamental knowledge of computer-aided design (CAD) using solid modeling software in three dimensions. CAD topics include feature-based modeling, engineering drawings, assemblies, simulation and analysis. Students groups will apply engineering mechanics, the engineering design process and solid modeling to complete a design project. An oral presentation and written report will be required. This course meets for 2 lecture hours and 2 laboratory hours. Course fee \$40.

Prerequisite(s): (ENGR 103 and ENGR 202)

ENGR 215 Chemical Engineering Analysis (3 credits)

This course is an introduction to methods of chemical engineering calculations and analysis. Topics include stoichiometric relations; material and energy balances; and the behavior of gases, vapors, liquids and solids. Analytical and computer methods are presented. This course meets 60 lecture/discussion hours.

Prerequisite(s): (ENGR 103 and CHEM 112)

ENGR 232 Engineering Thermodynamics (3 credits)

This course will introduce students to the interaction between energy in its various forms and the energy transformations that occur in engineering processes and systems. Topics covered include the first and second laws of thermodynamics, properties of pure substances, energy analysis of closed systems, mass and energy analysis of control volumes, entropy, exergy, gas power and refrigeration cycles, gas mixtures and chemical reactions. Conceptual understanding will be integrated with problem-solving. Course includes 45 hours of lecture. Offered only in the spring semester.

Prerequisite(s): (CHEM 112 and MATH 204 and PHYS 203 or PHYS 201)
or (CHEM 135 and MATH 204 and PHYS 203 and PHYS 201)

ENGR 273 Cooperative Education III: Engineering (3 credits)