

Course Descriptions

ENGINEERING

ENGR 101 – Introduction to CAD (3)

Pre-requisites: COSC 107 or Instructor's permission and MATH 100. Introduces the student to the computer as a tool to create basic 2D technical drawings using AutoCAD® 2007, one of the most widely used computer aided design software programs. Provides a basic understanding of the operating system's user interface, managing drawing files, setting up a drawing, using create and modify commands to construct a drawing, adding text and dimensions, and plotting or printing a drawing.

ENGR 102 – Advanced CAD (3)

Pre-requisite: ENGR 101 or Instructor's permission. Presents intermediate to advanced CAD concepts and commands designed to increase the user's productivity. Emphasis will be placed on the tools used for advanced dimensioning techniques, editing features, blocks, external references, drawing standards, drawing collaboration, e-transmittal, and pictorial drawing. Also allows an experienced user to enhance existing skills.

ENGR 103 – Engineering Graphics (4)

Pre-requisite: MATH 100 or Instructor's permission. Orthographic Projection, often called Multiview Drawing, is utilized to represent three-dimensional objects onto the two-dimensional plane of a sheet of paper or computer screen. This method of representation is the basis of engineering drawing. A drawing that is submitted for production must contain complete instructions so the part can be manufactured. This is accomplished by the use of proper *Dimensioning and Notation* on the drawing. This course introduces the methodology of standard dimensioning practices and helps develop proficiency in its application.

ENGR 104 – Mechanical and Electrical Drawing Applications (4)

Pre-requisite: ENGR 101. This advanced drawing course covers industrial applications and will consist of a CAD graphic design project in a selected area of study. The student will be responsible for the complete project development, necessary calculations, presentation and written report, and graphical design drawings. This may be accomplished through an intern program at a local company.

ENGR 105 – Introduction to Engineering and Design (3)

Pre-requisite: MATH 100 or Instructor's permission. This course focuses on the systematic approach to problem solving required in engineering practice and discusses the traits of a successful engineer and the engineering design method. The students will have introductions to bridge building (civil engineering), robotics (electrical engineering) and fluid mechanics (civil and mechanical engineering).

ENGR 106 – Solid Modeling (3)

Pre-requisite: ENGR 101 and ENGR 102. Introduces terminology and methods used to produce solid modeling and the creation of parts, assemblies, and drawings. Geometric models in three dimensions provide accurate information on the shape of a part for use in computer-aided engineering (CAE) or computer-aided manufacturing (CAM) applications.

ENGR 110 – Computer Aided Problem Solving (3)

Pre-requisites: ENGR 105, COSC 121, COSC 195. Co-requisite: MATH 162. Covers the evolution and application of computers, social and economic implications, and introduction to programming using engineering workstations. Provides extensive practice in writing programs to solve engineering problems. Includes computer interfaces to real-world systems.

ENGR 205 – Engineering Statics (3)

Pre-requisites: PHYS 160/160L and MATH 162. This course will employ vector math to cover equilibrium of particles, rigid bodies and structures, the analysis of beams and cables, centroids, centers of gravity,

distributed forces and moments of inertia. The application of Mohr's circle will also be discussed.

ENGR 211 – Circuit Analysis I (3)

Pre-requisites: MATH 162. Co-requisite: MATH 270 and ENGR 211L. The basic electrical elements and sources and the concepts of energy and power are introduced. Topics addressed include Ohm's Law and Kirchhoff's Laws, resistive networks, node and loop analysis, network theorems, first-order and second-order circuits, sinusoidal sources, complex representations of impedance, phasors, and complex power, and three-phase circuits.

ENGR 211L – Circuit Analysis I Lab (1)

Pre-requisites: MATH 162. Co-requisite: MATH 270 and ENGR 211. Provides practical application of learned circuit theory in a controlled lab setting.

ENGR 212 – Circuit Analysis II (3)

Pre-requisites: ENGR 211/211L and MATH 270. Co-requisite: ENGR 212L. Provides experience in general transient analysis of electrical circuits. Utilizes state-space equations and Fourier series analysis to examine the network function, convolution, and frequency response.

ENGR 212L – Circuit Analysis II Lab (1)

Pre-requisite: ENGR 211/211L and MATH 270. Co-requisite: ENGR 212. This course places emphasis on the lab analysis of sinusoidal and other transient waveforms and their applications.

ENGR 213 – Electronics I (3)

Pre-requisite: ENGR 212/212L. Co-requisite: ENGR 213L. Diodes and bipolar and field-effect transistors are introduced. Analysis and design of digital gates, circuits, flip-flops, and memory circuits are included. Circuits employing operational amplifiers and analog-to-digital and digital-to-analog converters will also be covered.

ENGR 213L – Electronics I Lab (1)

Pre-requisite: ENGR 212/212L. Co-requisite: ENGR 213. Provides practical application of learned semiconductor theory, with emphasis on the development of troubleshooting skills.

ENGR 215 – Strength of Materials (3)

Pre-requisites: ENGR 205 and MATH 270. Co-requisite: ENGR 215L. A lecture course, which looks at the response of static systems, composed of various materials to the application of loading forces.

ENGR 215L – Strength of Materials Lab (1)

Pre-requisites: ENGR 205 and MATH 270. Co-requisite: ENGR 215. This laboratory course utilizes professional lab equipment to illustrate such concepts as tension and compression of loaded members, stress/strain relationships in axially and torsionally loaded members, and shear/bending moments in beams.

ENGR 222 – Digital Design I (3)

Pre-requisite: COSC 121. Co-requisite: ENGR 222L. Introduces binary number systems and Boolean algebra. Covers combinational logic and state machine design. Includes implementation of VHDL, programmable logic devices, Arithmetic/Logic units, memories, computer organization, input-output, microprocessors, and microcontrollers.

ENGR 222L – Digital Design I Lab (1)

Pre-requisite: COSC 121. Co-requisite: ENGR 222. Provides direction and strategies in the application of troubleshooting techniques. The applications include expansion from four-bit to multi-bit circuits to demonstrate adaptability of each logic device. The student will be working with converters, encoders, counters, registers, memories, input-output, microprocessors, and microcontrollers.

ENGR 225 – Engineering Dynamics (3)

Pre-requisite: ENGR 205. This course examines kinematics and dynamics of particles, solid bodies and structures utilizing vector methods and momentum and energy methods.

ENGR 231 – Introduction to Fluid Mechanics (3)

Pre-requisite: ENGR 205. Co-requisite: ENGR 225. Introduction to basic fluid mechanics including statics, continuity, velocity of continuous fluids, laminar and turbulent flow, hydrostatic forces and friction.

ENGR 280 – Engineering Internship (3)

Pre-requisite: Second year standing in engineering and successful completion of all required non-elective 200-level engineering courses or successful completion of minimum required trimesters with a minimum cumulative GPA as required by the industry internship partner. This course provides the qualifying student with an internship or on-the-job training for gaining related experience in the engineering industry at an approved industrial facility.

ENGR 285 – Design Project (3)

Pre-requisite: Second year standing in engineering and successful completion of all required non-elective 200-level engineering courses. Design methodology and development of professional project-oriented skills including communication, team management, and economics. Working in teams, a proposal for a large design is prepared in response to an industrial or in-house sponsor.

ENGR 290 – Special Topics (1-4 credits, unlimited repetition)

Pre-requisite: Second year standing in engineering, completion of all required non-elective 200-level engineering courses, and permission of instructor. This course covers new topics, trends, methodology, skills, practices, industry certifications, etc. of interest in engineering and engineering technology fields.

ENGR 295 – Thermodynamics (3)

Pre-requisites: CHEM 121/121L, PHYS 162, and MATH 163. This course provides development of thermodynamic analysis, the first and second laws of thermodynamics, entropy and application to engineering power cycles. Related topics include: real gases; Rankine steam cycle; regenerative cycle; Otto, Brayton, and diesel cycles; refrigeration and air conditioning.

MATHEMATICS**MATH 163 – Calculus II (4)**

Pre-requisite: MATH 162. A continuation of MATH 162 with concentration on concepts that will enable students to solve problems through the study of integration techniques, solution of differential equations, calculus-based methods of approximation and infinite series.

MATH 270 – Ordinary Differential Equations (4)

Pre-requisite: MATH 162. This course provides an introduction to the algorithmic theory of ordinary differential equations. Topics to be covered are elementary theory of ordinary differential equations, numerical methods, phase-plane analysis and an introduction to Laplace transformations.

PHYSICS**PHYS 160 – Engineering Physics I (3)**

Pre-requisite: MATH 162. This course offers a calculus-based treatment of kinematics, work and energy, particle dynamics, conservation principles, and simple harmonic motion.

PHYS 160L – Engineering Physics I Lab (1)

Pre-requisite: MATH 162. Requires laboratory experiments associated with the material presented in PHYS 160.