

ENGR Engineering

ENGR 1112 Introduction to Scientific Modeling and Simulation **3 Credit Hours. 3 Lecture Hours. 0 Lab Hours.**

An introduction to the problems and solution methodologies in computational scientific modeling and computation. Computational tools such as a computer algebra system, visualization software and Internet resources will be used to explore and solve mathematical problems drawn from various fields of science and engineering.

Prerequisite(s): MATH 1111 or MATH 1113 or MATH 1441.

ENGR 1121 Computing Applications in Mechanical Engineering **2 Credit Hours. 0,2 Lecture Hours. 0,4 Lab Hours.**

This is an introductory level computing and application course for Mechanical Engineering students. It is intended for students to develop their technical computing skill using platforms that are current and widely used in the professional world. Standard mathematical functions and applications including logical expression, data input/output, arrays, and statistical functions will be introduced. Specific mechanical engineering applications are utilized to introduce students to basic problem solving logic, flow charting, and programming. **Prerequisite(s):** Prior or concurrent enrollment in MATH 1112 or MATH 1113 or MATH 1441.

ENGR 1133 Engineering Graphics

3 Credit Hours. 0,2 Lecture Hours. 0,3 Lab Hours.

This course develops and improves student visualization and spatial skills, free-hand sketching, design consideration of fabrication processes, and parametric solid modeling. The interpretation of drawings, a working understanding of technical terminology and participation in group engineering activities are the major highlights of this course. It is expected that the students will gain fundamental abilities in the use of commercial solid modeling tools and techniques.

ENGR 1731 Computing for Engineers

3 Credit Hours. 0,2 Lecture Hours. 0,2 Lab Hours.

This is an introductory course in the foundations of computing, computational thinking, and engineering problem-solving using programming. The course introduces students to the concepts of design and analysis of algorithms, and construction of programs for engineering problem-solving. Topics such as arrays, data types and related operations, decision, looping, input/output, functions, files, and plotting. **Prerequisite(s):** Prior with a minimum of "C" or concurrent enrollment in MATH 1441.

ENGR 1732 Program Design for Engineers

3 Credit Hours. 0,2 Lecture Hours. 0,2 Lab Hours.

This course will introduce engineering students to applications for engineering problem-solving and object-oriented programming principles in Electrical and Computer Engineering using standard (ANSI) C and C++.

Prerequisite(s): A minimum grade of "C" in ENGR 1731.

ENGR 2010 Computational Modeling

3 Credit Hours. 2 Lecture Hours. 3 Lab Hours.

Fundamentals of numerical methods and development of programming techniques for implementing them to solve civil and environmental engineering problems via computers.

Prerequisite(s): MATH 2242 and PHYS 2211K and ENGR 1731 or ENGR 1121.

ENGR 2110 Creative Decisions and Design

3 Credit Hours. 0,2 Lecture Hours. 0,3 Lab Hours.

Fundamental techniques for creating, analyzing, synthesizing, and implementing design solutions to open-ended problems through team and individual efforts utilizing flexibility, adaptability, and creativity. **Prerequisite(s):** A minimum grade of "C" in ENGR 1133 and ENGR 2231, and prior or concurrent enrollment with a minimum grade of "C" in MATH 2430.

ENGR 2112 Solid Modeling and Analysis

1 Credit Hour. 0 Lecture Hours. 0,3 Lab Hours.

Students will develop advanced proficiency using parametric solid modeling software, such as SolidWorks. In addition to creating solid models (advanced parts, advanced assemblies, surfacing, and weldments), students will develop a basic proficiency in structural analysis, flow simulation, surface modeling, NC programming, Manufacturing Constraints and Design for Additive Manufacturing.

Prerequisite(s): A minimum grade of "C" in ENGR 1133.

ENGR 2131 Electronics and Circuit Analysis

3 Credit Hours. 0,2 Lecture Hours. 0,2 Lab Hours.

This course introduces electric circuit elements, electronic devices, digital systems, and analysis of circuits containing such devices in order to provide students with the fundamental knowledge of electrical engineering principles and applications. Basic concepts of laboratory practice and instruments in the analysis of elementary electrical circuits will be covered in this course.

Prerequisite(s): A minimum grade of "C" in PHYS 2212K and prior or concurrent enrollment in MENG 2139.

ENGR 2137 Introduction to Renewable Energy

3 Credit Hours. 0-2 Lecture Hours. 0-2 Lab Hours.

This course will serve as an introduction to Renewable Energy sources and systems basic design and operation, with environmental and socio-economic impacts considered.

Prerequisite(s): A minimum grade of "C" in CHEM 1147 or CHEM 1146.

ENGR 2231 Engineering Mechanics I

3 Credit Hours. 3 Lecture Hours. 0 Lab Hours.

Fundamental concepts of mechanics. Statics of particles. Moments and equivalent systems of forces on rigid bodies; equilibrium of rigid bodies. Distributed forces-centroids and centers of gravity. Analysis of trusses, frames and machines. Internal normal and shearing forces, bending moments, and torque. Shear and bending moment diagrams, relations between distributed load, shear, and bending moment. Friction. Distributed forces area moments of inertia.

Prerequisite(s): A minimum grade of "C" in MATH 2242 and PHYS 2211.

ENGR 2232 Dynamics of Rigid Bodies

3 Credit Hours. 3 Lecture Hours. 0 Lab Hours.

Kinematics and dynamics of particles and rigid bodies in one, two, and three dimensions using Newton's Second Law Method, Work-Energy and Impulse-Momentum methods. Mass moments of inertia and products of inertia.

Prerequisite(s): A minimum grade of "C" in ENGR 2231.

ENGR 2323 Digital Design Lab

2 Credit Hours. 0,1 Lecture Hours. 0-3 Lab Hours.

Design and implementation of digital systems, including a team design project, using CAD tools, discrete chip-set and FPGA. Both schematic and hardware description language are used for digital design. Students will also learn logic systems, assembly language programming and project design methodologies.

Prerequisite(s): A minimum grade of "C" in all of the following: ENGR 1732, ENGR 2332.

ENGR 2332 Logic Circuit Design

3 Credit Hours. 3 Lecture Hours. 0 Lab Hours.

Computer systems and digital design principles. Architectural concepts, software, Boolean algebra, number systems, combinational datapath elements, sequential logic and storage elements.

Prerequisite(s): Prior (with a minimum grade of "C") or concurrent enrollment in ENGR 1731 or permission of instructor.

ENGR 2334 Circuit Analysis I**3 Credit Hours. 3 Lecture Hours. 0 Lab Hours.**

This course introduces the students to the basic concepts of circuit theory and analysis. Topics covered are basic elements and sources, energy and power, Ohm's law, Kirchhoff's law, nodal and mesh analysis, Thevenin's and Norton's theorems, capacitors, inductors, transient analysis, first-order and second-order circuits.

Prerequisite(s): A minimum grade of "C" in all of the following: PHYS 2212K and (prior or current enrollment in ENGR 2341) and (prior or current enrollment in MATH 3230).

ENGR 2341 Introduction to Signal Processing with Lab**4 Credit Hours. 0,3 Lecture Hours. 0,2 Lab Hours.**

This course introduces students to signal processing for discrete-time and continuous-time signals, convolutions, filtering, frequency response, Fourier series, Fourier transform, Laplace transform, and Z-transform. Laboratory emphasizes computer-based signal processing.

Prerequisite(s): A minimum grade of "C" in MATH 2242 and ENGR 1731 or equivalent.

ENGR 2343 Engineering Software Design**4 Credit Hours. 3 Lecture Hours. 3 Lab Hours.**

Object-oriented software methods for engineering applications including numerical analysis methods; simulations and graphical presentation of simulation results; and analysis of numerical precision. Students will apply and develop these concepts through programming projects.

Prerequisite(s): A minimum grade of "C" in all the following: ENGR 2332 and prior or concurrent enrollment in ENGR 2341 or permission of instructor.

ENGR 2432 Introduction to Engineering Materials**3 Credit Hours. 3 Lecture Hours. 0 Lab Hours.**

The structure, property, processing, and performance relationships of engineering materials. Materials selection is treated as part of engineering design. Prerequisite(s): CHEM 1146 or CHEM 1147 and CHEM 2211.

ENGR 2890 Introductory Selected Problems in Engineering**1-3 Credit Hours. 0 Lecture Hours. 0 Lab Hours.**

Individual and specialized introductory-level study in the areas of engineering projects and research not otherwise covered in the student's curriculum. This experience cannot be used as a substitute for a technical elective in the engineering curriculums.

Prerequisite(s): Identification of a problem or study area and permission of the instructor and department chair.

ENGR 2991 Topics in Engineering**1-4 Credit Hours. 0-4 Lecture Hours. 0-12 Lab Hours.**

"Special topics at freshman and sophomore level of current interest in engineering.

Prerequisite(s): Announced with the topic.

ENGR 3233 Mechanics of Materials**3 Credit Hours. 3 Lecture Hours. 0 Lab Hours.**

Definition and analysis of stress and strain, mechanical properties of materials, axially loaded members, torsion of circular sections, bending of beams, transformation of stress and strain, design of beams, and buckling of columns.

Prerequisite(s): A minimum grade of "C" in ENGR 2231.

ENGR 3235 Fluid Mechanics**3 Credit Hours. 3 Lecture Hours. 0 Lab Hours.**

The course includes fundamentals of fluid statics and fluid dynamics for incompressible fluids, fluid properties, static and dynamic forces, Bernoulli's equation, pipe flow and losses, open channel flow and flow measurement. The course also includes methods, procedures and the use of equipment to measure standard fluid properties and phenomena.

Prerequisite(s): MATH 2243 and MATH 3230 and a minimum grade of "C" in ENGR 2231.

ENGR 3310 Circuit Analysis Lab**1 Credit Hour. 0 Lecture Hours. 2 Lab Hours.**

Laboratory experimentations to enhance understanding of analytical principles developed in Circuit Analysis I & II by design and implementation of analog circuits (DC and AC), and achieving proficiency with standard electronic instrumentation including multimeters, oscilloscopes, dual power supplies, and function generators. Simulation tools are used to verify experimental results.

Prerequisite(s): A minimum grade of "C" in all of the following: ENGR 2334 and prior or concurrent enrollment in EENG 3335 or permission of instructor.

ENGR 3431 Thermodynamics**3 Credit Hours. 3 Lecture Hours. 0 Lab Hours.**

Thermodynamic properties, state postulate, work interactions, steady-state and transient energy and mass conservation, entropy and the second law. First and Second Law analysis of thermodynamic systems. Gas cycles and vapor cycles.

Prerequisite(s): A minimum grade of "C" or better in PHYS 2211K and MATH 2242.