

ENGINEERING (ENGR)

ENGR 103 Engineering First Year Experience and Fundamentals 3 cr.
This course provides an introduction to the practice of engineering through authentic, multidisciplinary problems and projects and addresses issues related to a successful college life. Students in this course will participate in service learning projects that will lay the foundation for careers in Engineering that create a better and more sustainable world. Code 2 course fee.

ENGR 123 Surveying I 3 cr.
Elementary surveying including measurements, leveling, transit surveys and computations. Practical field problems stressing use of tape, compass, transit and level. Code 2 course fee.
Prerequisite(s): MATH 161 or higher

ENGR 124 Engineering Analysis 3 cr.
This course is an application of the methods of mathematical analysis, algorithm design and data visualization to the solution of engineering problems using computational programs such as MatLab. Programs to solve real-life engineering problems will be written using a high-level programming language. Additional software packages will be investigated for use in problem solving. Code 4 course fee.
Prerequisite(s): Math 265, MATH 266

Corequisite(s): MATH 266

ENGR 161 Construction Methods and Materials 3 cr.
A basic course covering materials, equipment and procedures used in the construction industry. Topics include basic construction materials, aggregates, concrete, masonry, wood, metals and manufactured building products. Code 4 course fee.

ENGR 181 Graphics for Engineers 2 cr.
This course introduces students to graphic skills associated with engineering design, particularly those related to computer-aided design and drafting (CADD). The course provides the student with an understanding of design concepts, features and limitations of a micro-computer based CAD system. The majority of the course time consists of laboratory exercises. In the context of design, the course will cover fundamental aspects of engineering graphics including elementary projection, lines and planes, auxiliary views, edge views, oblique projection, angle between planes, angles between lines and planes, and intersection and revolution. Graphics will stress solutions of elementary design problems. Code 4 course fee.

ENGR 191 Autocad 2-D Basics I 3 cr.
This is the first part of a basic program in the fundamentals of computer aided drafting/design (CAD). The course provides the student with an understanding of the concepts, features, and limitations of a microcomputer-based CAD system. The course shows how to use AutoCAD to set up drawings and add lines, circles, arcs, other shapes, geometric constructions and text. Code 4 course fee.

ENGR 192 AutoCAD 2-D Basics II 3 cr.
This is the second part of a basic program in the fundamentals of computer aided drafting/design (CAD). The course continues from the prerequisite course with diminishing, blocks, attributes, section views, and an introduction to three-dimensional drawing. The course shows how to use AutoCAD to draw and edit polylines; set layers, linetypes and create colors; create section lines and graphic patterns. Code 2 course fee.
Prerequisite(s): ENGR 191

ENGR 198 Autodesk Inventor: 3D Design & Prototyping 3 cr.
This course will introduce the aspects of Solid and Parametric Modeling, using AutoDesk Inventor. The student will construct basic shapes in order to build intelligent solid models, create multi-view drawings and assembly models. They will have an opportunity to prototype designs using manufacturing techniques such as 3D printers and CNC routers. Code 2 course fee.

Prerequisite(s): Take ENGR 181;

ENGR 221 Engineering Statics 3 cr.
A quantitative study of forces that act on engineering structures in equilibrium. Force system classification, resultant forces and conditions for equilibrium of rigid bodies in two and three dimensions are covered. Mathematical principles of vectors and calculus are applied to trusses, frames, and simple machines. Centroids (center of mass) are developed and used in the analysis of stresses on beams. Special engineering topics discussed will include dry friction with an introduction to virtual work. The concept of moment of inertia included in discussion will establish the link between statics and solid mechanics. Code 1 course fee.

Corequisite(s): MATH 266, PHYS 281

ENGR 222 Engineering Dynamics 3 cr.
This course is a quantitative study of motion and the forces causing motion for particles and rigid-bodies. Analysis methods include utilization of Newton's Second Law, and energy and momentum methods. Additional topics include kinematics and kinetics of rigid bodies in three dimensions, and mechanical vibration. Code 1 course fee.
Prerequisite(s): MATH 266, PHYS 281, ENGR 221

ENGR 225 Strength & Mechanics of Materials 3 cr.
The course utilizes key concepts of mechanics of materials in various analysis and design applications. Students will apply the concepts of stress-strain, axial loading, torsion, bending, shear, deflection, combined loading, stress and strain transformations, structural failure theories and analysis methodologies to structures such as beams, thin-walled members and columns. They will also have an opportunity to become familiar with the basics of stress-strain testing. Code 1 course fee.
Prerequisite(s): ENGR 221

ENGR 251 Electrical Engineering I 4 cr.
Circuits are studied using the analytical tools of the engineer. The required theorems and techniques are derived first using resistive circuits, and then applied to RC, RL, and RLC networks. Transient analysis of these networks is then studied, followed by sinusoidal steady-state analysis, and sinusoidal power calculations. Laboratory work is correlated with the lectures. Code 4 course fee.
Corequisite(s): MATH 266, PHYS 282

ENGR 253 Electronic Circuits 4 cr.
This course introduces the student to electronic circuits and devices, particularly junction diodes, bipolar transistors and field effect transistors and Op-amps. The student will learn the elementary concepts of electronics such as device physics, diodes, transistor circuit biasing, amplifiers and filters, transistor models and typical circuit configurations. The student will design and analyze electronic circuits with the assistance of computer-aided circuit analysis software. They will also build and analyze electronic circuits in a lab setting. Code 3 course fee.
Prerequisite(s): ENGR 251, or ENGT 144

ENGR 255 Digital Circuits 4 cr.

In this course, students will be introduced to the basic principles of digital electronics: binary arithmetic, boolean algebra, K-maps, combinational circuit synthesis, combinational MSI circuits, Sequential logic, Synchronous state machine design, Sequential MSI circuits. This course includes both lecture and lab. Code 3 course fee.

Prerequisite(s): ENGR 251 or ELET 144

ENGR 271 Introduction to Biomechanics 3 cr.

This course introduces students to biomechanical engineering. Students will study traditional mechanical engineering topics in the context of biomedical engineering applications: statics, dynamics and deformable bodies mechanics. This course will also be an introduction to the mechanical properties of biological tissues. Code 3 course fee.

Corequisite(s): ENGR 222

ENGR 295 Engineering Product Development and Prototyping 4 cr.

This course introduces students to the fundamentals of technical product development and prototyping. Students in this course will pursue the evolution of their product concept through various phases of prototyping and formal testing, as they apply the engineering design process. While refining their product concept students will apply the fundamentals of Intuit D4d (Design for Delight), 3D CAD, various manufacturing techniques project management fundamentals and formal testing.

Prerequisite(s): ENGR 181