

Engineering (ENGR)

ENGR& 121 Engineering Graphics I **3 credits**

Quarter(s): F, W, Sp

Involves students in communicating design ideas, developing visualization abilities, and analyzing engineering data through the use of graphical techniques and practices. Includes free- hand sketching, use of drafting instruments, line work, lettering, orthogonal projection, pictorials, basic dimensioning, and an introduction to computer-aided design modeling.

Prerequisite: None

ENGR& 122 Engineering Graphics II **3 credits**

Quarter(s): F, W, Sp

Involves students in the use of graphical techniques and practices applied towards engineering design and analysis. Includes dimensioning and tolerancing, descriptive geometry, production of working drawings, advanced computer-aided design modeling, and an introduction to parametric solid modeling.

Prerequisite: ENGR& 121 (was ENGR 111) or instructor permission.

ENGR& 123 Engineering Graphics III **3 credits**

Quarter(s): F, W, Sp

Involves students in the use of parametric solid modeling towards design on three-dimensional part and assembly models. Includes creating part and assembly drawings from 3D models, modifications throughout the design process, and comparing the many parametric solid modeling software packages available.

Prerequisite: ENGR& 121 (was ENGR 111) and ENGR& 122 (was ENGR 112) or instructor permission.

ENGR& 204 Electrical Circuits **6 credits | ELEC**

Quarter(s): Sp

Provides application of fundamental electrical principles in designing engineering solutions associated with linear circuit analysis, mathematical models of electrical components and circuits; sources, resistors, capacitors, inductors, operational amplifiers, and associated simple differential equations. Prerequisites: PHYS 222, MATH& 152, or higher except MATH 246, and computer literacy.

ENGR& 214 Statics **5 credits**

Quarter(s): F

Engages student use of vector algebra and the sweeping power of a few fundamental principles to design real engineering solutions to problems involving discrete and distributed forces, resultants, equations of equilibrium, moments about points and lines, centroids, moments of inertia, and the principle of virtual work.

Prerequisites: MATH& 151 and either PHYS& 221 or ENGR 106.

ENGR& 215 Dynamics**5 credits****Quarter(s): W**

Engages student application of vector algebra and the sweeping power of a few fundamental principles to design real engineering solutions to problems involving translational and rotational motion associated with kinematics, kinetics, the impulse-momentum and work-energy principles, and related topics.

Prerequisites: ENGR& 214 (was ENGR 122), MATH& 152 (was MATH 152) and PHYS& 221, or instructor permission.

ENGR& 224 Thermodynamics**5 credits****Quarter(s): Sp**

Encourages student application of basic principles of macroscopic thermodynamics to design solutions to engineering problems involving energy transformations and state changes, the first and second principles of thermodynamics, macroscopic properties of substances, flow analysis, entropy, equations of state, power and refrigeration cycles, and thermodynamic relations. (Formerly known as ENGR 260)

Prerequisite: ENGR& 214 (was ENGR 122), PHYS& 221, and MATH& 152 or instructor permission.

ENGR& 225 Mechanics of Materials**5 credits****Quarter(s): Sp**

Engages students in application of fundamental principles and concepts of stress, strain and their relationships to design engineering solutions associated with axial loads, torsion and bending, combined stresses, properties of materials, columns, and repeated loadings.

Prerequisite: ENGR& 214 (was ENGR 122), concurrent enrollment in MATH& 152, and PHYS& 222 or instructor permission.

ENGR 106 Engineering Problems**5 credits | NSCI****Quarter(s): F**

Introduces engineering and the engineering professions. Emphasizes analysis of actual engineering problems. Concepts such as measurement theory, error analysis, dimensional analysis, metric units, systems of modeling, engineering design, and principles of elementary physics are explored.

Prerequisite: C or better in MATH 098 or placement into MATH& 141

ENGR 205 Design of Logic Circuits**5 credits | ELEC****Quarter(s): F**

Covers the design, analysis, and implementation of combinational logic circuits. Introduces sequential logic circuits.

Prerequisites: MATH& 141, or higher except MATH& 146 and MATH& 246

ENGR 206 Microprocessor Systems
5 credits | ELEC**Quarter(s): W**

Covers microprocessor/microcontroller system architecture, instruction sets, interfacing, assembly and C language programming.

Prerequisites: CS 270, ENGR 205

ENGR 210 Environmental Physics of Energy**5 credits | NSCI**

Solicits student descriptions of energy production, patterns of use, and the challenges posed by dwindling energy resources using the language of physics: work, power, energy, heat, and the Conservation of Energy Principle. Students explore the physical/technological bases of current/proposed technologies, along with current scientific discussions of environmental effects such as global warming and radiation. Students cannot receive credit for both ENGR 210 and PHYS 210.

Prerequisite: Algebraic, writing, and presentation skills; a previous distribution science course (e.g. PHYS& 100) would be helpful.

ENGR 288 Cooperative Work Experience**1-15 credits**

Provides work-based learning experience in a specific program of study. Individualized student outcomes are developed, focusing on behaviors that contribute to workplace success.

Prerequisites: Instructor or Cooperative Education Coordinator permission

Concurrent requirements: COLL 289 or BUS 294 must be taken prior to or concurrent with this course.

ENGR 299 Independent Study
1-10 credits

Offers individualized learning opportunities for knowledge or skill development. Content and expectations are established between the student and instructor, and documented in an Independent Study contract.

Prerequisites: By instructor permission only.