EGR Engineering

EGR 100 Introduction to Engineering (1-1)   **1 cr.**
This course is only offered in the fall term.
Introduces engineering techniques, methods and history. Explores career options and requirements for various engineering fields. Covers interrelationships within and between engineering, technology and science to allow differentiation between various career choices.

EGR 105 Problem-Solving With Matlab and Excel (1-1)   **1 cr.**
This course is only offered in the fall term.
Introduces students to techniques and computer applications for solving problems in engineering and science. Emphasis is on Microsoft Excel and Matlab, software packages required for many junior- and senior-level engineering courses and in professional practice. Topics include problem formulation, data plotting, roots of equations, systems of linear equations, numerical integration, and optimization. Laboratory exercises will allow students to apply these computer tools to solve a variety of practical problems in engineering and science.
Prerequisite: MTH 140 with a grade of C or better.

EGR 110 Introduction to Electrical and Computer Engineering (3-3)   **4 crs.**
This course is only offered in the spring term.
Provides an integrated introduction to selected fundamental concepts and principles in electrical and computer engineering including circuits, electromagnetics, communications, electronics, controls, and computing. Laboratory experiments focus on practical applications which will be applied to a design project.
Prerequisite: MTH 200 or higher with a grade of C or better or concurrent enrollment.

EGR 120 Engineering Graphics I (CAD) (2-5)   **4 crs.**
Introduces engineering graphics and design. Includes drafting, dimensioning, tolerancing, fasteners, and descriptive geometry. Engineering graphics topics include multi-view orthographic representations, principal auxiliary views, section views and production drawings. Laboratory work is supported by three-dimensional CAD utilizing solid modeling techniques. IAI EGR 941
Prerequisite: MTH 070 (or equivalent) with a grade of C or better or other placement/Geometry options. https://www.harpercollege.edu/testing/mathplacement.php

EGR 210 Analytical Mechanics - Statics (3-1)   **3 crs.**
Emphasizes analysis of force systems using vectors. Topics include particle statics, general principles and force vectors, rigid body equilibrium, moments of inertia, distributed forces and centroids, analysis of structures, virtual work and friction. IAI EGR 942
Prerequisite: MTH 200 (Calculus I, IAI M1 900-1, IAI MTH 901) and PHY 201 (General Physics I: Mechanics, IAI P2 900L, IAI PHY 911) with grades of C or better.

EGR 211 Analytical Mechanics - Dynamics (3-1)   **3 crs.**
This course is only offered in the spring term.
Emphasizes dynamic analysis of rigid bodies. Topics include particle kinematics (rectilinear and curvilinear), Newton's laws, energy, work, and momentum methods, planar dynamics and rigid bodies, rigid body kinematics, impulse and momentum, and vibrations. IAI EGR 943
Prerequisite: EGR 210 (Analytical Mechanics/Statics IAI EGR 942) and PHY 201 (General Physics I: Mechanics IAI P2 900L, IAI PHY 911) with grades of C or better.

EGR 212 Mechanics of Solids (3-1)   **3 crs.**
This course is only offered in the spring term. Covers elastic and inelastic relationships involving deformable bodies. Topics include concepts of stress and strain, material properties (elastic and plastic), torsion, shear stresses and deformations, thermal stresses, thin-walled pressure vessels, pure bending, stresses and strains, transverse loading of beams, shear stress and combined loadings, transformation of stress and strain (Mohr's Circle), design of beams and shafts for strength, shear and moment diagrams, deflection of beams, energy methods, and columns. IAI EGR 945
Prerequisite: EGR 210 (Analytical Mechanics: Statics, IAI EGR 942) with a grade of C or better.

EGR 240 Thermodynamics (3-1)   **3 crs.**
This course is only offered in the spring term.
Introduces classical thermodynamics. Topics include basic concepts and definitions, the zeroth law of thermodynamics, the first and second laws of thermodynamics, ideal and real gas behaviors, control-volume energy analysis, entropy, non-reactive ideal gas mixtures and psychrometrics and cycles.
Prerequisite: MTH 202 (Calculus III) with a grade of C or better.

EGR 265 Circuit Analysis (3-3)   **4 crs.**
This course is only offered in the summer term.
Introduces analysis of electric circuits, electrical components, and networks. Topics include concepts of electricity and magnetism, circuit variables (units, voltage, inductance, power and energy), circuit elements (R, L, C and operational amplifiers), simple resistive circuits, circuit analysis (node-voltage, mesh-current, equivalents, and superposition), transient analysis, and sinusoidal steady state (analysis and power). Introduces standard electrical instruments and measurement techniques. Covers circuit response, elementary filter response and resonance measurements. Includes basic measurements of transistors and operational amplifiers. IAI EGR 931L
Prerequisite: MTH 202 (Calculus III, IAI M1 900-3/IAI MTH 903) and PHY 202 (General Physics II-Electricity/Magnetism, IAI PHY 912) with grades of C or better.

EGR 295 Independent Study in Engineering (1-0 to 1-6)   **1-4 crs.**
Provides a project-based learning experience under the supervision of a faculty member. Designed to permit the student to pursue a course of study not typically available under traditional course structure. The student will contract with the appropriate faculty member for the objectives to be accomplished in the course. May be repeated up to a maximum of four credit hours.
Prerequisite: EGR 100 with a grade of C or better and consent of the instructor.