

# ENGINEERING (ENGIN)

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## ENGIN 1100

### *Engineering Orientation*

1 Credit Hour

This orientation course explores career options and requirements for various engineering fields. The course covers the interrelationships within and between engineering, technology, and science to allow differentiation between various career choices. It is intended for engineering majors. (1 lecture hour)

**Prerequisite:** Consent of instructor is required.

## ENGIN 1101 (EGR 941)

### *Engineering Graphics and Design*

3 Credit Hours

This is an introductory-level course in engineering graphics and design intended for mechanical, civil, and industrial engineering majors. It provides students with skills in basic drafting, spatial visualization, conceptual design, and the latest engineering software. The course's graphics topics include orthographic projection, pictorials, dimensioning, sectioning, tolerances, and assembly drawings utilizing free hand sketching, two-dimensional computer aided design, and solid modeling. The course's design topics include problem definition, functional analysis, generation of design alternatives, and evaluation. Basic shop operations are introduced. (2 lecture hours, 3 lab hours)

**Prerequisite:** MATH 0482 with a grade of C or better, or equivalent or a qualifying score on the mathematics placement test or a qualifying A.C.T. math score.

## ENGIN 1820

### *Selected Topics I*

1-3 Credit Hours

Introductory exploration and analysis of selected topics with a specific theme indicated by course title listed in college class schedule. This course may be taken four times for credit as long as different topics are selected. (1 to 3 lecture hours)

**Prerequisite:** Consent of instructor is required.

## ENGIN 1840

### *Independent Study*

1-4 Credit Hours

Exploration and analysis of topics within the discipline to meet individual student-defined course description, goals, objectives, topical outline and methods of evaluation in coordination with and approved by the instructor. This course may be taken four times for credit as long as different topics are selected. (1 to 4 lecture hours)

**Prerequisite:** Consent of instructor is required.

## ENGIN 2201 (EGR 942)

### *Statics*

3 Credit Hours

This course studies the internal forces that develop inside a structure or machine in equilibrium due to applied external forces. The course's topics begin with force vectors, moment vectors, distributed loads, particle equilibrium, and rigid body equilibrium in two and three dimensions. These concepts are applied toward the analysis of trusses, frames, machines, and beams. The course's topics conclude with a study of centroids, moments of inertia, friction, and virtual work. This course is intended for mechanical, civil, and industrial engineering majors. (3 lecture hours)

**Prerequisite:** MATH 2231 with a grade of C or better, or equivalent and concurrent enrollment in PHYSI 2111.

## ENGIN 2202 (EGR 943)

### *Dynamics*

3 Credit Hours

This is an advanced course that studies the motion of an object or system under the action of forces. The course's topics include kinematics and kinetics of particles and rigid bodies in two and three dimensions, non-Cartesian coordinate systems, absolute and relative motion, force, mass, acceleration, work, energy, impulse, momentum, and vibration. This course is intended for mechanical, civil, and industrial engineering majors. (3 lecture hours)

**Prerequisite:** ENGIN 2201 and PHYSI 2111, both with a grade of C or better or equivalent.

## ENGIN 2203 (EGR 945)

### *Mechanics of Materials*

3 Credit Hours

Analysis of stress, strain and deflection in machine and structural elements (axial, shear, torsion and bending loads). Stress and strain transformation using Mohr's Circle. Combined loading, repeated loading, theories of failure, related mechanical properties, and column buckling. Design of shafts, beams and columns. Elementary stress measurement devices. (3 lecture hours)

**Prerequisite:** ENGIN 2201.

## ENGIN 2205

### *Engineering Thermodynamics*

3 Credit Hours

Analysis of thermodynamic processes and systems. Engineering implications of the properties of ideal and real gases and vapors in thermal systems. Zeroth, first and second laws of thermodynamics, power and refrigeration systems, entropy and vapor power systems. (3 lecture hours)

**Prerequisite:** MATH 2233 or college equivalent.

## ENGIN 2207

### *Engineering Economy*

3 Credit Hours

Introduction to the economic aspects of engineering decisions. Topics include present and annual worth analysis, rate of return analysis, depreciation, inflation, income tax considerations, break-even analysis, sensitivity analysis, and financial decision making. Intended for mechanical, civil, and industrial engineering majors. (3 lecture hours)

**Prerequisite:** MATH 2232 with a grade of C or better, or equivalent.

## ENGIN 2210 (EGR 931L)

### *Circuit Analysis I*

4 Credit Hours

This is an introduction to engineering circuit analysis and design. The 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). This course includes a lab component. (3 lecture hours, 3 lab hours)

**Prerequisite:** MATH 2233 and PHYSI 2112, both with a grade of C or better, or equivalent.

**ENGIN 2213 (EGR 932)*****Introduction to Digital Systems***

4 Credit Hours

This is an introduction to digital circuit logic and design. The topics include representation of information, binary systems, Boolean algebra, Karnaugh maps, Quine-McClusky method, combinational switching circuits, multiplexers, decoders, encoders, latches, flip flops, registers, counters, sequential switching circuits, wired and stored program processor concepts (e.g. ROM), and VHDL. This course includes a lab component and is intended for computer engineering and electrical engineering students. (3 lecture hours, 3 lab hours)

**Prerequisite:** MATH 1431 with a grade of C or better, or equivalent or a qualifying score on the mathematics placement test or a qualifying A.C.T. math score.

**ENGIN 2220*****Circuit Analysis II***

4 Credit Hours

This is an advanced course in circuit analysis and design. The topics include three phase circuits, magnetically coupled circuits, frequency response of AC circuits, Fourier series, Fourier transforms, active filters, and two port networks. This course includes a lab component. (3 lecture hours, 3 lab hours)

**Prerequisite:** ENGIN 2210 and MATH 2270, both with a grade of C or better, or equivalent.

**ENGIN 2223*****Microcontrollers***

4 Credit Hours

This is an introduction to the structure of microprocessors. The topics include architecture, instruction set, assembly language programming, assembler directives, input/output operations, C language programming for an embedded device, timers, analog-to-digital conversion, interrupts, and timing analysis. The course includes a lab component and is intended for electrical and computer engineering students. (3 lecture hours, 3 lab hours)

**Prerequisite:** ENGIN 2213 and CIS 1400, both with a grade of C or better, or equivalent, or ENGIN 2213 and CIS 2485, both with a grade of C or better, or equivalent.

**ENGIN 2233*****Introduction to LC-3***

1 Credit Hour

This is an introduction to the LC-3 computer system. The topics include the von Neumann model of computer architecture, the architecture, datapath, and instruction set of the LC-3, and machine and assembly programming in LC-3. This course is intended for computer engineering and electrical engineering students. (1 lecture hour)

**Prerequisite:** ENGIN 2213 with a grade of C or better, or equivalent and corequisite enrollment in ENGIN 2223.

**ENGIN 2820*****Advanced Selected Topics I***

1-3 Credit Hours

Advanced exploration and analysis of selected topics with a specific theme indicated by course title listed in college class schedule. This course may be taken four times for credit as long as different topics are selected. (1 to 3 lecture hours)

**Prerequisite:** At least one course in the discipline or consent of instructor.

**ENGIN 2860*****Internship (Career & Technical Ed)***

1-4 Credit Hours

Course requires participation in Career and Technical Education work experience with onsite supervision. Internship learning objectives are developed by student and faculty member, with approval of employer, to provide appropriate work-based learning experiences. Credit is earned by working a minimum of 75 clock hours per semester credit hour, up to a maximum of four credits. (5 to 20 lab hours)

**Prerequisite:** Consent of instructor and 2.0 cumulative grade point average, 12 semester credits earned in a related field of study, students work with Career Services staff to obtain approval of the internship by the Dean from the academic discipline where the student is planning to earn credit.

**ENGIN 2865*****Internship Advanced (Career & Tech Ed)***

1-4 Credit Hours

Continuation of Internship (Career and Technical Education). Course requires participation in Career & Technical Education work experience with onsite supervision. Internship learning objectives are developed by student and faculty member, with approval of employer, to provide appropriate work-based learning experiences. Credit is earned by working a minimum of 75 clock hours per semester credit hour, up to a maximum of four credits. (5 to 20 lab hours)

**Prerequisite:** Consent of instructor and 2.0 cumulative grade point average, 12 semester credits earned in a related field of study, students work with Career Services staff to obtain approval of the internship by the Dean from the academic discipline where the student is planning to earn credit.

**ENGIN 2870*****Internship (Transfer)***

1-4 Credit Hours

Course requires participation in work experience with onsite supervision. Internship learning objectives are developed by student and faculty member, with approval of employer, to provide appropriate work-based learning experiences. Credit is earned by working a minimum of 75 clock hours per semester credit hour, up to a maximum of four credits. (5 to 20 lab hours)

**Prerequisite:** Consent of instructor and 2.0 cumulative grade point average, 12 semester credits earned in a related field of study, students work with Career Services staff to obtain approval of the internship by the Dean from the academic discipline where the student is planning to earn credit.

**ENGIN 2871*****Internship - Advanced (Transfer)***

1-4 Credit Hours

Continuation of Internship (Transfer). Course requires participation in work experience with onsite supervision. Internship learning objectives are developed by student and faculty member, with approval of employer, to provide appropriate work-based learning experiences. Credit is earned by working a minimum of 75 clock hours per semester credit hour, up to a maximum of four credits. (5 to 20 lab hours)

**Prerequisite:** Consent of instructor and 2.0 cumulative grade point average, 12 semester credits earned in a related field of study, students work with Career Services staff to obtain approval of the internship by the Dean from the academic discipline where the student is planning to earn credit.