

# GENERAL ENGINEERING (GEEN)

## Courses

### GEEN 1010 (4) Engineering Explorations Through Physics

Explore the world of engineering through understanding physics concepts, engaging in active learning assignments, and conducting hands-on labs and experiments. Students will analyze product designs and engineering decisions based on the physics surrounding the situation. Formerly COEN 1010.

**Requisites:** Restricted to College of Engineering majors with 75 or less cumulative hours.

### GEEN 1017 (3) Engineering Drawing

Introduces CAD software; relevant concepts, including orthographic projection, sections, engineering drawing, geometric dimensioning and tolerancing; and rapid manufacturing methods. Final design project involves rapid prototyping. Not recommended for AREN majors.

### GEEN 1400 (3) Engineering Projects

First-year students solve real engineering design problems in interdisciplinary teams. Design projects vary by section. Curriculum focuses on iterative design process, teamwork and team dynamics, supporting design with testing and analysis, and technical writing. Completed projects are exhibited at an end-of-semester design expo. Students are responsible for contributing towards their design project budget, workshop costs, and course arduino kit (approximately \$125).

**Equivalent - Duplicate Degree Credit Not Granted:** ASTR 2500, ASEN 1400, ASEN 1403 and ECEN 1400

**Requisites:** Restricted to College of Engineering majors with 75 or less cumulative hours or IUT On Track applicants only.

### GEEN 1830 (1-4) Special Topics in Engineering

Explores topics of interest in engineering. Content varies by instructor and semester.

**Repeatable:** Repeatable for up to 6.00 total credit hours.

### GEEN 2010 (3) Engineering Tools and Analysis

Taught by engineering faculty, this course utilizes active learning pedagogies to connect math content to engineering problems (across multiple disciplines) by using real engineering tools. Students are introduced to circuits, multimeters, oscilloscopes, sensors and more. They learn to program in MATLAB (no previous programming experience necessary). Students work collaboratively with other students to collect and analyze experimental data. There is one lecture, one mixed lecture/hands-on problem session, and one lab period each week.

### GEEN 2400 (3) Engineering Projects for the Community

Design engineering products for local community clients, with emphasis on humanitarian engineering and integrated systems with electrical, mechanical, and software components. Students are challenged to take design projects to a higher level by requiring an additional iteration through design cycle and more engaged user-testing, in order to infuse student projects with robustness necessary for public-use products. Students responsible for contributing towards their design project budget, workshop, and expo costs (approximately \$100). Cannot be taken concurrently with GEEN 3400.

**Requisites:** Restricted to students with 45-180 credits (Sophomores, Juniors or Seniors) or requires prerequisite course of GEEN 1400 or COEN 1400 or ASEN 1400 or ECEN 1400 (minimum grade C-). Must be College of Engineering majors or IUT On Track applicants only.

### GEEN 2830 (1-4) Special Topics

Explores topics of interest in engineering. Content varies by instructor and semester.

**Repeatable:** Repeatable for up to 9.00 total credit hours.

### GEEN 2851 (3) Statics for Engineers

Examines vector treatment of force systems and their resultants; equilibrium of frames and machines, including internal forces and three-dimensional configurations; static friction; properties of surfaces, including first and second moments; hydrostatics; and minimum potential energy and stability.

**Equivalent - Duplicate Degree Credit Not Granted:** CVEN 2121 and MCEN 2023

**Requisites:** Requires prerequisite course of PHYS 1110 and APPM 1360 or MATH 2300 (all minimum grade C-). Restricted to College of Engineering majors or IUT On Track applicants only.

### GEEN 3010 (3) Circuits for Engineers

Examines basic concepts of electricity, digital systems, circuit analysis, and circuit design. Specific topics covered include analysis of electric circuits by use of Ohm's law, network reduction, node and loop analysis, Thevenin and Norton theorems, DC and AC signals, transient response of simple circuits, basic diode and transistor circuits, operational amplifiers, and microcontrollers. Students are challenged to integrate their knowledge in a final design project.

**Requisites:** Requires a prerequisite course of PHYS 1140 and a prerequisite or corequisite course of (APPM 2360 or MATH 2130 and MATH 3430) (all minimum grade C-). Restricted to College of Engineering undergraduate majors only.

### GEEN 3024 (3) Materials Science for Engineers

Examines structure, properties, processing and uses of metallic, polymeric, ceramic and composite materials. Specific topics covered include perfect and imperfect solids, phase equilibria, transformation kinetics, mechanical and electrical behavior and failure modes. Approach incorporates both materials science and materials engineering applications. Formerly GEEN 2024.

**Equivalent - Duplicate Degree Credit Not Granted:** MCEN 2024

**Requisites:** Requires a prerequisite course of PHYS 1110 (minimum grade C-). Restricted to College of Engineering students only.

**Grading Basis:** Letter Grade

### GEEN 3400 (3) Invention and Innovation

Introduction to business development and product innovation with a hands-on approach. Students explore invention process, hone their engineering design skills, and explore initial stages of entrepreneurship (patenting, intellectual property, marketing research, and raising capital). Student teams design, create, and test a commercial product, and exhibit at an end-of-semester design expo. Students are responsible for contributing towards their design project budget, workshop, and expo costs (approximately \$100). Cannot be taken concurrently with GEEN 2400.

**Requisites:** Restricted to students with 57-180 credits (Junior or Senior) College of Engineering students only.

### GEEN 3830 (1-4) Special Topics

Explores topics of interest in engineering. Content varies by instructor and semester.

**Repeatable:** Repeatable for up to 9.00 total credit hours.

**Requisites:** Restricted to College of Engineering undergraduate students only.

**GEEN 3852 (3) Thermodynamics for Engineers**

Explores fundamental concepts and basic theory, including first and second laws of thermodynamics, properties, states, thermodynamic functions and cycles. Links theory and application with labs and a design project involving a functioning thermodynamic process.

**Equivalent - Duplicate Degree Credit Not Granted:** MCEN 3012 or AREN 2110

**Requisites:** Requires prerequisite course of PHYS 1110 (minimum grade C-). Restricted to College of Engineering majors only.

**GEEN 3853 (4) Data Analysis for Engineers**

Learn to design and execute experiments and analyze the results. Topics covered include measurement fundamentals, design of experiments, probability, descriptive statistics, linear regression, propagation of uncertainty, and hypothesis testing (t-tests and ANOVA).

**Equivalent - Duplicate Degree Credit Not Granted:** MCEN 3047

**Requisites:** Requires prereqs PHYS 1140 (APPM 1360 or MATH 2300) (ASEN 1320 or CHEN/ECEN 1310 or CSCI 1200 or 1300 or 1310 or 1320). Requires prereq or coreqs (ECEN/GEEN 3010 or MCEN 3017) (WRTG 3030 or 3035 or ENES 1010 or 3100 or ENLP 3100) (all min grade C-

**GEEN 4400 (3) Teaching Design**

Examines teaching engineering design to a variety of audiences including secondary schools, project teams, and other communities. Students examine the process of teaching hands-on design including scoping, stages of team evolution, and iteration. Students also explore different design methods, the development of engineering identity, and the interface between engineering and society. Students practice integrating design thinking into local schools and companies, develop ready-to-use tools and resources, and explore the design education literature.

**Requisites:** Requires prerequisite courses of GEEN 1400 and GEEN 2400 and prerequisite or corequisite course of GEEN 3400 (all minimum grade B).

**GEEN 4848 (1-6) Independent Study**

Subjects arranged in consultation with instructor and undergraduate advisor. Department consent required.

**Repeatable:** Repeatable for up to 6.00 total credit hours.

**Requisites:** Restricted to Integrated Design Engineering (IDEN-BSIDE) students only.