

ENGINEERING PLUS

The Engineering Plus (<http://www.colorado.edu/eplus>) program prepares graduates for exciting, diverse and innovative professional careers and for graduate study in a wide variety of disciplines. The degree program provides a pathway through engineering for students interested in interdisciplinary, hands-on engineering design by coupling a disciplinary engineering emphasis with a concentration of the students' choice within, or external to, engineering.

Students complete core engineering and design coursework, followed by coursework in their chosen engineering emphasis (i.e., aerospace, architectural, civil, electrical, environmental or mechanical engineering). Students also choose a concentration area, such as entrepreneurship, CU Teach engineering (i.e., secondary math or science teaching), business, pre-medical, and many others. Graduates from the Engineering Plus program will find opportunities in many engineering enterprises, as well as unique positions enabled by their engineering emphasis and concentration choices.

Course code for this program is GEEN.

Bachelor's Degree

- Engineering Plus - Bachelor of Science (BS) (catalog.colorado.edu/undergraduate/colleges-schools/engineering-applied-science/programs-study/engineering-plus/engineering-plus-bachelor-science-bs)

While many faculty teach both undergraduate and graduate students, some instruct students at the undergraduate level only. For more information, contact the faculty member's home department.

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Instructor; PhD, Stanford University

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Instructor; PhD, University of Colorado Boulder

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.

Grading Basis: Letter Grade

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 MCEN, AREN or CVEN majors.

Grading Basis: Letter Grade

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 responsible for contributing towards their design project budget and poster costs, and purchasing safety glasses (approximately \$75).

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

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 the design cycle and more engaged user-testing, in order to infuse student projects with the robustness necessary for public-use products.

Requisites: Requires prerequisite course of GEEN 1400 or COEN 1400 or ASEN 1400 or ECEN 1400 (minimum grade C). Restricted to College of Engineering majors only.

Grading Basis: Letter Grade

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 only.

Grading Basis: Letter Grade

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 (all minimum grade C). Restricted to College of Engineering undergraduate majors only.

Grading Basis: Letter Grade

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.

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 the invention process, hone their engineering design skills, and explore the initial stages of entrepreneurship (patenting, intellectual property, marketing research, and raising capital). Student teams design, create, and test a potentially commercial product, and exhibit at an end-of-semester design expo.

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

GEEN 3830 (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

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

Grading Basis: Letter Grade

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, elementary statistics and uncertainty analysis. Topics include probability, error propagation, confidence intervals, hypothesis testing, linear regression, one- and two-factor ANOVA and time series analysis.

Equivalent - Duplicate Degree Credit Not Granted: MCEN 3047

Requisites: Requires prereq courses of PHYS 1140 and APPM 2360 and (CHEN 1310 or CSCI 1300 or 1310 or 1320). Requires prereq or coreqs of (ECEN 3010 or GEEN 3010 or MCEN 3017) (GEEN 3024 or MCEN 2024) (WRTG 3030 or 3035 or HUEN 1010 or 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).

Grading Basis: Letter Grade

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 Engineering Plus (GEEN) students only.

Grading Basis: Letter Grade