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, Sustainability, 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.

Reamon, Derek T (https://experts.colorado.edu/display/fisid_120538)
Senior Instructor; PhD, Stanford University

Segil, Jacob Lionel (https://experts.colorado.edu/display/fisid_155128)
Instructor; MS, University of Colorado Boulder

Soltys, Michael A. (https://experts.colorado.edu/display/fisid_152021)
Instructor; PhD, University of Colorado Boulder

Sullivan, Jacquelyn F (https://experts.colorado.edu/display/fisid_102481)
Instructor

Tsai, Janet (https://experts.colorado.edu/display/fisid_156447)
Instructor; PhD, University of Colorado Boulder

Writer, Jeffrey H. (https://experts.colorado.edu/display/fisid_149024)
Instructor; PhD, University of Colorado

Zarske, Malinda Schaefer (https://experts.colorado.edu/display/fisid_120823)
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 manufacturing methods. Final design project involves rapid prototyping. Not recommended for MCEN, AREN or CVEN majors.
**Requisites:** Restricted to College of Engineering students with 75 or less cumulative hours.
**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.
**Grading Basis:** Letter Grade

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 1410 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 design and circuit analysis. 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, transfer functions, basic diode and transistor circuits, operational amplifiers and microcontrollers.
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 invention 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.
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 (3) Fluid Mechanics for Engineers
Introduces fluid mechanics and momentum transfer, emphasizing the application of these principles to engineering systems.
Equivalent - Duplicate Degree Credit Not Granted: CHEN 3200 and CVEN 3313 and MCEN 3021
Requisites: Requires prerequisite courses of APPM 2350 or MATH 2400 and CHEN 2120 or MCEN 2023 or CVEN 2121 (all minimum grade C-). Requires a prerequisite or corequisite course of APPM 2350. Restricted to College of Engineering majors only.

GEEN 4400 (3) Teaching Design
For pre-service math, science and engineering educators, this course focuses on teaching engineering design in secondary schools. Students examine the process of teaching hands-on design, including scoping, stages of team evolution, development of engineering identity and iteration. Students engage in practice of integrating design thinking into secondary math/science curriculum, develop ready-to-use tools and resources and explore the design education literature.
Requisites: Requires prerequisite courses of GEEN 1400 and EDUC 4060 (all minimum grade B). Requires corequisite course of GEEN 3400. Restricted to Engineering Plus (GEEN) majors in CU Teach math, biology, chemistry or physics (TMMA, TSBI, TSCH, TSPH).
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