ENGINEERING PLUS

Engineering Plus (http://www.colorado.edu/eplus) 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 traditional 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 combination of engineering emphasis and concentration.

Course code for this program is GEEN.

Bachelor’s Degree

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

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.

Bielefeldt, Angela R. (https://experts.colorado.edu/display/fisid_110322)
  Director, Professor, PhD, University of Washington

Godrick, Daniel (https://experts.colorado.edu/display/fisid_154955)
  Instructor; MS, University of Colorado Boulder

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

Stites, Nick
  Instructor; PhD, Purdue University

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

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

Zarske, Malinda Schaefer (https://experts.colorado.edu/display/fisid_120823)
  Senior 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 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:** Restricted to students with 30-180 credits (Sophomores, Juniors or Seniors) or requires prerequisite course of GEEN 1400 or COEN 1400 or ASEN 1400 or ECEN 1400 (minimum grade C). 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 2900 (3) Geometry and Design
Focuses on geometric and mechanical design principles, including orthogonal projection, sections, engineering drawing, geometric dimensioning and tolerancing, and rapid manufacturing methods. Final design project involves rapid prototyping. Recommended for AREN or CVEN majors.
**Grading Basis:** Letter Grade

GEEN 2010 (3) Engineering Design
Introduces design principles and practices, including 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) Design Engineering Products 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:** Restricted to students with 30-180 credits (Sophomores, Juniors or Seniors) or requires prerequisite course of GEEN 1400 or COEN 1400 or ASEN 1400 or ECEN 1400 (minimum grade C). Restricted to College of Engineering majors only.
**Grading Basis:** Letter Grade

GEEN 2600 (3) Introduction to Engineering Design
Introduces design principles and practices, including 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 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
Examine 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
Examine 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 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 (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
Requisites: Requires prerequisite course of PHYS 1110 (minimum grade C). Restricted to College of Engineering majors only.
Grading Basis: Letter Grade

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