ENGINEERING (ENGR)

Coursework in the College of Engineering may transfer differently between the quarter and semester systems. If a course includes a “Formerly” or “Replaced” label, please check the official course mapping (https://eadvise.calpoly.edu/semester-conversion-ceng-transition) information available through Engineering Student Services to confirm how the credit will apply toward your degree requirements.

undefined

ENGR Courses

ENGR 1110 Introduction to Engineering (1 unit)
Term Typically Offered: F

Introduction to engineering and the computing disciplines with emphasis on the design process, systems thinking, data literacy, teamwork, and skills for academic success in engineering. Exploration of social justice in engineering. 1 lecture. Formerly ENGR 110.

ENGR 2211 Introduction to Mechanics (4 units)
Term Typically Offered: F, SP, SU
Prerequisite: MATH 143 or MATH 1262; and PHYS 141 or PHYS 1141.

Analysis of forces and moments in engineering structures using vector mathematics. Equilibrium conditions, friction, centroids, and area moments. Mathematical modeling of axial, torsional, bending, and combined loading to estimate stresses, strains, and deformations in determinate and indeterminate systems. Not open to students with credit in ME 2204. 4 lectures.

ENGR 2212 Introduction to Engineering Dynamics (2 units)
Term Typically Offered: F, SP
Prerequisite: ARCE 211, ARCE 1121, ENGR 2211, ME 211, or ME 2210.

Analysis of motions of particles and rigid bodies encountered in engineering. Velocity, acceleration, relative motion, work and energy, impulse and momentum. Further development of mathematical modeling and problem solving. Vector mathematics where appropriate. Not open to students with credit in ME 212 or ME 2212. Course may be offered in classroom-based or hybrid format. 2 lectures.

ENGR 2234 Introduction to Design Thinking (4 units)
Term Typically Offered: F, SP
Prerequisite: Entrepreneurship Concentration, Entrepreneurship Minor, or Graphic Communication major.

Introduction to the process of design thinking and human centered design including design process, methodology, and implementation. Empathy, creativity, iterative prototyping, and contextual design of products and services. 4 discussions. Crosslisted as BUS/ENGR 2234. Formerly BUS/ENGR 234.

ENGR 2270 Special Topics (1-4 units)
Term Typically Offered: TBD
Prerequisite: Consent of instructor.

Directed group study of special topics. The Class Schedule will list topic selected. Repeatable up to 8 units. Course may be offered in classroom-based, online, or hybrid format. 1 to 4 lectures. Formerly ENGR 270.

ENGR 2271 Special Topics Laboratory (1-2 units)
Term Typically Offered: F
Prerequisite: Consent of instructor.

Directed group laboratory study of special topics. The Class Schedule will list topic selected. Repeatable up to 8 units. 1 to 2 laboratories.

ENGR 2995 Vertically Integrated Project Experience I (1-2 units)
Term Typically Offered: F, SP
Prerequisite: Completion of GE Area 1 with grades of C- or better (GE Area A for the 2020-26 catalogs); and consent of instructor.

Teams of students from multiple class levels work with faculty. Students participate in relevant disciplinary work, develop professional skills, make substantial contributions to sociotechnical projects or research, and work on multidisciplinary teams. Students can participate for multiple years. The Class Schedule will list subtitle selected. Repeatable up to 4 units. Course may be offered in classroom-based or online format. 1 to 2 lectures.

ENGR 3301 Engineering Professional Success (1 unit)
Term Typically Offered: F
CR/NC
Prerequisite: Junior standing and consent of instructor.

Strategies for success as an engineering transfer student and professional. Preparing for the job search, networking, exploring values, and building a professional identity in the context of society and community. Credit/No Credit grading only. 1 activity. Formerly ENGR 301.

ENGR 3302 The Learn By Doing Lab Teaching Practicum (2 units)
Term Typically Offered: SP
CR/NC
Prerequisite: Completion of GE Area 2 with a grade of C- or better (GE Area B4 for the 2020-26 catalogs); and completion of GE Area 5 (GE Areas B1 to B3 for the 2020-26 catalogs).

Early teaching experience in an informal science, technology, engineering, and mathematics (STEM) teaching and learning environment. Principles of inquiry-driven STEM education, lesson design, implementation and assessment. Intended for undergraduates exploring STEM teaching as a career. Repeatable up to 4 units. Credit/No Credit grading only. 1 seminar, 1 laboratory. Crosslisted as ENGR/HNRS/SCM 3302. Formerly ENGR 322/HNRS 302/SCM 302.

ENGR 3310 Ethical Engineering for the Anthropocene (2 units)
Term Typically Offered: SP
Prerequisite: ENGR 110 or ENGR 1110; and General Engineering major. Recommended: One of the following: PHIL 323, PHIL 3323, ES/WGQS 350, or ES/WGQS 3350.

Impact engineers have on society and the planet. Community-based project on the relationship of engineering to ethics, climate change, social justice, community, emerging technologies, global development, systems thinking, and social-technical integration. Field trip may be required. 1 lecture, 1 laboratory.

ENGR 3334 Needfinding in New Product Design (3 units)
Term Typically Offered: TBD
Prerequisite: One of the following: ENGR 234, ENGR 2234, IME 144, ME 234, or ME 3234.

Identification and characterization of human needs for future products, systems, services, and environments. Observation and interview techniques based on ethnographic approaches and building design empathy. Development of broad and flexible thinking skills for designers to address the needs of society. 3 lectures. Formerly ENGR 334.

ENGR 3350 The Global Environment (3 units)
Term Typically Offered: F, SP
2026-28 or later: Upper-Div GE Area 2/5
2020-26 catalogs: Upper-Div GE Area B
Sustainability Focused
Prerequisite: Junior standing; completion of GE Area 1 with grades of C- or better (GE Area A for the 2020-26 catalogs); completion of GE Area 2 with a grade of C- or better (GE Area B4 for the 2020-26 catalogs); and completion of GE Area 5 (GE Areas B1 to B3 for the 2020-26 catalogs).

Interdisciplinary investigation of how human activities impact the Earth's environment on a global scale. Examination of population, resource use, climate change, and biodiversity from scientific/technical and social/economic/ historical/political perspectives. Use of remote sensing maps. Sustainable solutions. Course may be offered in classroom-based, online, or hybrid format. 3 lectures. Crosslisted as AG/EDES/ENGR/GEOG/ISLA/SCM/UNIV 3350. Fulfills GE Areas Upper-Division 2 or Upper-Division 5 (GE Area Upper-Division B for students on the 2020-26 catalogs). Formerly AG/EDES/ENGR/GEOG/ISLA/SCM/UNIV 350.

ENGR 4400 Special Problems for Advanced Undergraduates (1-4 units)
Term Typically Offered: F, SP, SU
Prerequisite: Consent of Instructor.

Individual investigation, research, studies or surveys of selected problems. Repeatable up to 8 units. Formerly ENGR 400.

ENGR 4460 Interdisciplinary Senior Project I (2 units)
Term Typically Offered: F
Prerequisite: Senior standing and consent of instructor.

First of two courses taken sequentially in a team-based interdisciplinary senior design project. Project management, cost analysis, intellectual property, test plans, impact analysis on society, and ethical considerations. Communication of results to project sponsor. 2 laboratories. Formerly ENGR 459.

ENGR 4461 Interdisciplinary Senior Project II (2 units)
Term Typically Offered: TBD
Prerequisite: ENGR 459 or ENGR 4460.

Continuation of senior project. Activities focus on detail design, analysis, and material procurement. 2 laboratories. Formerly ENGR 460.

ENGR 4463 Interdisciplinary Entrepreneurial Senior Project I (2 units)
Term Typically Offered: F
Prerequisite: Senior standing and consent of instructor.

First of two courses taken sequentially in a team-based interdisciplinary senior design project with engineering and business students. Entrepreneurial process through design of a product or service, using customer development and agile engineering. 2 laboratories. Formerly ENGR 463.

ENGR 4464 Interdisciplinary Entrepreneurial Senior Project II (2 units)
Term Typically Offered: TBD
Prerequisite: ENGR 464 or ENGR 4463.

Continuation of the team-based interdisciplinary senior design project with engineering and business students. 2 laboratories. Formerly ENGR 464.

ENGR 4465 Senior Project I (2 units)
Term Typically Offered: F, SP, SU
Prerequisite: Senior standing; consent of program director; and consent of instructor.

First of two courses taken sequentially for an individually completed senior project. Development project goals and generation of design solutions. Project management, cost analysis, intellectual property, test plans, impact analysis on society, and ethical considerations. Communication of results to faculty supervising. Formerly ENGR 462.

ENGR 4466 Senior Project II (2 units)
Term Typically Offered: TBD
Prerequisite: ENGR 462 or ENGR 4465.

Continuation of the senior project. Activities focus on detail design, analysis, and material procurement.

ENGR 4470 Special Advanced Topics (1-4 units)
Term Typically Offered: TBD
Prerequisite: Consent of instructor.

Directed group study of special topics for advanced students. The Class Schedule will list topic selected. Repeatable up to 8 units. Course may be offered in classroom-based, online, or hybrid format. 1 to 4 lectures. Formerly ENGR 470.

ENGR 4471 Special Advanced Laboratory (1-2 units)
Term Typically Offered: TBD
Prerequisite: Consent of instructor.

Directed group laboratory study of special topics for advanced students. The Class Schedule will list topic selected. Repeatable up to 8 units. 1 to 2 laboratories. Formerly ENGR 471.

ENGR 4495 Cooperative Education Experience (1-12 units)
Term Typically Offered: F, SP, SU
CR/NC
Prerequisite: Sophomore standing and consent of instructor.

Work experience in business, industry, government, and other areas of student career interest. Positions are paid and usually require relocation and registration in course for one or two consecutive semesters. A formal report and evaluation by work supervisor required. Repeatable up to 24 units. Credit/No Credit grading only. Formerly ENGR 495.

ENGR 4995 Vertically Integrated Project Experience II (1-2 units)
Term Typically Offered: F, SP
Prerequisite: Junior standing; completion of GE Area 1 with grades of C- or better (GE Area A for the 2020-26 catalogs); and consent of instructor.

Teams of students from multiple class levels work with faculty. Students participate in relevant disciplinary work, develop professional skills, make substantial contributions to sociotechnical projects or research, and work on multidisciplinary teams. Students can participate for multiple years. The Class Schedule will list subtitle selected. Repeatable up to 8 units. Course may be offered in classroom-based or online format. 1 to 2 lectures.

ENGR 5500 Individual Study (1-4 units)
Term Typically Offered: F, SP, SU
Prerequisite: Graduate standing; and consent of program director and supervising faculty member.

Advanced study planned and completed under the direction of faculty. Open to graduate students who have demonstrated the ability to do independent work. Repeatable up to 8 units. Formerly ENGR 500.

ENGR 5570 Special Advanced Topics (1-4 units)
Term Typically Offered: TBD
Prerequisite: Graduate standing and consent of instructor.

Directed group study of special topics for advanced students. The Class Schedule will list topic selected. Repeatable up to 8 units. Course may be offered in classroom-based, online, or hybrid format. 1 to 4 lectures. Formerly ENGR 570.

ENGR 5571 Special Advanced Laboratory (1-2 units)
Term Typically Offered: TBD
Prerequisite: Graduate standing and consent of instructor.

Directed group laboratory study of special topics for advanced students. The Class Schedule will list topic selected. Repeatable up to 8 units. 1 to 2 laboratories. Formerly ENGR 571.

ENGR 5995 Vertically Integrated Project Experience III (1-2 units)
Term Typically Offered: F, SP
Prerequisite: Graduate standing and consent of instructor.

Teams of students from multiple class levels work with faculty. Students participate in relevant disciplinary work, develop professional skills, make substantial contributions to sociotechnical projects or research, and work on multidisciplinary teams. Students can participate for multiple years. The Class Schedule will list subtitle selected. Repeatable up to 6 units. Course may be offered in classroom-based or online format. 1 to 2 lectures.