ENGINEERING (ENG)

College of Engineering

ENG 001 — Introduction to Engineering (1 unit)

Course Description: Introduction to the role of engineers in the acquisition and development of engineering knowledge, the differences and similarities among engineering fields, and the work ethic and skills required for engineering.
Learning Activities: Lecture 1 hour(s).
Enrollment Restriction(s): Open to first year students only.
Grade Mode: Pass/No Pass only.
General Education: Science & Engineering (SE).

ENG 003 — Introduction to Engineering Design (4 units)

Course Description: Introduction to the engineering design process that incorporates the development of oral and written communication skills integral to the design process. Conducted in workshop format with hands-on engagement in the design process.
Prerequisite(s): Completion of Entry Level Writing Requirement (ELWR).
Learning Activities: Lecture 2 hour(s), Studio 2 hour(s), Project 2 hour(s).
Enrollment Restriction(s): Pass One restricted to lower division College of Engineering students; Pass Two restricted to lower division students.
Grade Mode: Letter.
General Education: Science & Engineering (SE) or Social Sciences (SS); Oral Skills (OL).

ENG 003Y — Introduction to Engineering Design (4 units)

Course Description: Introduction to the engineering design process that incorporates the development of oral and written communication skills integral to the design process. Conducted in workshop format with hands-on engagement in the design process.
Prerequisite(s): Completion of Entry Level Writing Requirement (ELWR).
Learning Activities: Web Virtual Lecture 2 hour(s), Studio 2 hour(s), Project 2 hour(s).
Enrollment Restriction(s): Pass One restricted to lower division College of Engineering students; Pass Two restricted to undergraduate College of Engineering students.
Credit Limitation(s): No credit if student has taken ENG 003.
Grade Mode: Letter.
General Education: Science & Engineering (SE) or Social Sciences (SS); Oral Skills (OL).

ENG 004 — Engineering Graphics in Design (3 units)

Course Description: Engineering design, descriptive geometry, pictorial sketching, computer-aided graphics, and their application in the solution of engineering problems.
Learning Activities: Lecture 2 hour(s), Laboratory 3 hour(s).
Grade Mode: Letter.
General Education: Science & Engineering (SE); Visual Literacy (VL).

ENG 006 — Engineering Problem Solving (4 units)

This version has ended; see updated course, below.
Course Description: Methodology for solving engineering problems. Engineering computing and visualization based on MATLAB. Engineering examples and applications.
Prerequisite(s): (MAT 016A C- or better or MAT 017A C- or better or MAT 019A C- or better or MAT 021A C- or better); (MAT 016B C- or better (can be concurrent) or MAT 017B C- or better (can be concurrent) or MAT 019B C- or better (can be concurrent) or MAT 021B C- or better (can be concurrent)).
Learning Activities: Lecture 3 hour(s), Laboratory 3 hour(s).
Grade Mode: Letter.
General Education: Science & Engineering (SE).

ENG 006 — Engineering Problem Solving (4 units)

Course Description: Methodology for solving engineering problems. Engineering computing and visualization based on MATLAB. Engineering examples and applications.
Prerequisite(s): (MAT 016A C- or better or MAT 017A C- or better or MAT 019A C- or better or MAT 021A C- or better); (MAT 016B C- or better (can be concurrent) or MAT 017B C- or better (can be concurrent) or MAT 019B C- or better (can be concurrent) or MAT 021B C- or better (can be concurrent)).
Learning Activities: Lecture 3 hour(s), Laboratory 1 hour(s).
Grade Mode: Letter.
General Education: Science & Engineering (SE).
This course version is effective from, and including: Spring Semester 2026.

ENG 008 — Introduction to Entrepreneurship (3 units)

Course Description: Students from all majors will learn the processes involved in modern entrepreneurship and identify an opportunity for innovation. The 3 C's of the entrepreneurial mindset (developed by KEEN) will be covered: Curiosity, Connections, and Creating Values.
Learning Activities: Lecture 3 hour(s).
Grade Mode: Letter.
General Education: Social Sciences (SS).

ENG 009 — Technology Startup Speaker Series (1 unit)

Course Description: Presentations from successful entrepreneurs about the challenges of building a technology company, leadership, barriers faced by underrepresented founders, and professional resources to support student entrepreneurship.
Prerequisite(s): Consent of instructor.
Learning Activities: Lecture 1 hour(s).
Grade Mode: P/NP only.
General Education: Social Sciences (SS).

ENG 010 — The Science Behind the Technology in Our Lives (4 units)

Course Description: Understanding of how the technology in our lives works using only basic concepts and rudimentry mathematics.
Prerequisite(s): High school algebra.
Learning Activities: Lecture 3 hour(s), Discussion 1 hour(s).
Grade Mode: Letter.
General Education: Science & Engineering (SE) or Social Sciences (SS).

ENG 011A — Issues in Engineering (1 unit)

Course Description: Engineering profession and its role in society; engineering design and development process; introduction to the engineering grand challenges; and professional resources for students.
Prerequisite(s): Consent of instructor.
Learning Activities: Lecture 1 hour(s).
Grade Mode: Pass/No Pass only.
General Education: Science & Engineering (SE).

ENG 011B — Issues in Engineering (1 unit)

Course Description: Engineering disciplines; the engineering profession's methods, principles, and career opportunities; professional resources for students.
Prerequisite(s): Consent of instructor.
Learning Activities: Lecture 1 hour(s).
Credit Limitation(s): No credit for students who have completed ENG 001.
Grade Mode: Pass/No Pass only.
General Education: Science & Engineering (SE).

ENG 017 — Circuits I (4 units)

This version has ended; see updated course, below.
Course Description: Basic electric circuit analysis techniques, including electrical quantities and elements, resistive circuits, transient and steady-state responses of RLC circuits, sinusoidal excitation and phasors, and complex frequency and network functions.
Prerequisite(s): MAT 021C; C- or better recommended.
Learning Activities: Lecture 3 hour(s), Discussion 1 hour(s).
Grade Mode: Letter.
General Education: Science & Engineering (SE); Visual Literacy (VL).

ENG 017 — Circuits I (4 units)

Course Description: Basic electric circuit analysis techniques, including electrical quantities and elements, resistive circuits, transient and steady-state responses of RLC circuits, sinusoidal excitation and phasors, and complex frequency and network functions.
Prerequisite(s): MAT 021C C- or better.
Learning Activities: Lecture 3 hour(s), Discussion 1 hour(s).
Grade Mode: Letter.
General Education: Science & Engineering (SE); Visual Literacy (VL).
This course version is effective from, and including: Spring Quarter 2026.

ENG 017V — Circuits I (4 units)

This version has ended; see updated course, below.
Course Description: Basic electric circuit analysis techniques, including electrical quantities and elements, resistive circuits, transient and steady-state responses of RLC circuits, sinusoidal excitation and phasors, and complex frequency and network functions.
Prerequisite(s): MAT 021C.
Learning Activities: Web Virtual Lecture 3 hour(s), Web Electronic Discussion 1 hour(s).
Grade Mode: Letter.
General Education: Science & Engineering (SE); Visual Literacy (VL).

ENG 017V — Circuits I (4 units)

Course Description: Basic electric circuit analysis techniques, including electrical quantities and elements, resistive circuits, transient and steady-state responses of RLC circuits, sinusoidal excitation and phasors, and complex frequency and network functions.
Prerequisite(s): MAT 021C C- or better.
Learning Activities: Web Virtual Lecture 3 hour(s), Web Electronic Discussion 1 hour(s).
Grade Mode: Letter.
General Education: Science & Engineering (SE); Visual Literacy (VL).
This course version is effective from, and including: Spring Quarter 2026.

ENG 020 — Introduction to Space Exploration: Understanding the Technological & Environmental Challenges (4 units)

Course Description: Introductory overview of the space environment. Discussion of space exploration technology including propulsion, orbital mechanics, and spacecraft engineering.
Prerequisite(s): High school level Algebra, Geometry, General Science (Physics and Chemistry).
Learning Activities: Lecture 3 hour(s), Discussion 1 hour(s).
Grade Mode: Letter.
General Education: Science & Engineering (SE); Quantitative Literacy (QL); Scientific Literacy (SL).

ENG 035 — Statics (4 units)

Course Description: Force systems and equilibrium conditions with emphasis on engineering problems.
Prerequisite(s): (PHY 009A C- or better or PHY 009HA C- or better); MAT 021D C- or better (can be concurrent).
Learning Activities: Lecture 3 hour(s), Discussion 1 hour(s).
Grade Mode: Letter.
General Education: Science & Engineering (SE).

ENG 045 — Properties of Materials (4 units)

Course Description: Introduction to the properties of engineering materials and their relation to the internal structure of materials.
Prerequisite(s): (MAT 016C C- or better or MAT 017C C- or better or MAT 019C C- or better or MAT 021C C- or better); (CHE 002B C- or better or CHE 004A C- or better); (PHY 007B C- or better or PHY 009A C- or better or PHY 009HA C- or better).
Learning Activities: Lecture 3 hour(s), Laboratory 3 hour(s).
Enrollment Restriction(s): Pass One restricted to College of Engineering majors and Physics/Applied Physics majors (LPHY and LAPP).
Grade Mode: Letter.
General Education: Science & Engineering (SE).

ENG 045H — Honors Properties of Materials (1 unit)

Course Description: Examination of special materials science and engineering topics through additional readings, discussions, collaborative work, or special activities which may include projects, laboratory experience or computer simulations.
Prerequisite(s): ENG 045 (can be concurrent) or ENG 045Y (can be concurrent); enrollment in the Materials Science and Engineering Honors Program; ENG 045 or ENG 045Y required concurrently.
Learning Activities: Discussion 1 hour(s).
Enrollment Restriction(s): Open only to students in the Materials Science and Engineering Honors Program.
Grade Mode: Letter.

ENG 045Y — Properties of Materials (4 units)

Course Description: Introduction to the properties of engineering materials and their relation to the internal structure of materials.
Prerequisite(s): (MAT 016C C- or better or MAT 017C C- or better or MAT 019C C- or better or MAT 021C C- or better); (CHE 002B C- or better or CHE 004A C- or better); (PHY 007B C- or better or PHY 009A C- or better, PHY 009HA C- or better).
Learning Activities: Web Virtual Lecture 3 hour(s), Laboratory 3 hour(s).
Enrollment Restriction(s): Pass One restricted to College of Engineering majors and Physics/Applied Physics majors (LPHY and LAPP).
Grade Mode: Letter.
General Education: Science & Engineering (SE).

ENG 098 — Directed Group Study (1-4 units)

Course Description: Directed group study.
Learning Activities: Variable.
Enrollment Restriction(s): Restricted to College of Engineering students only.
Repeat Credit: May be repeated 3 time(s) when content differs.
Grade Mode: Pass/No Pass only.

ENG 100 — Electronic Circuits & Systems (3 units)

This version has ended; see updated course, below.
Course Description: Introduction to analog and digital circuit and system design through hands on laboratory design projects.
Prerequisite(s): (ENG 017 or ENG 017V) C- or better recommended.
Learning Activities: Laboratory 3 hour(s), Lecture 2 hour(s).
Credit Limitation(s): Students who have completed EEC 100 may receive only 1.5 units of credit.
Grade Mode: Letter.
General Education: Science & Engineering (SE); Visual Literacy (VL).

ENG 100 — Electronic Circuits & Systems (3 units)

Course Description: Introduction to analog and digital circuit and system design through hands on laboratory design projects.
Prerequisite(s): ENG 017 C- or better or ENG 017V C- or better.
Learning Activities: Laboratory 3 hour(s), Lecture 2 hour(s).
Credit Limitation(s): Students who have completed EEC 100 may receive only 1.5 units of credit.
Grade Mode: Letter.
General Education: Science & Engineering (SE); Visual Literacy (VL).
This course version is effective from, and including: Spring Quarter 2026.

ENG 102 — Dynamics (4 units)

Course Description: Kinematics and kinetics of particles, systems of particles, and of rigid bodies; application of these topics are applied to engineering problems.
Prerequisite(s): ENG 035 C- or better; (MAT 022B C- or better or MAT 027B C- or better).
Learning Activities: Lecture 4 hour(s), Discussion 1 hour(s).
Enrollment Restriction(s): Open to College of Engineering students only.
Credit Limitation(s): Only 2 units of credit allowed to students who have previously taken ENG 036.
Grade Mode: Letter.
General Education: Science & Engineering (SE); Visual Literacy (VL).

ENG 103 — Fluid Mechanics (4 units)

Course Description: Fluid properties, fluid statics, continuity and linear momentum equations for control volumes, flow of incompressible fluids in pipes, dimensional analysis and boundary-layer flows.
Prerequisite(s): ENG 035 C- or better; PHY 009B C- or better; (MAT 022B C- or better or MAT 027B C- or better).
Learning Activities: Lecture 4 hour(s), Discussion 1 hour(s).
Enrollment Restriction(s): Open to students in the College of Engineering and Hydrology majors.
Credit Limitation(s): Not open for credit to students who have completed ECH 150A.
Grade Mode: Letter.
General Education: Science & Engineering (SE).

ENG 104 — Mechanics of Materials (4 units)

Course Description: Uniaxial loading and deformation. General concepts of stress-strain-temperature relations and yield criteria. Torsion of shafts. Bending of beams. Deflections due to bending. Introduction to stability and buckling.
Prerequisite(s): ENG 035 C- or better; (MAT 022B C- or better or MAT 027B C- or better).
Learning Activities: Lecture 4 hour(s).
Enrollment Restriction(s): Open to Engineering majors only.
Grade Mode: Letter.
General Education: Science & Engineering (SE); Quantitative Literacy (QL).

ENG 104L — Mechanics of Materials Laboratory (1 unit)

Course Description: Experiments which illustrate the basic principles and verify the analysis procedures used in the mechanics of materials are performed using the basic tools and techniques of experimental stress analysis.
Prerequisite(s): ENG 104 or ENG 104V.
Learning Activities: Laboratory 3 hour(s).
Grade Mode: Letter.
General Education: Science & Engineering (SE).

ENG 104V — Mechanics of Materials (4 units)

Course Description: Uniaxial loading and deformation. General concepts of stress-strain-temperature relations and yield criteria. Torsion of shafts. Bending of beams. Deflections due to bending. Introduction to stability and buckling.
Prerequisite(s): ENG 035 C- or better; (MAT 022B C- or better or MAT 027B C- or better).
Learning Activities: Web Virtual Lecture 4 hour(s).
Enrollment Restriction(s): Open to Engineering majors only.
Grade Mode: Letter.
General Education: Science & Engineering (SE); Quantitative Literacy (QL).

ENG 105 — Thermodynamics (4 units)

Course Description: Fundamentals of thermodynamics: heat energy and work, properties of pure substances, First and Second Law for closed and open systems, reversibility, entropy, thermodynamic temperature scales. Applications of thermodynamics to engineering systems. May be taught abroad.
Prerequisite(s): PHY 009B C- or better; (MAT 022B C- or better or MAT 027B C- or better).
Learning Activities: Lecture 4 hour(s), Discussion 1 hour(s).
Enrollment Restriction(s): Open to College of Engineering students only.
Grade Mode: Letter.
General Education: Science & Engineering (SE); Visual Literacy (VL).

ENG 106 — Engineering Economics (4 units)

Course Description: Analysis of problems in engineering economy; the selection of alternatives; replacement decisions. Compounding, tax, origins and cost of capital, economic life, and risk and uncertainty are applied to methods of selecting most economic alternatives.
Prerequisite(s): Upper division standing in Engineering.
Learning Activities: Lecture 3 hour(s), Discussion 1 hour(s).
Grade Mode: Letter.
General Education: Science & Engineering (SE) or Social Sciences (SS); Quantitative Literacy (QL); Scientific Literacy (SL); Visual Literacy (VL).

ENG 108 — Launching a Company (3 units)

Course Description: Technological innovation and product development. Working as a team to turn ideas into companies through customer development.
Prerequisite(s): ENG 008 or consent of instructor.
Learning Activities: Lecture 3 hour(s).
Credit Limitation(s): No credit for students who have previously completed ENG 002 or ENG 080.
Grade Mode: Letter.
General Education: Social Sciences (SS).

ENG 111 — Electric Machinery Fundamentals (4 units)

Course Description: Principles of AC and DC electric motors and generators, their control systems and power sources. Selection of electric power equipment components based on their construction features and performance characteristics.
Prerequisite(s): ENG 017 C- or better or ENG 017V C- or better.
Learning Activities: Lecture 3 hour(s), Laboratory 3 hour(s).
Grade Mode: Letter.
General Education: Science & Engineering (SE); Quantitative Literacy (QL); Scientific Literacy (SL); Visual Literacy (VL).

ENG 121 — Fluid Power Actuators & Systems (4 units)

Course Description: Hydraulic and pneumatic systems with emphasis on analysis and control of actuators. Design of hydraulic and pneumatic systems, specification and sizing of components, and selection of electro-hydraulics/electro-pneumatics, servo valves, and closed loop systems to solve basic control problems.
Prerequisite(s): ENG 100 C- or better; ENG 102 C- or better.
Learning Activities: Lecture 3 hour(s), Laboratory 3 hour(s).
Grade Mode: Letter.
General Education: Science & Engineering (SE); Quantitative Literacy (QL); Scientific Literacy (SL); Visual Literacy (VL); Writing Experience (WE).

ENG 122 — Introduction to Mechanical Vibrations (4 units)

Course Description: Free and forced vibrations in lumped-parameter systems with and without damping; vibrations in coupled systems; electromechanical analogs; use of energy conservation principles.
Prerequisite(s): ENG 102 C- or better; (ENG 006 C- or better or ENG 005 C- or better or ECS 030 C- or better); ability to program in MATLAB.
Learning Activities: Lecture 4 hour(s).
Grade Mode: Letter.
General Education: Science & Engineering (SE).

ENG 160 — Environmental Physics & Society (3 units)

Starting Summer Session 1 2026, this course is no longer offered.
Course Description: Impact of humankind on the environment are discussed from the point of view of the physical sciences. Calculations based on physical principles will be made, and the resulting policy implications are considered.
Prerequisite(s): (PHY 009D or PHY 010 or PHY 001B); MAT 016A.
Learning Activities: Lecture 3 hour(s).
Credit Limitation(s): In the College of Engineering, students may receive only 1 unit of credit towards the Technical Electives requirement.
Cross Listing: PHY 160.
Grade Mode: Letter.
General Education: Science & Engineering (SE); Scientific Literacy (SL).

ENG 180 — Engineering Analysis (4 units)

This version has ended; see updated course, below.
Course Description: Solutions of systems of linear and nonlinear algebraic equations; approximation methods; solutions of ordinary differential equations; initial and boundary value problems; solutions of partial differential equations of Elliptic, parabolic, and hyperbolic types; Eigen value problems.
Prerequisite(s): (ENG 006 C- or better or EME 005 C- or better or ECS 030 C- or better or ECS 032A C- or better or ECS 032AV C- or better or ECS 036A C- or better); ((MAT 021D C- or better, (MAT 022B C- or better or MAT 027B C- or better)).
Learning Activities: Lecture 3 hour(s), Discussion 1 hour(s).
Grade Mode: Letter.
General Education: Science & Engineering (SE).

ENG 180 — Engineering Analysis (4 units)

Course Description: Solutions of systems of linear and nonlinear algebraic equations; approximation methods; solutions of ordinary differential equations; initial and boundary value problems; solutions of partial differential equations of Elliptic, parabolic, and hyperbolic types; Eigen value problems.
Prerequisite(s): (ENG 006 C- or better or EME 005 C- or better or ECS 030 C- or better or ECS 032A C- or better or ECS 032AV C- or better or ECS 036A C- or better); ((MAT 021D C- or better, (MAT 022B C- or better or MAT 027B C- or better)).
Learning Activities: Lecture/Discussion 4 hour(s).
Grade Mode: Letter.
General Education: Science & Engineering (SE).
This course version is effective from, and including: Spring Quarter 2026.

ENG 188 — Science & Technology of Sustainable Power Generation (4 units)

This version has ended; see updated course, below.
Course Description: Focus on scientific understanding and development of power generation that is the basis of modern society. Concentration on power generation methods that are sustainable, in particular, discussion of the most recent innovations.
Prerequisite(s): PHY 007C or PHY 009C; upper division standing.
Learning Activities: Lecture 3 hour(s), Discussion 1 hour(s).
Grade Mode: Letter.
General Education: Social Sciences (SS).

ENG 188 — Science & Technology of Sustainable Power Generation (4 units)

Course Description: Focus on scientific understanding and development of power generation that is the basis of modern society. Concentration on power generation methods that are sustainable, in particular, discussion of the most recent innovations.
Prerequisite(s): PHY 007C or PHY 009C; upper division standing.
Learning Activities: Lecture/Discussion 4 hour(s).
Grade Mode: Letter.
General Education: Social Sciences (SS).
This course version is effective from, and including: Spring Quarter 2026.

ENG 190 — Professional Responsibilities of Engineers (3 units)

Course Description: Organization of the engineering profession; introduction to contracts, specifications, business law, patents, and liability; discussion of professional, ethical, societal, and political issues related to engineering.
Learning Activities: Lecture 3 hour(s).
Enrollment Restriction(s): Restricted to upper division students in the College of Engineering.
Repeat Credit: May be repeated.
Grade Mode: Letter.
General Education: Social Sciences (SS).

ENG 198 — Directed Group Study (1-5 units)

Course Description: Directed group study. May be taught abroad.
Learning Activities: Variable.
Repeat Credit: May be repeated 3 time(s) when content differs.
Grade Mode: Pass/No Pass only.
General Education: Science & Engineering (SE).

ENG 250 — Technology Management (3 units)

Course Description: Management of the engineering and technology activity. Functions of design, planning, production, marketing, sales, and maintenance. Technological product life cycle. Research and development activity. Project planning and organization. Manufacturing issues. Case studies.
Prerequisite(s): Consent of instructor.
Learning Activities: Lecture 3 hour(s).
Grade Mode: Letter.

ENG 289A — Special Topics in Engineering (1-5 units)

Course Description: Special topics in Engineering. Topics vary by instructor/quarter.
Learning Activities: Lecture 1-5 hour(s).
Repeat Credit: May be repeated when topic differs.
Grade Mode: Letter.