Engineering Courses (College of Engineering) (ENGR)

ENGR Courses

This is a list of courses with the subject code ENGR. For more information, see College of Engineering in the catalog.

ENGR:0000 Engineering Internships and Co-ops 0 s.h.
For engineering students completing a semester-long internship experience while working 35-40 hours a week at a professional company.

ENGR:0004 Engineering Academic Internship arr.
Academic credit for engineering majors participating in the Cooperative Education and Internship Program. Requirements: for international students—F-1 or J-1 visa, engineering undergraduate standing, full-time internship offer letter in hand (at least 40 hours/week and one semester in length), internship approved by International Student and Scholar Services for F-1 Curricular Practical Training (CPT) or J-1 Academic Training (AT), concurrent registration in approved 3 s.h. distance education or evening course, and preapproval of internship by Engineering Career Services; non-international students may be eligible on case-by-case basis.

ENGR:1000 Engineering Success for First-Year Students 1 s.h.
Introduction to engineering student life; electronic resources; keys to and skills for success; coping with adversity; selecting a major; advising; curriculum choices and career objectives; ethics; communication; internships and co-ops; job search skills.

ENGR:1029 First-Year Seminar arr.
Introduction to engineering fields of study; work closely with a faculty member or senior administrator; participation that eases the transition to college-level learning; cutting-edge research taking place in the College of Engineering.

ENGR:1040 Artificial Intelligence Fundamentals 3 s.h.
Foundational understanding of artificial intelligence; exploration of fundamental AI concepts and hands-on experience with common commercial AI tools, including large language models, image generators, and more; integration of AI tools into academic and professional work with critical evaluation of these tools for ethical risk through guided exercises and assignments; emphasis on responsible and ethical use of AI; focus on issues such as transparency, fairness, privacy, accountability, and broader social impacts of AI systems; no prior technical background required. Same as CSI:1040, PHIL:1040.

ENGR:1100 Introduction to Engineering Problem Solving 3 s.h.
Development and demonstration of specific problem solving skills; directed project or case study involving actual engineering problems and their solutions.

ENGR:1300 Introduction to Engineering Computing 3 s.h.
Engineering problem solving using computers; introduction to digital computations, problem formulation using a procedural high-level language; structured, top-down program design methodology; debugging and testing; introduction to use of software libraries; examples from numerical analysis and contemporary applications in engineering. Corequisites: MATH:1550.

ENGR:2110 Statics 2-3 s.h.
Vector algebra, forces, couples, moments, resultants of force couple systems; friction, equilibrium analysis of particles and finite bodies, centroids; applications. Prerequisites: MATH:1550. Corequisites: MATH:1560 and PHYS:1611.

ENGR:2120 Electrical Circuits 3 s.h.
Kirchhoff's laws and network theorems; analysis of DC circuits; first order transient response; sinusoidal steady-state analysis; elementary principles of circuit design; SPICE analysis of DC, AC, and transient circuits. Corequisites: MATH:2560.

ENGR:2130 Thermodynamics 3 s.h.
Basic elements of classical thermodynamics including first and second laws, properties of pure materials, ideal gas law, reversibility and irreversibility, and Carnot cycle; control volume analysis of closed simple systems and open systems at steady state; engineering applications, including cycles. Prerequisites: PHYS:1611 and CHEM:1110. Corequisites: MATH:1560.

ENGR:2510 Fluid Mechanics 4 s.h.
Fluid properties; hydrostatics; transfer of mass, momentum, and energy in control-volume and differential forms; dimensional analysis and similitude; laminar and turbulent flow in conduits; flow past bluff bodies and airfoils; engineering applications; experimental laboratories, computer simulation projects. Prerequisites: MATH:2560 and ENGR:2710. Corequisites: ENGR:2130.

ENGR:2710 Dynamics 3 s.h.
Vector calculus, Newton's laws, 3D motion of particles and multiparticle systems, 2D motion of rigid bodies applications. Prerequisites: ENGR:2110 and MATH:1550.

ENGR:2720 Materials Science 3 s.h.
Concepts and examples of selection and applications of materials used by engineers; mechanical, electrical, and thermal properties that govern a material's suitability for particular applications; lectures supplemented by laboratory experiments. Prerequisites: CHEM:1110. Corequisites: MATH:1550.

ENGR:2730 Computers in Engineering 3 s.h.
Advanced programming; good software engineering techniques including pseudocode and documentation dynamic data structures, recursive programming, procedural and object-oriented computing, inheritance, and standard template library; C++. Prerequisites: ENGR:1300.

ENGR:2750 Mechanics of Deformable Bodies 3 s.h.
Elementary theory of deformable bodies, stress, strain; axial, transverse, bending, torsion, combined and buckling loads; deflection of beam. Prerequisites: ENGR:2110. Corequisites: MATH:2560.

ENGR:3110 Introduction to Artificial Intelligence and Machine Learning in Engineering 3 s.h.
Introduction to artificial intelligence (AI), machine learning, data science, and data driven problem solving across all engineering disciplines; topics include supervised and unsupervised learning, clustering, heuristics, feature selection, ethics of AI—fairness and privacy issues, and performance evaluation; first in a series. Prerequisites: ENGR:1300. Corequisites: MATH:2550. Requirements: practical knowledge of programming, rudimentary understanding of probability concepts, and sophomore standing.

ENGR:4000 Engineering Honors Seminar 1 s.h.
Completion of an approved project under the supervision of a faculty member. Requirements: engineering honors and junior or higher standing.

ENGR:4001 Leadership Seminar: Mediocrity is Not an Option 1 s.h.
Skills needed to gain competitive edge in professional world with understanding that mediocrity is not an option; importance of developing a career plan, power of networking, significance of soft skills, value of mentoring; participation in series of discussions and activities; deeper insight of strengths and weaknesses, how to enhance skills that employers desire, and become effective leaders in workplace; presentation by retired chief operating officer of a leading aerospace company.

ENGR:7270 Engineering Ethics 1 s.h.
Introduction to practical issues associated with being a responsible scientist; topics in responsible conduct of research in engineering and the sciences using case studies, presentations, and discussions with visiting speakers; conforms to mandates set by the Office of the Vice President for Research and the Graduate College to train graduate students and postdoctoral scholars/fellows in responsible conduct of research. Requirements: first-year graduate standing in College of Engineering.

ENGR:7604 Engineering Ethics for Post Docs 0 s.h.
Introduction to practical issues associated with being a responsible scientist; topics in responsible conduct of research in engineering and the sciences using case studies, presentations, and discussions with visiting speakers; conforms to mandates set by the Office of the Vice President for Research and the Graduate College to train graduate students and postdoctoral scholars/fellows in responsible conduct of research. Requirements: new postdoctoral research scholar/fellow in College of Engineering.