

Engineering General (ENGR)

ENGR 111. Introduction to Engineering. 1 Credit.

Designed to provide general engineering students with an opportunity to review, study, discuss, and evaluate various engineering professions as career choices. F, S.

ENGR 194. Individual Study. 1-3 Credits.**ENGR 196. Field Experience. 1-15 Credits.****ENGR 199. Special Topics. 1-5 Credits.****ENGR 291. Seminar. 1-3 Credits.****ENGR 292. Study Abroad. 1-15 Credits.****ENGR 294. Individual Study. 1-5 Credits.****ENGR 299. Special Topics. 1-5 Credits.****ENGR 310. Entrepreneurship for Engineers and Scientists. 3 Credits.**

How to turn a great idea into a business by starting a company and/or profiting from a new invention. Developing a product, conducting patent searches, securing intellectual property rights, writing a business plan, obtaining financing, etc. are covered. F.

ENGR 311. History of Technology in America. 3 Credits.

Development of tools, technology, and whole systems, especially the U.S. experience since 1700. Contributions of Jefferson, Richards, Edison and others as models of creativity as a foundation for the emergence of modern conceptions of progress.

ENGR 312. Impact of Technology on Society. 3 Credits.

Study of the impact of technology on the natural environment; discussion of values, ethics, citizenship, social responsibilities, and the relationship of humans to the environment.

ENGR 379. Study Tour Abroad. 1-6 Credits.**ENGR 391. Seminar. 1-3 Credits.****ENGR 392. Study Abroad. 1-15 Credits.****ENGR 394. Individual Study. 1-3 Credits.****ENGR 399. Special Topics. 1-5 Credits.****ENGR 402. Engineering Ethics and Social Responsibility. 1 Credit.**

Philosophical basis for ethical decisions, guidance for ethical decision making in engineering practice, ethics of social responsibility, professionalism, case studies, and codes of conduct for engineers. F, S.

ENGR 489. Collaborative Engineering Capstone. 3 Credits.

Integration of engineering and architecture topics and job functions projects. Students will plan, design, develop, verify, produce/construct/ service facilities and systems created to fulfill industrial, agricultural, urban, and business needs. Prereq: Senior standing and major departmental approval. F, S.

ENGR 491. Seminar. 1-5 Credits.**ENGR 492. Study Abroad. 1-15 Credits.****ENGR 493. Undergraduate Research. 1-5 Credits.****ENGR 494. Individual Study. 1-5 Credits.****ENGR 496. Field Experience. 1-15 Credits.****ENGR 499. Special Topics. 1-5 Credits.****ENGR 696. Special Topics. 1-5 Credits.****ENGR 715. Engineering Systems. 3 Credits.**

Interdisciplinary systems analysis approach to engineering problems. Mathematical and physical stochastic process and control systems.

ENGR 741. Systems-Linear and Nonlinear Concepts. 3 Credits.

Nonlinear and linear programming methods for engineering design optimization. Formulation and optimization of design problems from all areas of engineering.

ENGR 762. Heat and Mass Transfer. 3 Credits.

Theory and application of transport of heat and mass. Heat diffusion equation in several coordinate systems. Fourier series and transforms and Laplace transform techniques. Mass transfer examples. Introduction to simulations.

ENGR 770. Quantitative Modeling. 3 Credits.

Applications modeling and optimization methods. Domains: transportation, logistics, manufacturing, service systems scheduling, and supply-chain management. Decision models: linear programming and sensitivity analysis, transportation and assignment, network models and algorithms, and integer, dynamic and nonlinear programming. Cross-listed with IME 770.

ENGR 771. Probabilistic and Deterministic Methods. 3 Credits.

Applications modeling. Domains include transportation, logistics, manufacturing, service systems scheduling, and supply-chain management. Quantitative models and tools include Markov chains, stochastic processes, queuing, deterministic and stochastic decision analysis, time series, forecasting, and regression modeling. Prereq: IME 660. Cross-listed with IME 771.

ENGR 780. Electromagnetic Theory. 3 Credits.

Physical concepts and mathematical solutions of Maxwell equations; boundary conditions, force, and energy equations; potential equations; Green's functions; wave equations, radiation, and propagation of electromagnetic waves. F/2.

ENGR 789. Advanced Research Methods in Engineering. 3 Credits.

Advanced study of the philosophy, reasoning, design, methods, and procedures employed in conducting and disseminating scientific research. Includes a survey of current and original research with interpretation and assessment.

ENGR 791. Temporary/Trial Topics. 1-5 Credits.**ENGR 793. Individual Study/Tutorial. 1-5 Credits.****ENGR 899. Doctoral Dissertation. 1-15 Credits.**