

# Engineering General (ENGR)

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## **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 191. Seminar. 1-5 Credits.**

## **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. Global Practicum: Study Abroad. 1-15 Credits.**

Pre-Arranged study at accredited foreign institutions (study abroad), domestic institutions (National Student Exchange) or on approved study abroad programs. Pre-requisite: Sophomore standing and prior approval by International Student and Study Abroad Services and major department. Graded 'P' or 'F' (Undergraduate), or 'S' or 'U' (Graduate).

## **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 321. Introduction to Robotics. 3 Credits.**

This course equips students with basic principles of Robotics. Students learn the basic engineering elements that are involved in building robots, and applications of robots in the engineering practice. Prereq: PHYS 252, PHYS 252L.

## **ENGR 327. Ethics, Engineering, and Technology. 3 Credits.**

Students will learn a unique and systematic approach to deal with the ethical issues that are increasingly inherent in technology and engineering practice. Using human morality, this course will examine the emergence of advanced technological systems and how they affect our individual and social behaviors, and in return, how they are affected by those behaviors and our shared and individual morality. Students will examine a broad range of ethical topics in design, sustainability and emerging technologies, professional codes of ethics and case studies. Cross-listed with PHIL.

## **ENGR 379. Global Seminar. 1-6 Credits.**

NDSU instructed experience or field study in a foreign country. Conducted in English for residence credit. Pre-requisite: Prior approval by International Student and Study Abroad Services and major department. May be repeated. Standard Grading.

## **ENGR 391. Seminar. 1-3 Credits.**

## **ENGR 392. Global Practicum: Study Abroad. 1-15 Credits.**

Pre-Arranged study at accredited foreign institutions (study abroad), domestic institutions (National Student Exchange) or on approved study abroad programs. Pre-requisite: Sophomore standing and prior approval by International Student and Study Abroad Services and major department. Graded 'P' or 'F' (Undergraduate), or 'S' or 'U' (Graduate).

## **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. Prereq: junior or senior standing.

## **ENGR 481. Engineering Entrepreneurship Capstone I. 3 Credits.**

Integration of engineering and entrepreneurship topics in capstone projects. Students will develop a new business starting from the identification of needs all the way through to the initial minimum viable product build. Prereq: ENGR 310, senior standing, and major departmental approval.

## **ENGR 482. Engineering Entrepreneurship Capstone II. 3 Credits.**

Integration of engineering and entrepreneurship topics in capstone projects. Students will develop a new business starting from the identification of needs all the way through to the initial minimum viable product build. Prereq: ENGR 310, senior standing, and major departmental approval.

**ENGR 491. Seminar. 1-5 Credits.**

**ENGR 492. Global Practicum: Study Abroad. 1-15 Credits.**

Pre-Arranged study at accredited foreign institutions (study abroad), domestic institutions (National Student Exchange) or on approved study abroad programs. Pre-requisite: Sophomore standing and prior approval by International Student and Study Abroad Services and major department. Graded 'P' or 'F' (Undergraduate), or 'S' or 'U' (Graduate).

**ENGR 493. Undergraduate Research. 1-5 Credits.**

**ENGR 494. Individual Study. 1 Credit.**

**ENGR 496. Field Experience. 1-15 Credits.**

**ENGR 499. Special Topics. 1-5 Credits.**

**ENGR 690. Graduate Seminar. 1-5 Credits.**

**ENGR 696. Special Topics. 1-5 Credits.**

**ENGR 722. Academic Writing in the Engineering Disciplines. 3 Credits.**

Students will learn to effectively use structural elements of academic writing by analyzing published papers. They will also work on sentence-level clarity and draft their own papers for publication. Restrictions: Enrollment is limited to graduate students in the College of Engineering or graduate students whose advisers are faculty members in the College of Engineering.

**ENGR 729. Machine Learning for Engineers. 3 Credits.**

This is an introductory course for supervised machine learning. The students will become familiar with basic feature selection methods, classification and regression algorithms. Students will be expected to write simple codes in standard programming languages. Students without programming experience will be given directed readings and tutorials to cope up with coding part of this course.

**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 790. Seminar. 1-5 Credits.**

**ENGR 791. Temporary/Trial Topics. 1-5 Credits.**

**ENGR 793. Individual Study/Tutorial. 1-5 Credits.**

**ENGR 899. Doctoral Dissertation. 1-15 Credits.**