

ENGINEERING (ENGR)

ENGR 1201. Introduction to Engineering. 2 Hours.

This course provides an introduction to the engineering profession. Information on the different disciplines of engineering will be presented. Professional and ethical aspects of engineering are covered. An introduction to problem solving and the engineering design process with the utilization of various computer applications are covered. Various forms of technical communication are emphasized.

ENGR 1204. Engineering Graphics I. 2 Hours.

This course is an introduction to computer-aided drafting. Emphasis is placed on drawing setup, creating and modifying geometry, adding text and dimensions, using levels, coordinate systems, and plot/print scale. Technical drawing skills including freehand sketching, text, orthographic projection, dimensioning, sectional views, and other viewing conventions will be developed.

ENGR 1304. Engineering Graphics I. 3 Hours.

This course is an introduction to computer-aided drafting. Emphasis is placed on drawing setup, creating and modifying geometry, adding text and dimensions, using levels, coordinate systems, and plot/print scale. Technical drawing skills including freehand sketching, text, orthographic projection, dimensioning, sectional views, and other viewing conventions will be developed.

ENGR 2301. Engineering Mechanics I - Statics. 3 Hours.

This course covers the principles of engineering mechanics in statics including force systems, moments of inertia, vector mechanics and analysis of structures. Prerequisite: PHYS 2325.

ENGR 2302. Engineering Mechanics II - Dynamics. 3 Hours.

This course covers the principles of engineering mechanics in dynamics including Newton's laws, kinetic and potential energy, linear and angular momentum, work, impulse, and inertia properties. Prerequisite: ENGR 2301.

ENGR 2303. Principles of Engineering I: Statics and Dynamics. 3 Hours.

This course examines the unified presentation of conservation principles applied to engineering mechanics and systems in statics and dynamics. Topics include force systems, moments of inertia, vector mechanics, Newton's laws, kinetic and potential energy, linear and angular momentum, work, impulse, and inertia properties. Prerequisite: MATH 2413, PHYS 2325, and PHYS 2125.

ENGR 2305. Electric Circuits I. 3 Hours.

This course focuses on the fundamental concepts of engineering with special emphasis on electrical engineering. It includes the concepts of current, voltage, power and energy, Kirchhoff's current and voltage laws, resistance, capacitance, inductance, series, and parallel combinations of circuit elements. Basic techniques such as superposition and node voltage analysis are introduced. Prerequisite: PHYS 2326.

ENGR 2308. Engineering Economics. 3 Hours.

Methods used for determining the comparative financial desirability of engineering alternatives. Provides the student with the basic tools required to analyze engineering alternatives in terms of their worth and cost, an essential element of engineering practice. The student is introduced to the concept of the time value of money and the methodology of basic engineering economy techniques. The course will address some aspects of sustainability and will provide the student with the background to enable them to pass the Engineering Economy portion of the Fundamentals of Engineering exam.

ENGR 2311. Engineering and Business Technical Writing. 3 Hours.

This course gives business and engineering students the ability to communicate effectively both in person and on paper. The course focuses on how to write effective letters, reports, memos, resumes, and other professional and technical documents.

ENGR 2312. Engineering and Business Statistics. 3 Hours.

The course will make science and engineering students aware of ethical issues that they will face in the work environment. It will help them understand the responsibilities of scientists and engineers and prepare them to articulate and respond to ethical conflicts. Class will involve case studies, discussions, writing response papers and tests.

ENGR 304. Engineering Graphics I. 3 Hours.

This course is an introduction to computer-aided drafting. Emphasis is placed on drawing setup, creating and modifying geometry, adding text and dimensions, using levels, coordinate systems, and plot/print scale. Technical drawing skills including freehand sketching, text, orthographic projection, dimensioning, sectional views, and other viewing conventions will be developed.

ENGR 305. Fundamentals of Power Systems. 3 Hours.**ENGR 306. Electric Power and Machinery Lab. 1 Hour.**

This lab addresses the basics of electric power components and operation. Topics cover the principles of DC machines, single and three phase circuits, synchronous generators, power transformers, power factor correction, and electric power analysis. Prerequisite: EE 305 or ENGR 305 or concurrent enrollment.

ENGR 307. Probability and Random Processes. 3 Hours.

This course introduces students to the fundamental principles of probability and random processes. While helping students to develop their problem-solving skills, the course strives to motivate students with practical applications from various engineering areas that demonstrate the relevance of probability theory to engineering practice. Topics covered in this course include probability theory, discrete and continuous random variables and statistical description, statistical characterization of sequence of random variables, and stationary random processes. Prerequisite: MATH 2415.

ENGR 310. Engineering and Business Technical Writing. 3 Hours.

The course gives business and engineering students the ability to communicate effectively both in person and on paper. The course focuses on how to write effective letters, reports, memos, resumes, and other professional and technical documents.

ENGR 312. Engineering and Business Ethics. 3 Hours.

This course will make science and engineering students aware of ethical issues they will face in the work environment. It will help them understand the responsibilities of scientists and engineers and prepare them to articulate and respond to ethical conflicts. Class will involve case studies, discussions, writing response papers and tests.

ENGR 315. Engineering Computations. 3 Hours.

This course covers numerical methods and their use for solving computational problems in engineering. The course is devoted to mathematical essentials and software utilization of the following numerical methods: solving nonlinear equations, solving systems of linear algebraic equations, interpolation, curve fitting, numerical differentiation, numerical integration, and optimization. Engineering applications of the numerical techniques are also considered. Prerequisite: MATH 2413 and COSC 1315 or ENGR 1201.

ENGR 333. Principles of Engineering II: Thermodynamics and Fluids. 3 Hours.

This course examines theory and application of energy methods in engineering, conservation principles to investigate "traditional" thermodynamics, and internal flow fluids. Topics include the Laws of Thermodynamics, entropy, refrigeration, fluid properties, momentum, and heat transfer.

Prerequisite: PHYS 2325 and PHYS 2125. Prerequisite or Corequisite: MATH 2413.

ENGR 365. Statistical Quality Control. 3 Hours.

Statistical control of the quality of processes; statistical methods for quality improvement; control charts for variables; attribute control charts; process capability analysis; statistical methods; analysis and design of sampling. Prerequisite: Junior standing, or instructor consent.

ENGR 389. Independent Study. 1-3 Hours.

This course provides individual instruction. Students may repeat the course when topics vary.

ENGR 410. Engineering Economics. 3 Hours.

Economic justification of projects; estimating; scheduling; network methods; critical path analysis; earned value management; project organizational structures; project risk assessment; resource allocation; ethics; characteristics of project managers.

ENGR 425. Principles of Process Design. 3 Hours.

The forest products industry partners of the university are used as experiential opportunities for mechanical engineering students to study all elements of optimization. This includes determining data requirements, collecting the data related to process design, analyzing that data, and determining the optimization requirements to drive process requirements. This process design provides students with the knowledge of process improvement and optimization that is generalized across all mechanical processes and manufacturing environments. Prerequisite: MATH 2415.

ENGR 431. Engineering Internship I. 3 Hours.

The course provides experience in an engineering service, industrial, or research setting. The program provides engineering experience during the last two years of an undergraduate academic career. During this period, students can complete at least one semester of work consisting of a 20 hour work week. Prerequisite: Junior standing and approval of CBET Dean.

ENGR 432. Engineering Internship II. 3 Hours.

This course provides the second phase of the experience in engineering service, industrial, or research setting. The program provides engineering experience during the last two years of an undergraduate academic career. During this period students can complete at least one semester of work consisting of a 20 hour work week. Prerequisite: ENGR 431 and Junior standing and approval of CBET Dean.

ENGR 440. Computer Aided Design of Mechanical Components. 3 Hours.

Effective and efficient use of modern computer hardware and software in modeling, design, and manufacturing; simulation of a broad spectrum of mechanical engineering problems.

ENGR 465. Reliability Engineering. 3 Hours.

Uncertainty in Engineering and Importance of Reliability. Fundamentals of probability theory. Reliability in Design and Probabilistic models of design variables. Monte Carlo simulation. Hazard functions and reliability models for failures. System reliability for series, parallel, and n out of k and series parallel systems. Formulation and Solution of Optimization Problems based on Reliability considerations. Quality, the six sigma approach and its relationship to reliability and maintenance strategies. Use of Excel and MATLAB in reliability analysis and predictions. Prerequisite: Senior standing, or instructor consent.

ENGR 489. Independent Study. 1-3 Hours.

This course provides individual instruction. Students may repeat the course when topics vary.

ENGR 499. Independent Research. 1-6 Hours.

Independent research in Engineering conducted by a student under the guidance of a faculty member of his or her choice. The student is required to maintain a research journal and submit a project report by the end of the semester and potentially make an oral presentation on the project. SCH and hours are by arrangement and, with a change in content, this course may be repeated for credit. Prerequisite: Consent of instructor.

ENGR 599. Independent Research. 1-6 Hours.

Independent research in Engineering conducted by a student under the guidance of a faculty member of his or her choice. Credits and hours are by arrangement and, with a change in content, this course may be repeated for credit. Prerequisite: Consent of instructor.