

ENGINEERING COURSES

ENGR 130 INTRODUCTION TO ENGINEERING

This course introduces engineering to engineering and physics students. It covers engineering ethics, teamwork, communication skills, and problem-solving Skills. This course covers quantitative topics including fundamental units and conversions, basic statistics, graphical analysis of data, and computing using Excel and MATLAB. Prerequisite: None.

ENGR 321 ENGINEERING PROFESSIONAL DEVELOPMENT (DESIGNATED SERVICE-LEARNING COURSE)

This course will cover skills necessary to successfully navigate the job market or pursue advanced studies. Topics include the importance of professional licensure and certification, strategies for selecting graduate school and managing the application process, interviewing etiquette, professional development timelines, engineering ethics, and social responsibility. Prerequisite: STEM 221 or Permission of Instructor.

ENGR 331 ENGINEERING ECONOMICS

Students will learn the fundamentals of economics related to engineering decision making. Concepts to be covered include manpower, resource, equipment and process selection, costs, cost/benefit analyses, project risk and uncertainty, replacement decisions, and making economic comparisons that include current and projected revenue costs. This course will focus heavily on calculation-based analyses that will include capital costs, revenue, taxes, appreciation, depreciation, replacement costs, one-time costs, recurring costs, and project scheduling. Prerequisite: Junior or Senior Status.

ENVIRONMENTAL ENGINEERING COURSES

ENGR132 INTRODUCTION TO ENGINEERING SOFTWARE

This course is an introduction to software used in the engineering profession, including computer- aided engineering graphics and geographic information systems (GIS). It covers fundamentals of CAD, 2D and 3D drawings, lettering, and dimensioning, sketching, geometric construction, orthographic projection, and sectional views. It also covers the fundamentals of GIS: finding, organizing, creating, and editing geographic data. Prerequisite: none

ENVE 230 ENVIRONMENTAL ENGINEERING FUNDAMENTALS I (DESIGNATED SERVICE-LEARNING COURSE)

This course provides knowledge of environmental elements with insight into quantitative analysis and design where applicable. Topics include mass and energy transfer and balances; environmental chemistry; mathematics of growth and decay; risk assessment and management; surface water pollutants, biological and chemical oxygen demands; eutrophication; water supply systems and drinking water standards; wastewater treatment systems and effluent standards; groundwater flow, contaminant transport, and remediation technologies. Prerequisites: ENGR 130; BIO 137; CHEM 137.

ENVE 210L ENVIRONMENTAL ENGINEERING FUNDAMENTALS I LAB

Students will gain knowledge and skills relevant to analysis of environmental data and participate in hands-on activities that reinforce the theoretical principles covered in ENVE 230. Laboratory experiments will be designed to accentuate instrumentation and equipment used in combination with physical, chemical, and biological processes that control material fate and transport in environmental and engineered systems. Prerequisites: CHEM 138; CHEM 118L or Permission of the Instructor.

ENVE 231 ENVIRONMENTAL ENGINEERING FUNDAMENTALS II (DESIGNATED SERVICE-LEARNING COURSE)

This course provides knowledge of environmental elements with insight into quantitative analysis and design where applicable. Topics include waste and pollution prevention; remedial and corrective actions at contaminated sites; air pollution sources, control technologies, and atmospheric stability; ambient air quality standards and indoor air quality; global temperature, greenhouse effect and warming potential; global energy balance, carbon emission, and stratospheric ozone depletion; solid waste management, landfill disposal, combustion, composting, and recycling; medical waste; and environmental law, ethics, and justice. Field trips are integrated into the classes. Prerequisite: ENVE 230.

ENVE 233 ENGINEERING GEOLOGY

This course covers the fundamentals of geology relevant to civil and environmental engineers. Topics include rock and mineral types, soil types and properties, soil and rock mechanics, geological hazard assessment, and slope stability. Instruction is conducted through lectures, laboratory exercises, and case studies. Prerequisite: None.

ENVE 330 ENVIRONMENTAL CHEMISTRY

Students will learn about chemical processes occurring in water, air, and soil. Subjects covered in the class will include dissolution, precipitation, chemical equilibrium, acid-base reactions, oxidation and reduction reactions, absorption of radiation by atmospheric gases, the greenhouse effect, and the chemistry of clays. The laboratory component of the class will focus on demonstrating concepts such as precipitation and oxidation and reduction reactions. Prerequisites: CHEM 138; CHEM 118L; or Permission of the Instructor.

ENVE 331 INTRODUCTION TO FLUID MECHANICS

Introduction to fluid mechanics, including hydrostatics (pressure, force on submerged surfaces) and fluid dynamics (Bernoulli equation, fluid kinematics). Includes principles of mass, momentum, and energy conservation, as well as energy loss in pipe flow. Prerequisites: PHYS 233; PHYS 213L; MATH 143.

ENVE 311L FLUID MECHANICS LAB

This course is an introduction to fluid mechanics, including hydrostatics and fluid flow. Lab topics include measurement of fluid properties, Bernoulli Equation, and fluid kinematics. Co-requisite: ENVE 331.

ENVE 332 SURFACE WATER QUALITY AND HYDROLOGY

This course covers open channel and overland flow, runoff hydrographs, surface water quality issues, regulations and measurement methods, and stormwater management techniques. Prerequisite: ENVE331

ENVE 333 SUSTAINABLE ENGINEERING

Sustainable engineering involves the responsible use of resources in a way that does not compromise the ability of future generations to meet their own needs. Shifting to sustainable engineering requires review of the short and long-term social, economic, and environmental impacts of engineering solutions. We will examine processes for sustainable land development and resource use, perform life cycle assessments, and review cases of sustainable engineering solutions at the local and global scale. Prerequisite: ENVE 231.

ENVE334 AIR QUALITY ENGINEERING

Principles of particulate and gaseous emission control; design and operation of particulate and gas control equipment to meet federal emission standards. Sources, effects, and regulation of air pollutants. Meteorology and dispersion of pollutants. Sampling and analysis of gaseous and particulate air pollutants. Photochemical air pollution and mobile sources. Prerequisites: ENVE 231

ENVE 337 GROUNDWATER HYDROLOGY

This course covers fundamentals of subsurface flow and transport, emphasizing the role of groundwater in the hydrologic cycle, the relation of groundwater flow to geologic structure, and the management of contaminated groundwater. The class includes laboratory and computer demonstrations. Prerequisite: ENVE 331.

**ENVE 427 SENIOR DESIGN PROJECT I
(DESIGNATED SERVICE-LEARNING COURSE)**

Planning, design, construction and/or management of an engineering project that handles contemporary engineering problems under the supervision of one or more faculty members. The course allows the student to apply the knowledge attained from the various courses of the undergraduate program to prepare the proper approach of solution to his/her project problem. Prerequisite: Graduating Senior.

**ENVE 428 SENIOR DESIGN PROJECT II
(DESIGNATED SERVICE-LEARNING COURSE)**

This course is a continuation of ENVE 427. Students are expected to complete their chosen design project. It is required that the student submit a well written report and to defend his/her project in Front of faculty, staff, and students. Prerequisite: ENVE 427.

ENVE 430 ENVIRONMENTAL MICROBIOLOGY

This course will cover microbially-mediated nutrient cycling in the environment, especially the Carbon, Nitrogen, Oxygen, and Sulfur cycles. In addition, the course will also cover microbial kinetics, aerobic vs. anaerobic processes, the role of microbes in wastewater treatment, and bioprocess engineering. Several lab exercises focused on culture-dependent and culture-independent identification of bacteria will be covered. Prerequisite: BIO 137.

ENVE 431 SOIL AND GROUNDWATER POLLUTION REMEDIATION AND SITE ASSESSMENT

This course will cover common pollutants of soil and groundwater associated remediation technologies used by environmental practitioners, including pump and treat, chemical oxidation/reduction and bioremediation. The course will also contain a unit on assessment of contaminated sites. Prerequisites: ENVE 231; ENVE 337.

ENVE 432 ADVANCED WASTEWATER TREATMENT

Fundamental microbiological and physicochemical processes for advanced treatment of municipal and industrial wastewater. Guidelines for implementation of water reclamation, harvesting, and beneficial reuse programs. Prerequisite: ESC 439, ESC 419L

ENVE 434 ADVANCED SOLID WASTE MANAGEMENT

Design fundamentals course focusing on solid and hazardous waste landfills, waste piles, monofills, waste-to-energy facilities, compost operations, and surface impoundments. Federal and state regulations pertaining to site requirements, cell sizing, liner design, leachate and gas management system design, operations, and closure. *Prerequisite:* ESC 230

ENVE 439 SPECIAL TOPICS IN ENVIRONMENTAL ENGINEERING

This course covers advanced topics in environmental engineering, such as stormwater management, sustainability design and technology, clean energy, or advanced materials. It will be offered on an as-needed basis. Prerequisite: Permission of the Instructor.