ENVIRONMENTAL ENGINEERING SCIENCES

Not all courses are offered every semester. Refer to the schedule of courses for each term's specific offerings.
More Info (https://one.uf.edu/soc/)

Unless otherwise indicated in the course description, all courses at the University of Florida are taught in English, with the exception of specific foreign language courses.

Department Information

The broad undergraduate environmental engineering curriculum of EES has earned the department a ranking as a leading undergraduate program. The ABET-accredited engineering bachelor's degree is comprehensively based on physical, chemical, and biological principles to solve environmental problems affecting air, land, and water resources. An advising scheme including select faculty, led by the undergraduate coordinator, guides each student through the program.
Website (https://www.essie.ufl.edu/environmental-engineering-sciences/)

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Map (http://campusmap.ufl.edu/#/index/0724)

Curriculum

- Combination Degrees

Courses

EES 3008 Energy and Environment 3 Credits
Grading Scheme: Letter Grade
Consideration of the energy basis for humans and nature, including principles of energy analysis, systems ecology, and public policy.

EES 3206 Environmental Chemistry 4 Credits
Grading Scheme: Letter Grade
Provides the fundamental knowledge needed to solve pollution problems specific to environmental systems by focusing primarily on thermodynamic equilibrium and kinetic principles associated with both natural and engineered systems.
Prerequisite: (CHM 2046 or CHM 2096) and MAC 2311.

EES 4005C Ecological Engineering 3 Credits
Grading Scheme: Letter Grade
Application of ecological and engineering principles to natural resource management and problem solving.
Prerequisite: CHM 2046 or CHM 2096;
Corequisite: EES 4203.

EES 4050 Environmental Planning and Design 3 Credits
Grading Scheme: Letter Grade
Principles and practices of environmental planning. Planning for and designing sustainable communities and regions. Exploration of quantitative methods for the evaluation of environmental impacts and analysis of carrying capacity of economic development. Exploration of theories of spatial and temporal organization of systems of humanity and nature.

EES 4102 Wastewater Microbiology 2 Credits
Grading Scheme: Letter Grade
General concepts in microbiology and cell biology with major emphasis on the role of microorganisms in polluted environments.
Prerequisite: CHM 2046.

EES 4201 Water Chemistry 3 Credits
Grading Scheme: Letter Grade
Kinetics and equilibrium of aqueous chemistry including acid-base, complexation, precipitation and redox equilibria.
Prerequisite: CHM 2046 or CHM 2096 and MAC 2311 or MAC 2233.

EES 4203 Phase Partitioning in the Environment 4 Credits
Grading Scheme: Letter Grade
A study of the fate of organic pollutants in the environment through application of principles of organic chemistry and chemical thermodynamics, including phase partitioning between environmental media.
Prerequisite: CHM 2046 or CHM 2096.

EGN 4912 Engineering Directed Independent Research 0-3 Credits
Grading Scheme: S/U
Provides firsthand, supervised research with a faculty advisor or postdoctoral or graduate student mentor. Projects may involve inquiry, design, investigation, scholarship, discovery, or application.
Prerequisite: Department permission.

EMA 4535 Sustainable Nanotechnology 3 Credits
Grading Scheme: Letter Grade
Increase in production and use of engineered nanomaterials (ENMs) raises concerns on their potential impacts on the environment and human health. The sustainable development of nanotechnology requires knowledge of life cycle and environmental fate/implications of ENMs. Focuses on linkages between ENMs properties and environmental implications.
Prerequisite: CHM 2046 or CHM 2047 or CHM 2096.

ENV 2003 Introduction to Environmental Engineering 1 Credit
Grading Scheme: S/U
Introduction to topics in environmental engineering, including water and air quality, sustainable materials management, and ecosystems.
Prerequisite: Environmental Engineering Sciences major.

ENV 3000 Core 2: Fundamentals of Environmental Engineering 4 Credits
Grading Scheme: Letter Grade
Fundamentals of environmental engineering, including water, air, materials, and ecological resources. Environmental laws and regulations that motivate environmental engineering practice. Theoretical approaches for quantifying fundamental environmental processes, interactions, impact, and risks. Build knowledge and relevant skills in topics that bridge disciplines, including statistics, thermodynamics, microbiology, and organic chemistry.
Prerequisite: ENV 3001.

ENV 3001 Core 1: Introduction to Environmental Systems 4 Credits
Grading Scheme: Letter Grade
Introduces environmental systems, including water, air, materials, and ecological resources with motivating case studies across topics and fundamental definitions, laws, and theories in environmental engineering sciences. Build a knowledge base and relevant skills in topics that bridge disciplines, including statistics, thermodynamics, microbiology, and organic chemistry.
Prerequisite: PHY 2048 & (CHM 2045 or CHM 2095) & MAC 2312 & EVE_BS.

ENV 3040C Computational Methods in Environmental Engineering 3 Credits
Grading Scheme: Letter Grade
Computational analysis techniques and their application to environmental engineering. Use of spreadsheets and programming tools to process, analyze, and visualize environmental engineering data and test hypotheses.
Prerequisite: COP 2273.

ENV 3930 Environmental Engineering Ethics 2 Credits
Grading Scheme: Letter Grade
Lectures and discussion on topics in ethics as related to environmental engineering.
Prerequisite: ENC 1101 or ENC 1102 and EVE_BS.

ENV 4009 Core 5: Environmental Engineering Practice 4 Credits
Grading Scheme: Letter Grade
Utilize fundamental and applied concepts in environmental engineering practice, including applications of ecological engineering, air pollution control, waste facilities design, and advanced water treatment processes. Build a knowledge base and relevant skills in topics that bridge disciplines, including statistics, thermodynamics, microbiology, and organic chemistry.
Prerequisite: ENV 4454.

ENV 4041C Environmental Analysis 4 Credits
Grading Scheme: Letter Grade
Theory and laboratory techniques for the analysis of air and water pollutants and basic concepts of ecosystems structure and analysis.
Prerequisite: CHM 2046 or CHM 2096.

ENV 4101 Elements of Atmospheric Pollution 3 Credits
Grading Scheme: Letter Grade
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.
Prerequisite: EES 4203 and PHY 2049.

ENV 4121 Air Pollution Control Design 3 Credits
Grading Scheme: Letter Grade
Principles of particulate and gaseous emission control; design and operation of particulate and gas control equipment to meet federal emission standards.
Prerequisite: ENV 4101.

ENV 4300 Solid Waste Containment Design 3 Credits
Grading Scheme: Letter Grade
Design fundamentals of solid and hazardous waste landfills, waste piles, monofills and surface impoundments. Regulations, site requirements, sizing, liner design, leachate and gas management system design, operations and closure.
Prerequisite: ENV 4351;
Corequisite: ENV 4561 or CWR 4202.

ENV 4351 Solid and Hazardous Waste Management 4 Credits
Grading Scheme: Letter Grade
Generation of solid and hazardous wastes. Collection, methods, equipment, costs and disposal. Rules, regulations and management systems for proper control of solid and hazardous wastes. Evaluation of engineering systems to minimize costs and regulatory problems.
Prerequisite: EES 4201.

ENV 4353 Solid Waste Systems Design 3 Credits
Grading Scheme: Letter Grade
A capstone design experience focusing on the design of solid waste management systems such as landfills, waste-to-energy facilities, compost operations, recycling facilities and hazardous waste treatment/storage/disposal facilities.
Prerequisite: ENV 4351.

ENV 4405 Nutrient Control and Water Reuse 3 Credits
Grading Scheme: Letter Grade
Biological and physicochemical processes for advanced treatment of municipal wastewater. Reuse guidelines and applications.

ENV 4411 Stormwater Control Systems 3 Credits
Grading Scheme: Letter Grade
Chemical, physical, biological, and hydrologic aspects of rainfall runoff and control through unit operations and processes (UOPs). Stormwater physical and chemical loads. Interactions between hydrologic processes, water chemistry, sediment transport, infrastructure materials, and UOPs for treatment and reuse.
Prerequisite: EES3206 or instructor permission.

ENV 4430 Water Treatment Process Design 3 Credits
Grading Scheme: Letter Grade
Design of selected water treatment processes including disinfection, air stripping, adsorption, ion exchange and membrane processes.
Prerequisite: ENV 4514C and EES 4201.

ENV 4432 Potable Water System Design 3 Credits
Grading Scheme: Letter Grade
Design of conventional water treatment operations, including reactor design, coagulation, flocculation, mixing, sedimentation, filtration, softening, disinfection and sludge management.
Prerequisite: EES 4201 and ENV 4514C.

ENV 4453 Core 3: Processes in Environmental Engineering 4 Credits
Grading Scheme: Letter Grade
Theoretical and applied knowledge in environmental engineering processes across the air, water, and solid phases. Quantitative tools for describing materials and energy flows and transformations. Build a knowledge base and relevant skills in topics that bridge disciplines, including statistics, thermodynamics, microbiology, and organic chemistry.
Prerequisite: ENV 3000.

ENV 4454 Core 4: Environmental Engineering Applications 4 Credits
Grading Scheme: Letter Grade
Application of fundamental concepts and laws to design, assess, and predict outcomes in environmental engineering systems handling water, air, materials, and ecosystems. Build a knowledge base and relevant skills in topics that bridge disciplines, including statistics, thermodynamics, microbiology, and organic chemistry.
Prerequisite: ENV 4453.

ENV 4501 Environmental Hydrology 1 3 Credits
Grading Scheme: Letter Grade
Surface and atmospheric hydrology. Hydrologic processes controlling streamflow events. Practical application to stormwater management.
Prerequisite: ENV 3040C and (STA 3032 or STA 2023) and (CWR 3201 or EGN 3353C).

ENV 4506 Environmental Hydrology 2 3 Credits
Grading Scheme: Letter Grade
Subsurface hydrology. Properties of porous media governing flow and chemical transport in the subsurface. Environmental site evaluation methods.
Prerequisite: ENV 3040C and (CWR 3201 or EGN 3353C).

ENV 4514C Water and Wastewater Treatment 3 Credits
Grading Scheme: Letter Grade
Design of water and wastewater treatment units.

ENV 4532 Wastewater System Design 3 Credits
Grading Scheme: Letter Grade
Detailed design and layout of gravity wastewater collection systems, pumping facilities, force mains, and a wastewater treatment plant. Emphasis on the preparation of design drawings and estimating costs.
Prerequisite: ENV 4514C;
Corequisite: ENV 4561 or CWR 4202.

ENV 4545 Environmental Hydrology 4 Credits
Grading Scheme: Letter Grade
Atmospheric, surface, subsurface hydrology and interactions as part of the water cycle. Properties of natural and anthropogenic surfaces and porous media governing flow and transport.
Prerequisite: (ENV 3040C or CGN 3421) and (CWR 3201 or EGN 3353C).

ENV 4601 Environmental Resources Management 3 Credits
Grading Scheme: Letter Grade
Theory and application of engineering economics and systems analysis to the design of environmental management systems.
Prerequisite: ENV 3001.

ENV 4892 Environmental Engineering Design 1 3 Credits
Grading Scheme: Letter Grade
First semester of a two-semester capstone experience. Learn the fundamentals of environmental engineering professional practice using real world engineering project examples: project management, project delivery methods, plans reading, construction documents, cost estimating, scheduling, and professional communication.
Prerequisite: ENV 4453.

ENV 4893 Environmental Engineering Design 2 3 Credits
Grading Scheme: Letter Grade
Second semester of the capstone design experience where environmental engineering seniors work in teams on an actual project. Projects encourage creativity, innovation, curiosity, and educational foundation to solve complex real-world problems.
Prerequisite: ENV 4892.

ENV 4905 Individual Studies in Environmental Engineering Sciences 1-4 Credits
Grading Scheme: Letter Grade
Selected problems or projects in the student's major field of study.

ENV 4912 Integrated Product and Process Design 1: Environmental Engineering Sciences 3 Credits
Grading Scheme: Letter Grade
The first part of a two-course sequence in which multidisciplinary teams of engineering and business students partner with industry sponsors to design and build authentic products and processes-on time and within budget. Working closely with industry liaison engineers and a faculty coach, students gain practical experience in teamwork and communication, problem solving and engineering design, and develop leadership, management and people skills.
Prerequisite: ENV 4514C;
Corequisite: ENV 4121 or ENV 4351.

ENV 4913 Integrated Product and Process Design 2: Environmental Engineering Sciences 3 Credits
Grading Scheme: Letter Grade
The second part of the sequence in which multidisciplinary teams of engineering and business students partner with industry sponsors to design and build authentic products and processes-on time and within budget. Working closely with industry liaison engineers and a faculty coach, students gain practical experience in teamwork and communication, problem solving and engineering design, and develop leadership, management and people skills.
Prerequisite: ENV 4912.

ENV 4932 Special Problems in Environmental Engineering Sciences 1-4 Credits
Grading Scheme: Letter Grade
Special problems in environmental engineering science.

ENV 4949 Environmental Engineering Internship/Co-op 1-3 Credits
Grading Scheme: S/U
Practical internship/co-op work experience under approved industrial supervision. (S/U)
Prerequisite: Engineering major.