

BSENV Curriculum Engineering Courses

Existing Courses

CE 212. Civil Engineering Graphic Communications (3 credits) - Integrating manual drafting and computer-aided drafting/design in one course with emphases on civil engineering practices. This required course will be taught at sophomore level to get students properly prepared for CE courses. Prereq: Sophomore standing in CE program.

CE 309. Fluid Mechanics (3 credits) - Statics, kinematics, and dynamics of fluid flow; momentum and energy concepts; flow through pipes; uniform flow in open channels; pumps and measurement of flow. 3 one-hour lectures. Prereq: ME 222.

CE 310. Fluid Mechanics Laboratory (1 Credit) - Visualization and verification of the concepts of fluid flow, pumps, turbines, and flow meters. 1 two-hour laboratory. Prereq: CE 309.

CE 316. Soil Mechanics (3 Credits) - Principles of soil mechanics including three-phase composition, classification, effective stress, consolidation, shear strength, compaction, and site investigation. 2 lectures, 1 two-hour laboratory. Prereq: ME 222, ME 223. Co-req or Prereq: MATH 266.

CE 408. Water Resources and Supply (3 Credits) - Hydrologic concepts, development of water supply sources, principles involved in the collection and transportation of water/wastewater/storm runoff, and distribution of water for municipal use. Prereq: CE 309.

CE 410. Water and Wastewater Engineering (3 Credits) - Principles involved in treatment, disposal, reuse, and recycling of municipal water supplies and wastewaters. Laboratory introduces tests to evaluate treatment requirements and effectiveness. 3 one-hour lectures, 1 three-hour laboratory. Prereq: CE 370. {Also offered for graduate credit - see CE 610.}

CE 473. Air Pollution (3 Credits) - Fundamentals of air pollution and its control technology. Types and sources of air pollutants, meteorology, effects on plants, animals, people, and property. Design of control equipment. 3 one-hour lectures, 1 three-hour laboratory. Prereq: CE 370. S {Also offered for graduate credit - see CE 673.}

CE 477. Applied Hydrology (3 Credits) - Scope of hydrology, hydrologic cycle and components, runoff volume and peak flow estimation, hydrograph analysis, probabilistic concepts in water resources, flood- frequency analysis, application of risk concepts to hydrological design, flow estimation for ungaged watersheds. Two 75-minute lectures. Prereq: CE 408. F {Also offered for graduate credit - see CE 677.}

IME 440. Engineering Economy (2 Credits) - Capital investment decision foundation within the rules of general and project accounting. Analysis of benefits and returns against cost for engineering installation, operation, life cycle, and buy-rent-lease decisions. Prereq: Junior standing or IME major. {Also offered for graduate credit - see IME 640.}

IME 460. Evaluation of Engineering Data (3 Credits) - Design of engineering experiments and evaluations, curve fitting, regression, hypothesis testing, ANOVA, Taguchi methods in engineering design. Coreq: MATH 166. {Also offered for graduate credit - see IME 660.}

ME 221. Engineering Mechanics I (3 Credits) - Scalar and vector approaches to trusses, frames and machines, internal forces, friction forces, center of gravity, centroid, and moment inertia. Prereq: MATH 165.

ME 222. Engineering Mechanics II (3 Credits) - Dynamics of particles and rigid bodies, work energy, impulse-momentum, principles of conservation of energy and momentum. Prereq: ME 221, MATH 166.

ME 223. Mechanics of Materials (3 Credits) - Introduction to stress, strain, and their relationships; torsion of circular shafts, bending stresses, deflection of beams, stress transformations. Prereq: ME 221.

New Courses

ENVE 111 Introduction to Environmental Engineering (1 credit) – Introduction to the environmental engineering discipline; overview of the design process and pertinent regulations; and, technical, communication, and presentation skills. Open to environmental engineering majors. 2 hr. lab. *[Suggested text: none]*

ENVE 211 Analysis and Design Methods for Environmental Engineers (1 credit) – Exposure to real-life environmental design, analysis, and processes. This will include an overview of contemporary software; and, sustainability, social, and economic considerations. Open to environmental engineering majors. 1 three-hour lab. Pre-req is ENVE 111 or consent of the instructor. *[Suggested text: Environmental Engineering: Fundamentals, Sustainability, Design. James R. Milhelcic and Julie Beth Zimmermann. 2014. ISBN: 9781118741498].*

ENVE 250 Environmental Engineering Fundamentals (3 credits) – Fundamental principles in environmental engineering; basic principles of calculation; introduction to mass and energy balances; chemical stoichiometry; biology, microbiology, biochemistry, and enzyme kinetics; risk and uncertainty; and, fundamental concepts for assessing sustainability. Pre-reqs are ENVE 211, and Math 165. Co-requisite of CHEM 240. 3 one-hour lectures. *[Suggested text: Environmental Engineering: Fundamentals, Sustainability, Design. James R. Milhelcic and Julie Beth Zimmermann. 2014. ISBN: 9781118741498]*

ENVE 350 – Microbiological Principles for Environmental Engineers (3 credits) – Overview of microbiology for natural and engineered systems; fundamentals of microbiology for water/wastewater treatments and hazardous waste remediation; microbial risk assessment; microbial kinetics. Pre-req. is ENVE 250. 3 one-hour lectures.

ENVE 360 – Environmental Chemistry for Water and Wastewater (3 credits) – Chemical and microbiological principles applied to surface water quality issues in water supply, wastewater treatment, natural water/pollution. Includes coverage of organic loads, trace metals, organic compounds, nutrients, solids, disinfectants, and dissolved oxygen. Pre-req. is ENVE 350. 3 one-hour lectures. *[Suggested text: TBD].*

ENVE 370 –Sustainability Engineering - Social, economic, and environmental aspects of sustainable design, including regulations; introduction to life cycle assessment and environmental impacts; overview of GIS and risk assessment; and use of probability and statistics to understand uncertainty. Pre-req. is MATH 266, IME 460, and ENVE 250. *[Suggested Text: TBD].*

ENVE 450 Environmental Engineering Chemistry Lab (1 credit) – Water chemistry laboratory; technical communication and statistical analyses. Pre-reqs. are ENVE 360, IME 460, and ENGL 321. 1 three-hour lab. [*Suggested Text: upgrade of current Environmental Engineering lab manual used for CE 372*]

ENVE 460 Environmental Fate and Transport (3 credits) – Introduction to the major physical, chemical, and biological processes of pollutant transformation and transport between air, water, and the subsurface. Pre-reqs. are ENVE 360 and CE 408.

ENVE 412 Unit Operations and Processes (2 credits) – Application of physical and chemical operations and biological processes in environmental engineering. Topics include biokinetics, coagulation/flocculation, absorption, gas stripping, and bench-scale projects. Pre-req. is CE 410. 1 one-hour lecture and 1 three-hour lab. [*Suggested Text: AEESP Lab Manual*]

ENVE 488 Senior Design I (2 credits) –Pre-reqs. are CE 410, ENGR 402, and ENGL 321 and co-reqs. are IME 440 and ENVE 412. 1 one-hour lecture and 1 three-hour lab.

ENVE 489 Senior Design II (2 credits) – Pre-req. is ENVE 488. 1 one-hour lecture and 1 three-hour lab.

CE 472/672 Solid/Hazardous Waste (3 credits) – this course combines the current CE 472/672 (solid waste) and CE 770 (hazardous waste) into a single UG/Grad course. Pre-req. is ENVE 460. 3 one-hour lectures.

Proposed BSENVE Technical Electives

The BSENVE has three technical elective course (nine credit hours). Five of the nine credit hours must be design credits. At least two of the courses must be in engineering.

Civil Engineering

CE 491 – Small Community Water Supply and Sanitation
CE 462 – Designing with Geosynthetics
CE 486 - Nanotechnology and Nanomaterials
CE 421 - Open Channel Flow
CE 476 - Watershed Modeling
CE 492 - Groundwater Sustainable Design
CE 471 - Environmental Nanotechnology
CE 478 - Water Quality Management
CE 479 - Advanced Water and Wastewater Treatment
CE 441 – Finite Element Analysis

Agricultural and Biosystems Engineering

ABEN 456 – Biobased Energy
ABEN 464 – Resource Conservation and Irrigation
ABEN 484 – Drainage and Wetland Engineering
ABEN 444 – Transport Processes

Natural Resources Management

NRM – River and Stream Resource Management
NRM 431 – National Environmental Policy Act & Environmental Impact Assessment
NRM 453 – Rangeland Resources Watershed Management
NRM 454 – Wetland Resources Management

Geography

GEOG 455 – Introduction to Geographic Information Systems