

Comparison of Environmental Engineering related programs at the University of Minnesota

(DRAFT)

Because environmental issues and challenges span across many disciplines, there are educators and researchers from a wide spectrum of fields working in environmental problem solving. Students interested in pursuing an environmental area of study can pursue a number of different options. In addition to the Environmental and Ecological Engineering (in BBE) and Environmental Engineering options outlined below, students, in consultation with an advisor, can choose to specialize in subject matter directly related to the environment within Mechanical Engineering, Chemical Engineering, Civil Engineering, Chemistry, or Earth Sciences.

Environmental and Ecological Engineering (EEE), a major-sub plan within BBE, emphasizes an ecological/ecosystems approach to addressing environmental issues in the natural world. The EEE program integrates basic engineering principles and design with biological and ecological systems. The program is aimed at designing, developing and implementing sustainable solutions for the mutual benefit of both natural systems and systems significantly affected by human activities. Specific examples of areas of emphasis include: land use management systems involving renewable, biological resources and ecological systems; preserve and improve land and water resources, water quality and air quality; non-point source pollution and their mitigation; agricultural irrigation and drainage; ecosystem restoration; wetland restoration; soil erosion; biological waste and nutrient management; and storm-water management.

The proposed **Environmental Engineering** program within Civil Engineering emphasizes a traditional, infrastructure based engineering to address environmental issues. Specific examples of areas of emphasis include: sanitary engineering; water treatment; wastewater treatment; point-source pollution and their mitigation; management of solid wastes or refuse; and hazardous waste management.

The following table and chart provides a comparison of key curricular components differentiating the two programs:

Environmental and Ecological Engineering

BioC 2011 BioC Ag. & Health (3)
 BBE 3043 Biological and Environmental Thermodynamics (3)
 BBE 3013 Eng. Principles of Molecular and Cellular Processes (3)

BBE 3023 Ecological Engineering Principles (3)
 BBE 3033 Material and Energy Balances in Biological Systems (3)
 BBE 2001 Mechanics and Structural Design (4)

BBE 4303 Bio-based Materials Science (3)
 BBE 3012 Transport in Biological Processes I (4)
 BBE 4013 Transport in Biological Processes II (3)
 BBE 4023W Process Control and Instrumentation (3)

BBE 4523 Ecological Engineering Design (3)
 BBE 4533 Sustainable Waste Management Engineering (3)
 BBE 4535 Assessment and Diagnostics of Impaired Waters (3)
 BBE 5513 Watershed Engineering (3)
 BBE 4502W Capstone Design (4)

Technical Electives focussing on biological, ecological and environmental sciences and Engineering

Environmental Engineering

Chem 2311 Organic Chemistry I (3)
 Chem 4501 Intro Thermodynamics, Kinetics and Stat Mechanics (3)

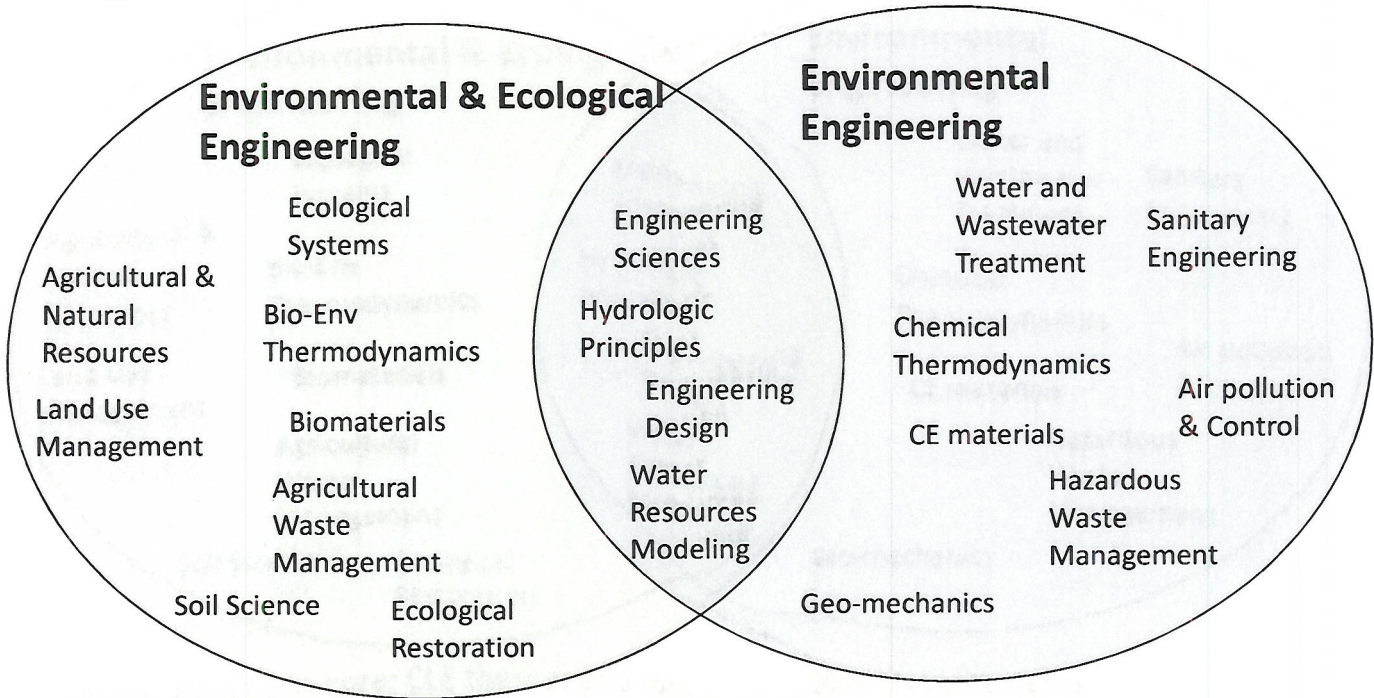
CE 3501 Environmental Engineering (3)
 CE 3542 Environmental Engineering Lab (3)
 CE 3301 Soil Mechanics I (3)
 ESCI 1101 Introductory Geology (3)

CE 3402W CE Materials (3)
 CE 3502 Fluid Mechanics (4)

CE 4502 Wastewater Treatment (3)
 CE 4501 Water Treatment (3)
 CE 4501 Hydrologic Design (4)
 CE 4102W Capstone Design (4)

Technical Electives focussing on Earth and environmental sciences and Engineering

Basic core: 2 years of math, 1 year of physics, 1.5 year of chemistry/biochemistry, basic biology



Liberal education core: CLE themes and cores plus other requirements