

BS in Environmental Engineering

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Degree Program Description

The environmental engineering BS program combines a solid background in science and engineering (chemistry, math, physics, thermodynamics) with discipline core classes in water quality and treatment, air pollution, and solid and hazardous waste management and civil and environmental engineering or interdisciplinary elective courses. Optional tracks are offered in public health and emerging contaminants, data analytics and big data or biological and agricultural engineering. The program culminates with a capstone environmental engineering design project.

Program graduates can become licensed environmental engineers or and continue to graduate programs in environmental or related fields. Environmental engineers work in industrial facilities, consulting firms, research laboratories and in the public sector, mostly in government/regulatory agencies or municipal facilities. Typically, environmental engineers work in the design of projects that lead to environmental protection. Those may include water reclamation facilities or air pollution control systems, and they are also involved in the operation and monitoring of those projects.

Environmental engineers conduct environmental investigations and prepare reports; they review and update reports, plans, permits, and standard operating procedures related to environmental aspects. Environmental engineers lead inspections of industrial and municipal facilities and programs in order to ensure compliance with environmental regulations. In a consulting role, they advise private companies and government agencies about assessment and remediation of contaminated sites.

Major Program Requirements

The BS in Environmental Engineering requires a total of 125 credit hours for completion. Students are required to complete all University general education (<http://catalog.missouri.edu/academicdegree/requirements/generaleducationrequirements/>), University undergraduate requirements (<http://catalog.missouri.edu/academicdegree/requirements/universityrequirements/>), degree, and major requirements, including selected foundational courses, which may fulfill some University general education requirements.

Students are introduced to Environmental Engineering and professional engineering design practices in the CV_ENG 1000 course. Basic science and engineering courses ground the students in the fundamentals necessary for future course work: biology (BIO_SC 1500), general chemistry (CHEM 1400 and CHEM 1410), organic chemistry (CHEM 2100), physics (PHYSICS 2750 and PHYSICS 2760), soil science (SOIL 2100) and thermodynamics (ENGINR 2300).

Students are also required to complete one 3-hour cultural awareness course which is selected from an approved cultural awareness course list,

created and maintained by the College of Engineering or which meets the Arts and Science (A&S) diversity intensive (DI) requirement.

Engineering topics required courses impart general engineering foundations necessary for the discipline-specific courses. Civil Engineering topics required courses in the sophomore and junior years provide students with the basic fundamentals in the areas of environmental engineering (CV_ENG 3200), water resources (CV_ENG 3702), data analysis and modeling (CV_ENG 4001), fluid mechanics (CV_ENG 3700), water (CV_ENG 4290), air (CV_ENG 4001) and solid waste (CV_ENG 4220) pollution and control.

Civil Engineering elective courses provide students opportunity to specialize in different aspects of environmental engineering and water resources. With the Program elective courses, students may further focus on environmental engineering or opt for one of the three tracks: public health and emerging contaminants, big data and data analysis or, biological and agricultural engineering.

Design and communication skills are integrated throughout the curriculum culminating in a capstone design project. This "final" course requires working in teams, making oral and written presentations, and completing a final design report. Oversight, interaction, and evaluation are provided by practicing engineers from industry and governmental organizations.

Core Requirements

Math		16
MATH 1500	Analytic Geometry and Calculus I	5
MATH 1700	Calculus II	5
MATH 2300	Calculus III	3
MATH 4100	Differential Equations	3
Basic Sciences		29
CHEM 1400 & CHEM 1401	College Chemistry I and College Chemistry I Laboratory	4
CHEM 1410 & CHEM 1411	College Chemistry II and College Chemistry II Laboratory	4
CHEM 2100	Organic Chemistry I	3
PHYSICS 2750	University Physics I	5
PHYSICS 2760	University Physics II	5
BIO_SC 1500	Introduction to Biological Systems with Laboratory	5
SOIL 2100	Introduction to Soils	3
Engineering Topics-General		5
ENGINR 1050	Foundations of Engineering	2
ENGINR 2300	Engineering Thermodynamics	3
Civil Engineering Topics		30
CV_ENG 1000	Introduction to Civil Engineering	1
CV_ENG 3200	Fundamentals of Environmental Engineering	4
CV_ENG 3010	Decision Methods for Civil Engineering Design	3
CV_ENG 3700	Fluid Mechanics	3
CV_ENG 3702	Fundamentals of Water Resources Engineering	4
CV_ENG 4290	Water and Wastewater Treatment Engineering	3
CV_ENG 4220	Hazardous Waste Management	3
CV_ENG 4702	Data Analysis Modeling in Environmental Engineering #	3
CV_ENG 4211	Air Pollution Control Engineering #	3

CV_ENG 4980	Civil Engineering Systems Design	3
Civil Engineering Electives (any four courses from the below list)		12
CV_ENG 4270	Environmental Engineering Microbiology	3
CV_ENG 4250	Environmental Regulatory Compliance	3
CV_ENG 4286	Environmental Sustainability	3
CV_ENG 4230	Introduction to Water Quality	3
CV_ENG 4700	Hydraulics of Open Channels	3
CV_ENG 4730	Hydraulic Design	3
CV_ENG 4990	Undergraduate Research in Civil and Environmental Engineering	3
or CV_ENG 4995	Research in Civil and Environmental Engineering-Undergraduate Honors	
CV_ENG 4720	Watershed Modeling Using GIS	3
or BIOL_EN 4350	Watershed Modeling Using GIS	
CV_ENG 4740	Irrigation and Drainage Engineering	3
or BIOL_EN 4250	Irrigation and Drainage Engineering	
Program Electives (any four courses from the below list of general electives or tracks)*		12
BIOL_EN 4560	Observing the Earth from Space	3
CV_ENG 3600	Civil Engineering Materials	4
ENGINR 2100	Circuit Theory for Engineers	3
ATM_SC 3600	Climates of the World	3
Students may choose one of the following tracks. Three courses from the student's selected track plus one additional elective course from the Civil Engineering electives or Program electives list. Students may use the courses below as electives if not all three courses in a track are completed.		
1. Public Health and Emerging Contaminants		
P_HLTH 4350	Principles of Environmental Health for Public Health	3
P_HLTH 3560	Public Health and Environmental Justice	3
P_HLTH 4620	Climate Change and Human Health	3
2. Data Analytics and Big Data		
STAT 4710	Introduction to Mathematical Statistics	3
STAT 4510 & STAT 4520	Applied Statistical Models I and Applied Statistical Models II	6
STAT 4870	Time Series Analysis	3
3. Biological and Agricultural Engineering**		
CV_ENG 4710	Soil and Water Conservation Engineering	3
CV_ENG 4720	Watershed Modeling Using GIS	3
CV_ENG 4740	Irrigation and Drainage Engineering	3

* Any of the above listed Civil Engineering Electives may also be chosen, but will only count towards one requirement
 ** Courses in the bio/agricultural track may change based on availability of offering.
 # Courses are under development and subject to change.

Semester Plan

First Year			
Fall	CR	Spring	CR
MATH 1500		5 MATH 1700	5
CHEM 1400 & CHEM 1401		4 S BS or HS FAA**	3
BIO_SC 1500		5 CHEM 1410 & CHEM 1411	4

CV_ENG 1000	1 ENGLISH 1000	3
	ENGINR 1050	2
		15

Second Year			
Fall	CR	Spring	CR
MATH 2300		3 MATH 1400	3
S BS or HS FAA**		3 CV_ENG 3200	4
PHYSICS 2750		5 PHYSICS 2760	5
CHEM 2100		3 CV_ENG 3700	3
CV_ENG 3010		3 S BS or HS FAA**	3
		17	18

Third Year			
Fall	CR	Spring	CR
SOIL 2100		3 CV_ENG Elective	3
ENGINR 2300		3 Elective	3
CV_ENG 4702		3 CV_ENG 4290	3
S BS or HS FAA**		3 CV_ENG 3702	4
CV_ENG Elective		3	
		15	13

Fourth Year			
Fall	CR	Spring	CR
CV_ENG 4220		3 CV_ENG 4980	3
CV_ENG Elective		3 CV_ENG 4001	3
Elective		6 CV_ENG 4211	3
S BS or HS FAA**		3 CV_ENG Elective	3
		Elective	3
		S BS or HS FAA**	3
		15	18

Total Credits: 128

Degree Audit

The degree audit is an automated report reflecting a student's academic progress toward the completion of a degree.

MU students can request a degree audit by logging in to myDegreePlanner (<https://mydegreeplanner.missouri.edu>). Students may also access myDegreePlanner via myZou, in the Student Center, click on the Academic Progress Tile, then select Request Degree Audit. The audit automatically pulls in the student's MU course work, transfer courses and courses in progress. This is available to current students, admitted students, and those who last attended less than three terms ago.

Past MU students can request a degree audit by contacting the Academic Advising Unit of the division in which they were last enrolled at MU. For contact information, go to <https://advising.missouri.edu/contact/>.

Prospective students, can access a preliminary MU degree audit via <https://www.transferology.com> (<https://www.transferology.com/>). Information on the college credits already earned will have to be manually entered before it can be evaluated against current degree requirements.

For additional details on degree audits, go to <https://registrar.missouri.edu/degrees-audits/degree-audits/>.

Major and Career Exploration

The University of Missouri has many resources to assist you in exploring majors and career possibilities. For guidance, visit the Majors and

Careers (<https://career.missouri.edu/majors-careers/>) website or view specific resources below.

- If you are considering a change of major or are exploring multiple majors, schedule an appointment with an advisor in the Discovery Center (<https://discoverycenter.missouri.edu/>) by calling (573)884-9700 or through MU Connect (<https://mizzou.starfishsolutions.com/starfish-ops/dl/instructor/serviceCatalog.html?bookmark=service/3761489>) Discovery Center service in your success network.
- If you have decided on a major, visit an academic advisor in the School or College that you are interested in to discuss the process of declaring the major (<https://advising.missouri.edu/majors-minors/changing-major/>).
- If you would like to learn more about your career interests, abilities, values and talents, visit the MU Career Center (<https://career.missouri.edu/connect/>). No Appointment is necessary to explore career options with one of our staff members.
- If you would like information about MU majors and degree programs, visit:
 - the Degrees, Majors (Degree Programs), Emphasis Areas, Minors and Certificates (<http://catalog.missouri.edu/degreesanddegreeprograms/>) page in the catalog,
 - the MU Majors (<https://majors.missouri.edu>) website.

For additional major and career exploration resources, visit Major & Career Exploration (<http://catalog.missouri.edu/majorcareerexploration/>) in the catalog.