

ENVIRONMENTAL ENGINEERING

<http://www.ccee.iastate.edu/>

Administered by the Department of Civil, Construction and Environmental Engineering

For undergraduate curriculum in environmental engineering leading to the degree bachelor of science.

Students in the environmental engineering bachelor's degree program will complete a curriculum covering the engineering and science knowledge necessary to design and implement effective, affordable solutions for environmental challenges involving water, air, and land. The environmental engineering curriculum equips students with a broad education that includes technical skills in analysis and design and professional practices such as communication, teamwork, leadership, and ethics. Graduates will have a strong foundation necessary to solve complex current and future infrastructure challenges within the diverse areas of environmental engineering.

Graduates of this program will be prepared to work in environmental engineering positions within the private and public (e.g., federal, military, state and community) sectors that deal with pollution and contamination in all aspects of the built and natural environment. Examples of this work include analyzing and designing systems for water supply and distribution, collecting and processing waste, controlling air quality, recycling residuals, and protecting public health. Students interested in a more general education in civil engineering should consider the B.S. in civil engineering with environmental emphasis.

Student Learning Outcomes: Graduates of the Environmental Engineering curriculum should have, at the time of graduation:

1. an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
2. an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors
3. an ability to communicate effectively with a range of audiences
4. an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts

5. an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives
6. an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions
7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

Program Educational Objectives: Three to five years after graduation, graduates of the environmental engineering program will have:

1. Pursued successful careers and expertise in environmental engineering or a related profession.
2. Collaborated effectively on multi-disciplinary teams to address the needs of society and the environment.
3. Pursued lifelong learning, professional development, and licensure as appropriate for their career goals.

The faculty encourages the students to develop their professional skills by participating in cooperative education, internships, or progressive summer engineering employment and study abroad programs. Qualified juniors and seniors interested in graduate studies may apply to the Graduate College to pursue concurrently the bachelor degree and either a master of science in Civil Engineering or a master of business administration in the College of Business Administration. These students would have an opportunity to graduate in five years with both degrees.

Curriculum in Environmental Engineering

Administered by the Department of Civil, Construction and Environmental Engineering.

Leading to the degree bachelor of science.

Total credits required: 130. Any transfer credit courses applied to the degree program require a grade of C or better (but will not be calculated into the ISU cumulative GPA, Basic Program GPA or Core GPA). See also Basic Program and Special Programs. Note: Department does not allow Pass/Not Pass credits to be used to meet graduation requirements.

International Perspectives: 3 cr.¹

U.S. Diversity: 3 cr.¹

Communication Proficiency/Library requirement

ENGL 150	Critical Thinking and Communication (Must have a C or better in this course)	3
ENGL 250	Written, Oral, Visual, and Electronic Composition (Must have a C or better in this course)	3
LIB 160	Introduction to College Level Research	1

Social Sciences and Humanities: 12 cr.²

Complete 12 cr. with 6 cr. at 200-level or above.

Basic Program: 24 cr³. Minimum GPA of 2.00 required for this set of courses to graduate, including any transfer courses (please note that transfer course grades will not be calculated into the Basic Program GPA).

CHEM 167	General Chemistry for Engineering Students	4-7
or CHEM 177 & CHEM 178	General Chemistry I and General Chemistry II	
ENGL 150	Critical Thinking and Communication (Must have a C or better in this course)	3
ENGR 101	Engineering Orientation	R
C E 160	Engineering Problems with Computational Laboratory ³	3
LIB 160	Introduction to College Level Research	1
MATH 165	Calculus I	4
MATH 166	Calculus II	4
PHYS 231	Introduction to Classical Physics I	4
PHYS 231L	Introduction to Classical Physics I Laboratory	1
Total Credits		24-27

Math and Physical Science: 27 cr.

CHEM 177L	Laboratory in General Chemistry I	1
CHEM 178	General Chemistry II ⁴	3
CHEM 178L	Laboratory in College Chemistry II ⁴	1
CHEM 231	Elementary Organic Chemistry	3
BIOL 251	Biological Processes in the Environment	3
CHEM 231L	Laboratory in Elementary Organic Chemistry	1
GEOL 201	Geology for Engineers and Environmental Scientists	3
MATH 265	Calculus III	4
MATH 266	Elementary Differential Equations	3
MICRO 201	Introduction to Microbiology	2
Statistics Elective ²		3
Total Credits		27

Env Engineering Core: 27 cr. Minimum GPA of 2.00 required for this set of courses to graduate (including transfer courses; please note that transfer course grades will not be calculated into the Core GPA).

ENV E 201	Environmental Engineering Measurements and Analysis	3
C E 326	Principles of Environmental Engineering	3
C E 372	Engineering Hydrology and Hydraulics	3
A B E 378	Mechanics of Fluids	3
M E 231	Engineering Thermodynamics I	3
ENV E 426	Environmental Engineering Science	3
ENV E 429X	Air Pollution and Control	3
ENV E 430X	Solid and Hazardous Waste Management	3

ENV E 427X	Environmental Engineering Systems	3
Total Credits		27

Other Remaining Courses: 45 cr.

ENGL 250	Written, Oral, Visual, and Electronic Composition (Must have a C or better in this course)	3
Technical Communication Elective ²		3
SP CM 212	Fundamentals of Public Speaking	3
ENV E 120	Environmental Engineering Learning Community	1
ENV E 190	Introduction to Undergraduate Research in Civil and Environmental Engineering	2
C E 306	Project Management for Civil Engineers	3
C E 388	Sustainable Engineering and International Development	3
or C E 488	Sustainable Civil Infrastructure Systems	
C E 206	Engineering Economic Analysis and Professional Issues in Civil Engineering	3
C E 274	Engineering Statics	3
C E 360	Geotechnical Engineering	4
E M 324	Mechanics of Materials	3
C E 428	Water and Wastewater Treatment Plant Design	3
Engineering Topics Electives ²		6
Total Credits		40

Seminar/Co-op/Internships: R cr.

Co-op/Internship optional.

Notes.

- These university requirements will add to the minimum credits of the program unless the university-approved courses are also approved by the department to meet other course requirements within the degree program. U.S. diversity and international perspectives courses may not be taken Pass/Not Pass.
- Choose from department approved list. (<http://www.ccee.iastate.edu/academics/advising/civil-engineering-student-forms/>)
- See Basic Program for Professional Engineering Curricula for accepted substitutions for curriculum designated courses in the Basic Program.

Freshman

Fall	Credits Spring	Credits
C E 160	3 ENV E 190	2
CHEM 177	4 CHEM 178	3
CHEM 177L	1 CHEM 178L	1
ENGL 150	3 MATH 166	4
MATH 165	4 PHYS 231	4
LIB 160	1 PHYS 231L	1
ENGR 101	R SSH Elective	3

ENV E 120	1	
	17	18

Sophomore

Fall	Credits Spring	Credits
ENGL 250	3 C E 326	3
C E 274	3 C E 306	3
CHEM 231	3 A B E 378	3
CHEM 231L	1 BIOL 251 (Offered Spring Only)	3
MATH 265	4 MATH 266	3
ENV E 201	3	
	17	15

Junior

Fall	Credits Spring	Credits
C E 206	3 C E 372	3
Sustainability Elective	3 C E 360	4
E M 324	3 Technical Communication Elective	3
Statistics Elective	3 MICRO 201	2
GEOL 201	3 M E 231	3
SSH Elective	3	
	18	15

Senior

Fall	Credits Spring	Credits
ENV E 426	3 C E 428	3
ENV E 430X	3 ENV E 427X	3
Engineering Topics Elective	3 ENV E 429X	3
SSH Elective (Intl. Perspective)	3 Engineering Topics Elective	3
SP CM 212	3 SSH Elective (U.S. Diversity)	3
	15	15