

What is Environmental Engineering?

Environmental engineering is a relatively young branch of the engineering profession but is projected to be among the fastest growing. It has developed in response to the serious problems of environmental contamination caused by the activities and waste products of our modern society. The U.S. Department of Labor, Bureau of Labor Statistics projects that jobs for environmental engineers will grow by 25% from 2006 to 2016. Pollution has many sources and is found in the land, air, and water around the globe. Environmental engineers usually specialize in dealing with certain types of pollution or a particular resource:

AIR POLLUTION: Environmental engineers design chemical and mechanical means of preventing pollutants from being discharged into the atmosphere.

HAZARDOUS WASTE: From chemical neutralization to genetically engineered “waste-eating” bacteria, environmental engineers devise better ways to clean up hazardous wastes.

INDUSTRIAL HYGIENE: Engineers specializing in industrial hygiene help design efficient industrial and manufacturing processes that minimize waste and hazardous by-products.

WATER RESOURCES: Water resource engineers plan and design water delivery systems and ensure that municipal water supplies are safe to drink.

SOLID WASTE MANAGEMENT: Environmental engineers lead the way in solid waste management, from designing landfills that won't contaminate soil or groundwater, to reducing the amount of trash through better recycling processes, to understanding how various materials biodegrade.

WASTEWATER: Treating sewage and other wastewater is vitally important, not only for aquatic habitats but for human health as well. Engineers design facilities and processes to minimize the environmental impact of wastewater treatment.



Major Areas of Emphasis

We offer a strong core curriculum, providing our students with rigorous training in the causes, control, and prevention of environmental contamination and the flexibility to secure their future in an environmental profession. The curriculum provides a broad foundation in mathematics and the fundamentals of physical, chemical, and biological processes. From there, the curriculum builds understanding of the fate of environmental contaminants, analysis and design of solutions to real-world environmental problems, and the application of modeling and simulation methods to assess risk and estimate cost.

Active research ensures that the content of the curriculum is constantly renewed and maintained at a technically challenging level and that discovery learning is integrated into the program. Opportunities abound for environmental engineering undergraduates to work with faculty and graduate students in our world-class research program. Roughly two-thirds of our students work as research assistants, either for pay or independent study credit. We want our graduates to have the skills necessary to pursue advanced degrees. More detailed information on our research program is available at www.ce.udel.edu/ewre.

Environmental engineering students at UD choose one of the following concentrations:

CONTAMINANT TRANSPORT AND CONTROL PROCESSES: providing an in-depth understanding of both engineered and natural processes controlling contaminant behavior and remediation techniques.

ENVIRONMENTAL FACILITIES DESIGN AND CONSTRUCTION: preparing students to develop and engineer the systems for air, water, and wastewater purification.

ENVIRONMENTAL ENGINEERING BIOTECHNOLOGY: familiarizing students with biological and microbial aspects of ecology and pollution control.

WATER RESOURCES AND WATER QUALITY: enabling students to develop engineered solutions to mitigate the effects of droughts and floods and to clean up contaminated rivers, streams, and groundwater.

To meet the threats posed by pollution, **environmental engineers** are being called upon to design solutions that are workable and cost-effective for our society. They are therefore often drawn to related areas of business, law, public administration and policy, and urban planning. But whatever their specialty, environmental engineers **protect the health of the Earth and its inhabitants.**

Additional Opportunities for Study

Exploring the humanities and social sciences through the breadth requirements

All engineering curricula have at least 21 credits set aside for breadth requirement courses, 18 credits of which are chosen from an extensive list of humanities and social science options. The remaining 3 credits are usually satisfied by chemistry, math, or physics courses all engineering students are required to take. The University requires that 3 credits of breadth requirement coursework satisfy the Multicultural Requirement and the College requires that 6 credits of breadth requirement coursework be above the introductory level. Students entering with Advanced Placement (AP) credit may already have completed several of these courses.

Exploring other subjects through minors

A minor is a small set of courses in a particular subject area that is different from a student's major. Minors normally require five to seven courses to be completed in their subject areas. Because students may double-count courses for credit against both majors and minors, they can often complete a minor by doing no additional work if they choose their elective courses carefully. About half of all engineering students have at least one minor, and many have two or three. Some of the most popular minors for environmental engineering majors include chemistry, civil engineering, economics, foreign languages, materials science, mathematics, nanoscale materials, physics, and sustainable energy technology.

4+1 BCE/MCE and BENE/MCE Program

Well-qualified Civil and ENvironmental Engineering majors may apply to the 4x1 program which would culminate in the student earning a Bachelor degree in Civil Engineering (BCE) or Environmental Engineering (BENE) and a Master of Civil Engineering (MCE) degree within 5 years. The program is limited to University of Delaware undergraduates pursuing the BCE or BENE degree, with a minimum Grade Point Average of 3.25 at the time of application.

After Graduation

Our program has an outstanding record of placing graduates in high-paying jobs and prestigious graduate programs. Environmental engineers are employed in specialized consulting firms, in state and federal agencies, in municipal public works, in corporate research and engineering groups, and in academic positions. Approximately 20–25% of environmental engineering graduates choose to continue their education toward a master's or Ph.D. degree, and some graduates will choose to attend law or business schools. Students who earn advanced degrees in engineering usually pursue a career in advanced research or as a faculty member in a college of engineering.

Environmental Engineering Curriculum

Spring

First Year

COURSE #	COURSE DESCRIPTION	CREDITS
EGGG 101	Introduction to Engineering (FYE)	2
CHEM 103	General Chemistry I	4
MATH 241	Analytic Geometry & Calculus A	4
CISC 106	General Computer Science for Engineers	3
ENGL 110	Critical Reading and Writing	3
		16

Fall

First Year

COURSE #	COURSE DESCRIPTION	CREDITS
CHEM 104	General Chemistry II	4
MATH 242	Analytic Geometry & Calculus B	4
PHYS 207	Fundamentals of Physics I	4
	Breadth Requirement Elective 1*	3
		15

Second Year

COURSE #	COURSE DESCRIPTION	CREDITS
CIEG 211	Statics	3
CIEG 233	Environmental Engineering Processes	3
MATH 243	Analytic Geometry & Calculus C	4
ENGL 410	Technical Writing	3
	Breadth Requirement Elective 2	3
		16

Second Year

COURSE #	COURSE DESCRIPTION	CREDITS
	Computer Elective	3
MATH 351	Engineering Math I	3
BISC 267	Introductory Biology I	4
	Breadth Requirement Elective 3	3
	Breadth Requirement Elective 4	3
		16

Third Year

COURSE #	COURSE DESCRIPTION	CREDITS
CIEG 305	Fluid Mechanics	3
CIEG 438	Water and Wastewater Engineering	3
CIEG 440	Water Resources Engineering	3
CHEG 231	Chemical Engineering Thermodynamics	3
	Breadth Requirement Elective 5	3
		15

Third Year

COURSE #	COURSE DESCRIPTION	CREDITS
CIEG 306	Fluid Mechanics Laboratory	1
CIEG 315	Probability and Statistics for Engineers	3
CIEG 337	Environmental Engineering Laboratory	3
	Technical Elective	3
	Technical Elective	3
	Breadth Requirement Elective 6	3
		16

Fourth Year

COURSE #	COURSE DESCRIPTION	CREDITS
CIEG 461	Senior Design Project (DLE)	2
CIEG 436	Processing, Recycling, Mgt of Solid Waste	3
CIEG 468	Principles of Water Quality Criteria	3
EGTE 321	Storm Water Management	4
	Technical Elective	3
		15

Fourth Year

COURSE #	COURSE DESCRIPTION	CREDITS
CIEG 461	Senior Design Project (DLE)	2
CIEG 430	Water Quality Modeling	3
CIEG 437	Water and Wastewater Quality	3
CIEG 434	Air Pollution Control	3
CIEG 498	Groundwater Flow and Cont Trans	3
	Technical Elective	2
		16

TOTAL CREDIT HOURS: 125

* A list of Breadth Requirement courses is available at: www.engr.udel.edu/advise/undergrad_programs.html