



WHAT IS CIVIL ENGINEERING?

Civil engineers work to solve a wide variety of problems associated with the infrastructure and daily service needs of society—needs like clean water, safe buildings, and convenient transportation. It's a diverse field that opens the door for careers in a wide variety of areas, including the following:

- **STRUCTURES:** Civil engineers design and supervise construction of skyscrapers, dams, stadiums, airports, highways, and bridges.
- **FAILURE ANALYSIS:** Civil engineers analyze the causes of structural failures in order to improve structural codes and construction techniques.
- **TUNNELS AND FOUNDATIONS:** Specializing in earth structures and foundations, geotechnical engineers make sure that tunnels and other structures below ground are safely excavated.
- **WATER RESOURCES:** Water resource engineers plan and design water delivery systems and ensure that municipal water supplies are safe to drink.
- **THE ENVIRONMENT:** Environmental engineers help keep our environment clean by dealing with society's by-products, from hazardous waste remediation to landfill design and wastewater treatment.
- **TRANSPORTATION:** From high-speed railroads to computer-controlled traffic systems, transportation engineers devise ways to make our transportation systems more efficient.
- **COASTAL ENGINEERING:** This area of specialty focuses on the interaction of waves and currents with nearshore and offshore structures.
- **DISASTERS:** One of the most crucial jobs civil engineers do is to protect people from disasters such as earthquakes, floods, and high winds by designing structures that can withstand these forces.
- **MATERIALS:** Civil engineers are exploring ways to use advanced composite materials and new high-performance steel and concrete to reinforce deteriorating structures and build longer-lasting new ones.

MAJOR AREAS OF EMPHASIS

Students working on their Bachelor of Civil Engineering degree have some flexibility in designing a curriculum to meet their needs and interests. After laying a strong foundation in math, science, and engineering through

In the face of decaying cities, clogged roadways, urban sprawl, and widespread pollution, civil 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, architecture, and urban planning. But whatever their specialty, civil engineers do work that directly affects the quality of life for millions of people.

required courses, students may begin taking technical electives in one of the main focus areas—structural, geotechnical, environmental, water resources, transportation, or ocean and coastal engineering. The department also offers minors in civil engineering and environmental engineering.

Active research ensures that the content of the undergraduate program is constantly renewed and maintained at a challenging technical level and integrates discovery learning into the program. Opportunities abound for civil engineering undergraduates to work with faculty and graduate students as research assistants, either for pay or independent study credit. We want our graduates to have the skills necessary to pursue advance degrees.

Research in the department covers a broad range of topics with particular strengths in bridge design, construction, evaluation, and rehabilitation; applications of composite materials to concrete, steel, and earth structures; computer modeling of wave/shoreline interactions; intelligent transportation systems; management and operation of civil infrastructure systems; remediation of contaminated soil and groundwater; and biodegradation of wastes. More detailed information about our research program is available on our website.



ADDITIONAL OPPORTUNITIES FOR STUDY

EXPLORING THE HUMANITIES AND SOCIAL SCIENCES THROUGH THE BREADTH REQUIREMENTS

All engineering curricula have at least 18 credits set aside for breadth requirement courses, which are chosen from an extensive list of humanities and social science options. To provide both breadth and depth, students are required to complete courses from both categories, with at least two of the courses being above the introductory level. Students entering with Advanced Placement (AP) credits 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 civil engineering majors include: economics, environmental engineering, foreign languages, materials science, mathematics, nanoscale materials, physics, and sustainable energy technology.

AFTER GRADUATION

The study of engineering fosters the development of quantitative, analytical, and problem-solving skills that are very useful in many different career areas. On average, 70–80% of graduates with a Bachelor of Civil Engineering degree choose employment in private industry; federal, state, and local government agencies; and private practice. Approximately 15–20% of civil engineering graduates will choose to continue their

education toward a master's or Ph.D. degree, and some graduates will choose to attend law, architecture, medical, or business school. Students who earn Ph.D. degrees in engineering usually pursue a career in advanced research or as a faculty member in a college of engineering.

CIVIL ENGINEERING CURRICULUM

FALL			SPRING		
FIRST YEAR			FIRST YEAR		
COURSE #	COURSE DESCRIPTION	CREDITS	COURSE #	COURSE DESCRIPTION	CREDITS
EGGG 101	Introduction to Engineering (FYE)	2	CIEG 126	Introduction to Surveying and CAD	3
CHEM 103	General Chemistry	4		Natural Science Elective	4
MATH 241	Analytic Geometry & Calculus A	4	MATH 242	Analytic Geometry & Calculus B	4
CISC 106	General Computer Science for Engineers	3		Breadth Requirement Elective 1*	3
ENGL 110	Critical Reading and Writing	3			14
		16			
SECOND YEAR			SECOND YEAR		
CIEG 211	Statics	3	CIEG 212	Solid Mechanics	3
PHYS 207	Fundamentals of Physics I	4	CIEG 213	Civil Engineering Materials Lab	1
MATH 243	Analytic Geometry & Calculus C	4	CIEG 311	Dynamics	3
COMM 212	Oral Communication in Business	3	MSEG 302	Materials Science for Engineers	3
	Breadth Requirement Elective 2	3	MATH 351	Engineering Mathematics I	3
		17		Breadth Requirement Elective 3	3
					16
THIRD YEAR			THIRD YEAR		
CIEG 301	Structural Analysis	4	CIEG 302	Structural Design	4
CIEG 320	Soil Mechanics	3	CIEG 321	Geotechnical Engineering	3
CIEG 323	Soil Mechanics Laboratory	1	CIEG 331	Environmental Engineering	3
CIEG 305	Fluid Mechanics	3	CIEG 351	Transportation Engineering	3
MATH 353	Engineering Mathematics III	3	CIEG 306	Fluid Mechanics Laboratory	1
ENGL 410	Technical Writing	3	CIEG 315	Probability and Statistics for Engineers	3
		17			17
FOURTH YEAR			FOURTH YEAR		
CIEG 461	Senior Design Project (DLE)	2	CIEG 461	Senior Design Project (DLE)	2
CIEG 486	Construction Methods and Management	3		Technical Elective 2	3
CIEG 440	Water Resources Engineering	3		Technical Elective 3	3
CIEG 451	Transportation Engineering Lab	1		Breadth Requirement Elective 5	3
	Technical Elective 1	3		Breadth Requirement Elective 6	3
	Breadth Requirement Elective 4	3			14
		15			
TOTAL CREDIT HOURS 126					

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