DEPARTMENT OF CIVIL AND ENVIRONMENTAL ENGINEERING

UNDERGRADUATE PROGRAM CLASS OF 2020

University of Delaware
August 2016

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Introduction

Welcome to the University of Delaware. The Department of Civil and Environmental Engineering is part of the College of Engineering. In the 2016 fall semester, 2,500 undergraduates will be registered in the College, of which approximately 450 are undergraduate civil and environmental engineering students. The graduate student enrollment in the department is around 120 students.

You will find that a strong working relationship exists within the departments of the College of Engineering, and interdepartmental programs broaden the opportunities for research and coursework. Vigorous, well-staffed departments of chemistry, physics, biology, geology, mathematics, and computer science are closely aligned, and some of your first courses will be taught by those departments. Joint appointments of some of our faculty with the College of Earth, Ocean, and Environment and the College of Arts and Science exemplify the interdisciplinary relationships you'll find across campus. Engineering research centers create a background of scholarly and research activities from which our students benefit. The University's Undergraduate Research Program further enhances the opportunities by bringing students in active contact with faculty research.

You will also get to use Morris Library, which contains over 2.8 million volumes and subscribes to over 40 ,000 journals and newspapers, as well as the University's outstanding computing facilities.

Less tangible, but very important, is the friendly and intellectually stimulating atmosphere that exists on campus. It is enhanced by the many honor societies and student chapters of professional engineering societies as well as opportunities for sports and outdoor activities offered by the University and the surrounding area. Of particular interest are the student chapters of the American Society of Civil Engineers (ASCE), the Institute of Transportation Engineers (ITE), Chi Epsilon, the Environmental Engineering Student Association (EESA), the American Society of Highway Engineers (ASHE), and Engineers Without Borders (EWB).

Common First Semester in Engineering

The University of Delaware offers seven degrees in engineering: Civil, Environmental, Mechanical, Electrical, Chemical, Computer, and Biomedical Engineering. Freshman engineering majors have the opportunity to learn about and experience all seven of these disciplines through a common first semester and the course EGGG101: Introduction to Engineering.

In this course, students have the opportunity to learn about the engineering design process from a team of faculty. EGGG101 will address “grand challenges” in engineering. You will learn more about each of the engineering disciplines as well as the skills needed to be successful in your college career. During your first semester, you will take the same courses as all other first- semester engineering majors. At the end of your first semester you will have the opportunity to request a change of major into a different engineering major, should you decide that civil or environmental engineering is not for you, provided you meet the academic requirements and there is space available in the major. Please consult with your academic advisor or the College of Engineering Assistant Dean for Undergraduate Services for an up-to-date list of the restricted engineering majors.

Undergraduate Degree Programs

The Department of Civil & Environmental Engineering offers two undergraduate degree programs in Civil Engineering and in Environmental Engineering, as well as four minors in these two subjects.

Civil Engineering Bachelor's Degree Program

The Bachelor of Civil Engineering (BCE) program at the University of Delaware offers training in all of the major disciplines of civil engineering: structural, geotechnical, transportation, environmental, infrastructure systems, railroad, and coastal engineering. The curriculum gives our students a unique opportunity to acquaint themselves with the various disciplines within the profession. Civil engineering students may select technical electives in one field or take a variety of courses to explore several areas of civil engineering. Students are encouraged to meet with their faculty advisors regularly to discuss their progress and any curricular matters.

You will spend the early part of your studies learning about the mathematics and science that form the foundation of practical engineering. A second important component in your education as an engineer is the development of your understanding of mechanics, a branch of physics, through special courses in the engineering science disciplines of statics, solid mechanics, dynamics, and fluid mechanics. Based on these tools of the trade, you'll spend much of the final year or two of your studies with courses that teach you the skills of analysis and design of engineering structures, as well as provide insights into the modern disciplines of civil engineering.

Also woven into the curriculum is a requirement to supplement your science and engineering skills with courses in communication, humanities, and social sciences. These courses will broaden your cultural background and improve your ability to function in a modern society.

The undergraduate program prepares our graduates for entry-level positions. After four years of work experience, you can qualify for a license to practice by passing a Principles and Practice of Engineering (PE) examination administered by a State Board. You can take the introductory Fundamentals of Engineering (FE) exam, which is a prerequisite for the PE, during senior year. In Delaware, the PE license is administered by the Delaware Association of Professional Engineers (DAPE). Information about the exam can be found at www.dape.org or www.ncees.org.

A complete description of the undergraduate curriculum can be found in the current Undergraduate & Graduate Catalog. A brief overview is given on the check sheet shown on the next page, which shows the recommended courses for each semester and helps you keep track of your progress toward graduation. You can also check your progress on UDSIS using the degree audit tool, or by reviewing your unofficial transcript.

Name _____ Advisor _____

CIVIL ENGINEERING PROGRAM
(126 hours)
Effective for fall 2014 and subsequent classes.
The required courses are normally taught in fall or spring semesters as indicated below.
Each student is responsible for tracking future changes in this schedule.

FIRST YEAR

FALL	**16 credits**	**Sem.**	**Grade**
General Chemistry*	CHEM 103 (4)		
Computer Science	CISC 106 (3)		
Intro. to Engineering	EGGG 101 (2)		
Analy. Geom. & Calc. A*	MATH 241 (4)		
Breadth Requirement	(3)		

FIRST YEAR

SPRING	**17 credits**	**Sem.**	**Grade**
Freshman Design	CIEG 161 (3)		
Seminar in Composition	ENGL 110 (3)		
Analy. Geom. & Calc. B*	MATH 242 (4)		
Science Elective **(a)**	(4)		
Breadth Requirement	(3)		

SOPHOMORE YEAR

FALL	**17 credits**	**Sem.**	**Grade**
Statics	CIEG 211 (3)		
Oral Communication	COMM 212(3)		
Analy. Geom. & Calc. C	MATH 243 (4)		
General Physics I*	PHYS 207 (4)		
Breadth Requirement	(3)		

SOPHOMORE YEAR

SPRING	**16 credits**	**Sem.**	**Grade**
CE Materials Lab	CIEG 213 (1)		
Dynamics	CIEG 311 (3)		
Engineering Math I	MATH 351 (3)		
Materials Science	MSEG 302 (3)		
Breadth Requirement	(3)		
Solid Mechanics	CIEG 212 (3)		

JUNIOR YEAR

FALL	**15 credits**	**Sem.**	**Grade**
Structural Analysis	CIEG 301 (4)		
Fluid Mechanics	CIEG 305 (3)		
Fluid Mechanics Lab	CIEG 306 (1)		
Soil Mechanics	CIEG 320 (3)		
Soil Mechanics Lab	CIEG 323 (1)		
Engineering Math III	MATH 353 (3)		

JUNIOR YEAR

SPRING	**17 credits**	**Sem.**	**Grade**
Structural Design	CIEG 302 (4)		
Prob. & Stats. for Engineers	CIEG 315 (3)		
Geotechnical Engineering	CIEG 321 (3)		
Environmental Engineering	CIEG 331 (3)		
Transportation Engineering	CIEG 351 (3)		
Transportation Eng. Lab	CIEG 451 (1)		

SENIOR YEAR

FALL	**14 credits**	**Sem.**	**Grade**
Senior Design	CIEG 461 (2)		
Eng. Project Management	CIEG 486 (3)		
Technical Writing	ENGL 410 (3)		
Water Resources Eng.	CIEG 440 (3)		
Technical Elective	(3)		

SENIOR YEAR

SPRING	**14 credits**	**Sem.**	**Grade**
Breadth Requirement	(3)		
Breadth Requirement	(3)		
Technical Elective	(3)		
Technical Elective	(3)		
Senior Design	CIEG 461 (2)		

*Grade of C- or higher for degree requirement or as pre-requisite for other courses.

All breadth requirements (18 credit hours) require a C- or better. The three University breadths must be taken from separate departments. See UD Academic Catalog for more information.

Creative Arts & Humanities	**Sem.**	**Grade**	History & Cultural Change	**Sem.**	**Grade**	Social & Behavioral Sciences	**Sem.**	**Grade**
Add'l Breadth Req.			Add'l Breadth Req.			Add'l Breadth Req.		

_____ two upper-level (300 and higher) courses _____ Multicultural Requirement

(a) one course from: BISC207, BISC208, CHEM104, GEOL107, PHYS208, or PHYS245

Minor in Civil Engineering

A minor in Civil Engineering may be earned by a student in any University bachelor's degree program through successful completion of a minimum of 21 credits in civil engineering and engineering mechanics. Before beginning the civil engineering courses, the student must meet the required mathematics and physics prerequisites. A grade of C- or better is required in all of the courses completed for the minor.

The required civil engineering and engineering mechanics courses are as follows:

CIEG 211 Statics
CIEG 212 Solid Mechanics (Lab optional)
CIEG 305 Fluid Mechanics (Lab optional)
CIEG 311 Dynamics

An additional 9 credits (3 courses) in civil engineering must be taken of which at least 6 credits must be at the 300-level or higher. Those courses should be selected in consultation with an advisor in the Department of Civil and Environmental Engineering to meet each student's objectives. For students oriented toward earth sciences these might include CIEG 320 and CIEG 321; for those interested in the environment, CIEG 331 and CIEG 438; for those interested in urban topics, CIEG 331 and CIEG 351; for those interested in construction and structures, CIEG 301 and CIEG 302; for those interested in the oceans, CIEG 440 and CIEG 471. CIEG 161 may not be counted toward the minor.

Accomplishment of a minor in Civil Engineering has many advantages for students who are earning degrees in other sciences such as geology or in other professional areas such as business administration. However, it must be understood that meeting the requirements for a minor in Civil Engineering without fulfilling the remaining requirements for an accredited engineering degree does not provide the breadth and depth necessary to practice engineering or to become a licensed professional engineer.

Minor in Sustainable Infrastructure

The objective of this minor is to provide the basic knowledge and skills required in balancing civil infrastructure development with environmental and societal impacts, so that sustainability can be methodically defined and attained. Students will learn the principles of sustainability and the fundamental tools needed to assess sustainability; be able to evaluate the impact of proposed infrastructure development on limited natural resources; recognize and assess the political, economic, environmental, and social impacts of infrastructure development; and develop the insight needed to find solutions that minimize the effect of infrastructure development on the local community and across global boundaries.

A minor in Sustainable Infrastructure may be earned by a student in any University bachelor's degree program. To receive a minor in Sustainable Infrastructure, the student must successfully complete a minimum of 15 credits as described below with a minimum grade of C- in each course.

All students must complete the following core course:

CIEG 402	Introduction to Sustainability Principles in Civil Engineering

All students must complete one of the following core courses:

CIEG 403	Sustainability Applications in Infrastructure
CIEG 465	Global Sustainable Engineering

All students must complete three of the following sustainability-related breadth courses:

APEC 343	Environmental Economics
BUAD 429	Sustainability and Green Business
ECON 311	Economics of Developing Countries
ELEG 415	Electric Power and Renewable Energy Systems
ELEG 491	Ethics/Impacts of Engineering
ENEP 410	Environmental Sustainability: Economic and Policy Analysis
GEOG 422	Resources, Development and the Environment
GEOG 434	Plan Sustainable Communities & Regions
LEAD 451	Leadership for Sustainability
MAST 676	Environmental Economics
MEEG 435	Wind Power Engineering
PHIL 448	Environmental Ethics
POSC 311	Politics of Developing Nations
POSC 350	Politics and the Environment
SOCI 471	Disasters, Vulnerability & Development
UAPP 452	International Development Pol & Admin

The minor is open to all majors, though several courses included as electives in the minor may require completion of prerequisite courses for students in some majors.

Civil Engineering Technical Electives

In addition to specific required technical courses, three technical elective courses in civil engineering must be completed. Technical electives include upper-level courses in engineering, mathematics, computer science, and the sciences, subject to advisor approval. Graduate-level courses may also be taken as technical electives. The following is a list of technical electives for civil engineering. Some of these courses may not be offered a particular year. A current list is available in the department office. Some courses offered in other departments may also be approved as technical electives. Students should check with their advisor before selecting courses.

General Civil Engineering

CIEG 401	Introduction to the Finite Element Method
CIEG 402	Introduction to Sustainability Principles in Civil Engineering
CIEG 403	Sustainability Applications in Infrastructure
CIEG 407	Building Design
CIEG 409	Forensic Engineering
CIEG 413	Advanced Structural Analysis
CIEG 414	Railroad Geotechnical Engineering
CIEG 417	Introduction to Railroad Safety and Derailment Engineering
CIEG 418	Railroad Engineering
CIEG 429	Concrete Design
CIEG 465	Global Sustainable Engineering

Environmental and Water Resources Engineering

BISC 641	Microbial Ecology
CHEM 443	Physical Chemistry I
CIEG 415	Meteorologic Processes in Air Pollution
CIEG 430	Water Quality Modeling
CIEG 433	Hazardous Waste Management
CIEG 434	Air Pollution Control
CIEG 436	Processing, Recycling, Management of Solid Wastes
CIEG 437	Water and Wastewater Quality
CIEG 438	Water and Wastewater Engineering
CIEG 439	Biosustainability and Public Health
CIEG 442	Stormwater Management
CIEG 444	Microbiology of Engineered Systems CIEG 445 Industrial Ecology
CIEG 468	Principles of Water Quality Criteria
CIEG 498	Groundwater Flow & Contaminant Transport
ELEG 681	Remote Sensing of Environment
GEOL 421	Environmental and Applied Geology

Hydraulic and Ocean Engineering

CIEG 471	Introduction to Coastal Engineering
CIEG 661	Introduction to Ocean Modeling
CIEG 670	Physics of Cohesive Sediment
CIEG 672	Water Wave Mechanics
CIEG 675	MATLAB for Engineering Analysis
CIEG 678	Transport and Mixing Processes
CIEG 679	Sediment Transport Mechanics
CIEG 680	Littoral Processes
CIEG 681	Water Wave Spectra
CIEG 682	Nearshore Hydrodynamics

Structures and Geotechnical Engineering

CIEG 401	Introduction to the Finite Element Method
CIEG 407	Building Design
CIEG 408	Introduction to Bridge Design
CIEG 409	Forensic Engineering
CIEG 421	Foundation Engineering
CIEG 422	Earth Structures Engineering
CIEG 427	Deep Foundations
CIEG 428	Ground Improvement Methods

Transportation and Construction Engineering

CIEG 452	Transportation Facilities Design
CIEG 453	Roadway Geometric Design
CIEG 454	Urban Transportation Planning
CIEG 456	Regional Analysis Method
CIEG 458	Pavement Analysis and Design
CIEG 459	Optimal Design
CIEG 463	Traffic Eng and Modeling
GEOG 328	Transportation Geography
STAT 420	Data Analysis and Nonparametric Statistics

Environmental Engineering Bachelor's Degree Program

The Bachelor of Environmental Engineering (BENE) program educates students in the causes, control, and prevention of environmental contamination so that they may analyze those processes and improve the quality of our earth's atmospheric, water, and land resources.

The curriculum provides a broad background in mathematics and sciences common to all engineering disciplines. This includes a background in the fundamentals of physical, biological, and chemical processes. Students take courses in environmental engineering beginning in the second semester of their freshman year, while simultaneously developing a strong foundation in mathematical, scientific, and engineering fundamentals. The core curriculum also includes important aspects of chemical thermodynamics and ecology, as well as courses on treating water and wastewater, controlling air pollution, and managing solid wastes. Laboratory coursework emphasizes the current methods for pollutant analysis and treatment.

These offerings are integrated into a plan of study that also provides many essential courses from the civil engineering curriculum, such as solid mechanics and fluid mechanics. Beyond the common core curriculum, students select one of three concentrations:

- *environmental biological and chemical processes*, providing a background in chemical engineering kinetics, thermodynamics, heat and mass transfer, and physical chemistry
- *environmental facilities design and construction*, including training in structural analysis, structural design, and soil mechanics
- *water resources and water quality*, providing background in stormwater management and the modeling of water and pollutant movement on the land surface (e.g., rivers) and below ground (e.g., groundwater)

Students in each concentration also take additional technical electives, allowing them to obtain greater depth within their concentration or to broaden their training through additional upper-level courses in engineering, the sciences, or mathematics.

Through these courses, students develop an understanding of the fate of environmental contaminants; an ability to apply methods of modeling and simulation to environmental processes and the ability to assess risk and estimate cost. The program emphasizes teaching students to apply knowledge to the conception, analysis, and design of solutions to real-world environmental problems. Students develop the ability to implement technology-based solutions to real-world environmental problems through design, construction, and operation. Graduates will be competent in basic environmental engineering laboratory skills and will have received training in oral and written communications.

The curriculum guides students from solid basics in math and science to a strong understanding of the fundamental design principles employed in engineering practice. While the minimum number of credit hours for the Environmental Engineering major is 125, we encourage students to consider additional courses to expand their training and to make the most of their time while at the University.

The undergraduate program prepares our graduates for entry-level positions. After four years of work experience, graduates can qualify for a license to practice by passing the Principles and Practice of Engineering (PE) examination administered by a State Board. In Delaware, the PE license is administered by the Delaware Association of Professional Engineers (DAPE). Students can take the introductory Fundamentals of Engineering (FE) exam, which is a prerequisite for the PE, during senior year.

A complete description of the undergraduate curriculum can be found in the current university Undergraduate & Graduate Catalog. A brief overview is given for each of the concentrations on the check sheets shown on the next pages. The sheets show how we recommend that courses be selected each semester, and may also

be used to keep track of progress toward graduation. You can also check your progress on UDSIS by using the degree audit tool or by reviewing your unofficial transcript.

Following the check sheets is a list of technical electives that are frequently taken by students in their junior and senior years. Depending on the environmental engineering concentration selected, students are required to take 6-11 credits of additional technical electives. These courses are typically upper-level (300-400 level) and can be taken from mathematics, science, and engineering departments. Students should select technical electives in consultation with their faculty advisor.

Because a number of our students seek either M.S. or Ph.D. degrees following the undergraduate program, a separate list of courses that should be considered in preparation for advanced studies in environmental engineering is also provided.

Name _____ Advisor _____

ENVIRONMENTAL ENGINEERING PROGRAM
Environmental Biological and Chemical Processes (125 hours)
Effective for fall 2014 and subsequent classes.
The required courses are normally taught in fall or spring semesters as indicated below.
Each student is responsible for tracking future changes in this schedule.

FIRST YEAR

FALL	**16 credits**	**Sem.**	**Grade**
General Chemistry*	CHEM 103 (4)		
Computer Science	CISC 106 (3)		
Intro. to Engineering	EGGG 101 (2)		
Analy. Geom. & Calc. A*	MATH 241 (4)		
Breadth Requirement	(3)		

FIRST YEAR

SPRING	**17 credits**	**Sem.**	**Grade**
General Chemistry*	CHEM 104 (4)		
Enviro. Eng. Processes*	CIEG 233 (3)		
Seminar in Composition	ENGL 110 (3)		
Analy. Geom. & Calc. B*	MATH 242 (4)		
Breadth Requirement	(3)		

SOPHOMORE YEAR

FALL	**15 credits**	**Sem.**	**Grade**
Quantitative Analysis	CHEM 220 (3)		
Quantitative Analysis Lab	CHEM 221 (1)		
Statics	CIEG 211 (3)		
Analy. Geom. & Calc. C*	MATH 243 (4)		
General Physics I*	PHYS 207 (4)		

SOPHOMORE YEAR

SPRING	**16 credits**	**Sem.**	**Grade**
Introductory Biology I	BISC 207 (4)		
Physical Chemistry II	CHEM 444 (3)		
Prob. & Stats. for Engineers	CIEG 315 (3)		
Engineering Math I	MATH 351 (3)		
Breadth Requirement	(3)		

JUNIOR YEAR

FALL	**16 credits**	**Sem.**	**Grade**
Chem. Eng. Thermo.*	CHEG 231 (3)		
Fluid Mechanics	CIEG 305 (3)		
Fluid Mechanics Lab	CIEG 306 (1)		
Enviro. Eng. Lab **(a)**	CIEG 337 (3)		
Water and Wastewater **(a)**	CIEG 438 (3)		
Air Pollution or Tech Elec.**(b)**	(3)		

JUNIOR YEAR

SPRING	**16 credits**	**Sem.**	**Grade**
Intro. to Microbiology	BISC 300 (4)		
Chem. Eng. Thermo.*	CHEG 325 (3)		
Technical Writing	ENGL 410 (3)		
Water and WW Quality	CIEG 437 (3)		
Breadth Requirement	(3)		

SENIOR YEAR

FALL	**15 credits**	**Sem.**	**Grade**
Chem. Eng. Kinetics	CHEG 332 (3)		
Organic Chemistry	CHEM 321 (3)		
Organic Chemistry Lab	CHEM 325 (1)		
Water Resources Eng.	CIEG 440 (3)		
Senior Design	CIEG 461 (2)		
Breadth Requirement	(3)		

SENIOR YEAR

SPRING	**14 credits**	**Sem.**	**Grade**
Introductory Biochemistry	CHEM 527 (3)		
Senior Design	CIEG 461 (2)		
Air Pollution or Tech Elec.**(b)**	(3)		
Technical Elective **(c)**	(3)		
Breadth Requirement	(3)		

*Grade of C- or higher for degree requirement or as pre-requisite for other courses.

All breadth requirements (18 credit hours) require a C- or better. See UD Academic Catalog for more information.

Creative Arts & Humanities	**Sem.**	**Grade**	History & Cultural Change	**Sem.**	**Grade**	Social & Behavioral Sciences	**Sem.**	**Grade**
Add'l Breadth Req.			Add'l Breadth Req.			Add'l Breadth Req.		

_____ two upper-level (300 and higher) courses _____ Multicultural Requirement

a) Courses alternate—taught in even years;
b) CIEG415 (every spring) or CIEG434 (fall, even years)—must take earth science course if 434 is taken;
c) Engineering Topic—must consult advisor

Name _____ Advisor _____

ENVIRONMENTAL ENGINEERING PROGRAM
Environmental Facilities Design and Construction (125 hours)
Effective for fall 2014 and subsequent classes.
The required courses are normally taught in fall or spring semesters as indicated below.
Each student is responsible for tracking future changes in this schedule.

FIRST YEAR

FALL	**16 credits**	**Sem.**	**Grade**
General Chemistry*	CHEM 103 (4)		
Computer Science	CISC 106 (3)		
Intro. to Engineering	EGGG 101 (2)		
Analy. Geom. & Calc. A*	MATH 241 (4)		
Breadth Requirement	(3)		

FIRST YEAR

SPRING	**17 credits**	**Sem.**	**Grade**
General Chemistry*	CHEM 104 (4)		
Enviro. Eng. Processes*	CIEG 233 (3)		
Seminar in Composition	ENGL 110 (3)		
Analy. Geom. & Calc. B*	MATH 242 (4)		
Breadth Requirement	(3)		

SOPHOMORE YEAR

FALL	**17 credits**	**Sem.**	**Grade**
Statics	CIEG 211 (3)		
Enviro. Eng. Thermo.	CIEG 333 (3)		
Analy. Geom. & Calc. C*	MATH 243 (4)		
General Physics I*	PHYS 207 (4)		
Breadth Requirement	(3)		

SOPHOMORE YEAR

SPRING	**17 credits**	**Sem.**	**Grade**
Introductory Biology I	BISC 207 (4)		
Solid Mechanics	CIEG 212 (3)		
CE Materials Lab	CIEG 213 (1)		
Prob. & Stats. for Engineers	CIEG 315 (3)		
Engineering Math I	MATH 351 (3)		
Breadth Requirement	(3)		

JUNIOR YEAR

FALL	**17 credits**	**Sem.**	**Grade**
Structural Analysis	CIEG 301 (4)		
Fluid Mechanics	CIEG 305 (3)		
Fluid Mechanics Lab	CIEG 306 (1)		
Enviro. Eng. Lab **(a)**	CIEG 337 (3)		
Water and Wastewater **(a)**	CIEG 438 (3)		
Air Pollution or Tech Elec **(b)**	(3)		

JUNIOR YEAR

SPRING	**16 credits**	**Sem.**	**Grade**
Structural Design	CIEG 302 (4)		
Water and WW Quality	CIEG 437 (3)		
Technical Writing	ENGL 410 (3)		
Computer Elective **(c)**	(3)		
Breadth Requirement	(3)		

SENIOR YEAR

FALL	**12 credits**	**Sem.**	**Grade**
Soil Mechanics	CIEG 320 (3)		
Soil Mechanics Lab	CIEG 323 (1)		
PRM of Solid Waste	CIEG 436 (3)		
Water Resources Eng.	CIEG 440 (3)		
Senior Design	CIEG 461 (2)		

SENIOR YEAR

SPRING	**13 credits**	**Sem.**	**Grade**
Senior Design	CIEG 461 (2)		
Air Pollution or Tech Elec **(b)**	(3)		
Technical Electives	(5)		
Breadth Requirement	(3)		

*Grade of C- or higher for degree requirement or as pre-requisite for other courses.

All breadth requirements (18 credit hours) require a C- or better. See UD Academic Catalog for more information.

Creative Arts & Humanities	**Sem.**	**Grade**	History & Cultural Change	**Sem.**	**Grade**	Social & Behavioral Sciences	**Sem.**	**Grade**
Add'l Breadth Req.			Add'l Breadth Req.			Add'l Breadth Req.		

_____ two upper-level (300 and higher) courses _____ Multicultural Requirement

a) Courses alternate—taught in even years;
b) CIEG415 (every spring) or CIEG434 (fall, even years)—must take Earth Science course if 434 is taken;
c) APEC480, GEOG250, GEOG372, CIEG367 (CAD course), or PLSC150

Name _____ Advisor _____

ENVIRONMENTAL ENGINEERING PROGRAM
Water Resources and Water Quality (125 hours)
Effective for fall 2015 and subsequent classes.
The required courses are normally taught in fall or spring semesters as indicated below.
Each student is responsible for tracking future changes in this schedule.

FIRST YEAR

FALL	**16 credits**	**Sem.**	**Grade**
General Chemistry*	CHEM 103 (4)		
Computer Science	CISC 106 (3)		
Intro. to Engineering	EGGG 101 (2)		
Analy. Geom. & Calc. A*	MATH 241 (4)		
Breadth Requirement	(3)		

FIRST YEAR

SPRING	**17 credits**	**Sem.**	**Grade**
General Chemistry*	CHEM 104 (4)		
Enviro. Eng. Processes*	CIEG 233 (3)		
Seminar in Composition	ENGL 110 (3)		
Analy. Geom. & Calc. B*	MATH 242 (4)		
Breadth Requirement	(3)		

SOPHOMORE YEAR

FALL	**17 credits**	**Sem.**	**Grade**
Statics	CIEG 211 (3)		
Enviro. Eng. Thermo.	CIEG 333 (3)		
Analy. Geom. & Calc. C*	MATH 243 (4)		
General Physics I*	PHYS 207 (4)		
Breadth Requirement	(3)		

SOPHOMORE YEAR

SPRING	**16 credits**	**Sem.**	**Grade**
Introductory Biology I	BISC 207 (4)		
Prob. & Stats. for Engineers	CIEG 315 (3)		
Engineering Math I	MATH 351 (3)		
Computer Elective **(a)**	(3)		
Breadth Requirement	(3)		

JUNIOR YEAR

FALL	**16 credits**	**Sem.**	**Grade**
Fluid Mechanics	CIEG 305 (3)		
Fluid Mechanics Lab	CIEG 306 (1)		
Enviro. Eng. Lab **(b)**	CIEG 337 (3)		
Water and Wastewater **(b)**	CIEG 438 (3)		
Water Resources Eng.	CIEG 440 (3)		
Breadth Requirement	(3)		

JUNIOR YEAR

SPRING	**15 credits**	**Sem.**	**Grade**
Technical Writing	ENGL 410 (3)		
Water and WW Quality	CIEG 437 (3)		
Grndwater or Tech Elec **(c)**	(3)		
Watershed or Tech Elec **(d)**	(3)		
Breadth Requirement	(3)		

SENIOR YEAR

FALL	**14 credits**	**Sem.**	**Grade**
PRM of Solid Waste	CIEG 436 (3)		
Senior Design	CIEG 461 (2)		
Grndwater or Tech Elec **(c)**	(3)		
Watershed or Tech Elec **(d)**	(3)		
Air Pollution or Tech Elec **(e)**	(3)		

SENIOR YEAR

SPRING	**14 credits**	**Sem.**	**Grade**
Senior Design	CIEG 461 (2)		
Air Pollution or Tech Elec **(e)**	(3)		
Surface Water Course **(f)**	(3)		
Technical Elective	(2)		
Stormwater Management	CIEG 442 (4)		

*Grade of C- or higher for degree requirement or as pre-requisite for other courses.

All breadth requirements (18 credit hours) require a C- or better. See UD Academic Catalog for more information.

Creative Arts & Humanities	History & Cultural Change	Social & Behavioral Sciences
Add'l Breadth Requirement	Add'l Breadth Requirement	Add'l Breadth Requirement

_____ two upper-level (300 and higher) courses _____ Multicultural Requirement

a) APEC480, GEOG250, GEOG372, CIEG367 (CAD course), or PLSC150;
b) Courses alternate—taught in even years;
c) CIEG498 (spring) or GEOL428 (fall) and take tech elective in alt. semester;
d) GEOG432 (fall), PLSC421 (fall), or UAPP411 (spring) and take tech elective in alt. semester;
e) CIEG415 (spring) or CIEG434 (fall, even years);
f) CIEG430 (even years) or CIEG468 (odd years)

Minor in Environmental Engineering

A minor in Environmental Engineering may be earned by a student in any University bachelor's degree program through the successful completion of a minimum of 18 credits as described below. Before beginning the environmental engineering courses, the student must meet the required mathematics, physics, and other prerequisites for each course. A grade of C- or better is required in all of the courses completed for the minor.

One chemistry course is required:

CHEM 104* General Chemistry
*Can be replaced with CHEM 112

Two environmental engineering courses (6 credits) are required:

CIEG 233* Environmental Engineering Processes
CIEG 305** Fluid Mechanics (Lab optional)
*Can be replaced with CIEG 331 or CHEG 112
**Can be replaced with MEEG 331 or CHEG 341

Further, an additional three courses in environmental engineering must be taken from the following:

CIEG 430 Water Quality Modeling
CIEG 433 Hazardous Waste Management
CIEG 434 Air Pollution Control
CIEG 436 Processing, Recycling, Management of Solid Wastes
CIEG 438* Water and Wastewater Engineering
CIEG 440 Water Resources Engineering
CIEG 498 Groundwater Flow and Containment Transport
*Will not count if CIEG 331 is taken in place of CIEG 233

Courses should be selected from the above list with the specific advice of an advisor in the Department of Civil and Environmental Engineering to meet each student's objectives. Other courses in civil and environmental engineering may be included in the above list with prior approval from the Department of Civil and Environmental Engineering.

Civil Engineering majors would be able to pursue the minor by selecting their required technical and science electives appropriately. No additional credits beyond what is required by their major would be necessary to obtain an Environmental Engineering minor.

Minor in Environmental Sustainability

The objective of this minor is to provide basic knowledge and skills required in balancing technological development and environmental impacts, so that sustainability can be methodically defined and attained. Students will have the opportunity to assess sustainability using tools such as life cycle analysis, risk assessment, and the triple bottom line of economic, environmental, and societal effects; recognize and specify engineering solutions to resource, pollution, and sanitation problems that are in harmony with local cultures; relate environmental issues to local political, societal, and economic factors to provide a proper context for sustainable solutions; and evaluate and compare "appropriate technologies" and other sustainable solutions across global boundaries.

To receive a minor in Environmental Sustainability the student must complete a total of 15 credits in accordance with the requirements specified below. Before beginning these courses, the student must meet the required course prerequisites. A minimum grade of C- must be achieved in each course qualifying for the minor.

Recommended prerequisite:

To be accepted into the minor, the student is advised to have completed an introductory course in mass and energy balances such as CHEG112, CIEG233, or MEEG331.

Two of the following core courses:

CIEG 439	Biosustainability and Public Health
CIEG 445	Industrial Ecology
CIEG 465	Engineers Without Borders

One of the following pollution control technology courses:

CIEG 433	Hazardous Waste Management
CIEG 436	Processing, Recycling, Management of Solid Wastes
CIEG 438	Water and Wastewater Engineering

Two of the following sustainability-related breadth courses:

APEC 343	Environmental Economics
BUAD 429	Selected Topics in Management: Sustainability and Green Business
ECON 311	Economics of Developing Countries
ENEP 410	Environmental Sustainability: Economic and Policy Analysis
GEOG 320	Water and Society
GEOG 422	Resources, Development, and the Environment
MAST 676	Environmental Economics
PHIL 448	Environmental Ethics
POSC 311	Politics of Developing Nations POSC 350 Politics and the Environment
SOCI 471	Disasters, Vulnerability & Development

Environmental Engineering Technical Electives

The Environmental Engineering program has a common core curriculum and three concentrations: environmental biological and chemical processes, environmental facilities design and construction, and water resources and water quality. Each concentration requires four or five courses beyond the core curriculum that provide additional training specific to the selected concentration. In addition to these courses, students select two to four technical electives. These courses must be upper-level courses in engineering, science, computer science, or mathematics and must combine for sufficient credit hours to satisfy the requirements of each concentration. Students should select their desired technical electives with the assistance of their academic advisor. It is advisable to select these courses in the spring of the sophomore year to avoid scheduling conflicts and ensure that any prerequisite courses are taken.

Courses that satisfy the technical electives requirements are listed below. You must select courses in the other two degree concentrations not otherwise required for your concentration. This list is not comprehensive. Many other courses may qualify as technical electives, provided they are approved by your faculty advisor. Your advisor can also help you select technical electives that are most suitable for the concentration that you've chosen.

Technical electives satisfying the earth science requirement:

CIEG 430	Water Quality Modeling
CIEG 498	Groundwater Flow and Contaminant Transport
GEOL 107	General Geology
PLSC 419	Soil Microbiology

Other recommended technical electives:

BISC 300	Introduction to Microbiology
BISC 641	Microbial Ecology
CHEG 332	Chemical Engineering Kinetics
CHEG 342	Heat and Mass Transfer
CHEG 622	Chemicals, Risk and the Environment
CHEM 443	Physical Chemistry I
CHEM 444	Physical Chemistry II
CHEM 321	Organic Chemistry
CHEM 325	Organic Chemistry Lab
CHEM 527	Introductory Biochemistry
CIEG 311	Dynamics
CIEG 321	Geotechnical Engineering
CIEG 430	Water Quality Modeling
CIEG 433	Hazardous Waste Management
CIEG 439	Biosustainability and Public Health
CIEG 465	Global Sustainable Engineering
CIEG 445	Industrial Ecology
CIEG 468	Principles of Water Quality Criteria
CIEG 498	Groundwater Flow and Contaminant Transport
CIEG 636	Biological Aspects of Environmental Engineering
GEOG 372	Introduction to GIS
GEOG 431	Watershed Hydro-Ecology
GEOG 432	Environmental Hydrology
GEOG 471	Advanced GIS
GEOL 421	Environmental and Applied Geology
GEOL 446	General Geochemistry
MSEG 302	Materials Science for Engineers

PLSC 608	Environmental Soil Chemistry

Recommended for advanced study

After completing an undergraduate degree in Environmental Engineering, students may pursue advanced studies in environmental engineering or related fields. For such students, courses in engineering, the sciences, and mathematics are recommended to provide the foundation for more advanced study. The specific courses that will be most beneficial to each student depend upon their area(s) of interest. Below is a list of courses that students should consider. Students interested in advanced study should consult with their advisor about which courses would be most beneficial. Most courses may be counted as technical electives.

BISC 300	Introduction to Microbiology
BISC 641	Microbial Ecology
CHEG 332	Chemical Engineering Kinetics
CHEG 342	Heat and Mass Transfer
CHEM 443	Physical Chemistry I
CHEM 444	Physical Chemistry II
CHEM 321	Organic Chemistry
CHEM 325	Organic Chemistry Lab
CHEM 527	Introductory Biochemistry
MATH 352	Engineering Mathematics II
MATH 353	Engineering Mathematics III
MATH 426	Intro to Numerical Analysis and Algorithmic Computation

4+1 Degree Programs

Well-qualified Civil and Environmental Engineering majors may apply to the 4+1 program which culminates in the student earning a Bachelor degree in Civil Engineering (BCE) or Environmental Engineering (BENV) and a Master of Civil Engineering (MCE) degree within five years. The program is limited to University of Delaware undergraduates pursuing the BCE or BENV degree, with a minimum grade point average of 3.25 at the time of application. Students must complete at least 90 credits toward the undergraduate degree before they can be enrolled in the program. Only full-time students at the time of application are eligible.

Additionally, the College of Engineering and the College of Business and Economics offer a joint five-year program that leads to a baccalaureate degree in an engineering major and a Master of Business Administration degree from the College of Business and Economics. Talk to your advisor if you are interested in this option, and visit http://graduate.lerner.udel.edu/mba-programs/mba-41-options/engineering for more information.

Civil and Environmental Engineering Faculty

Name	Office	Title	Ph.D.	Areas of Expertise
Nii Attoh-Okine	354 DuPont Hall	Professor	University of Kansas	Pavement management, design, and performance modeling
Daniel Cha	346A DuPont Hall	Professor	University of California, Berkeley	Control of population dynamics and performance of biological wastewater treatment processes; biotransformation of organic and inorganic toxic pollutants
Michael Chajes	358A DuPont Hall	Professor	University of California, Davis	Structural engineering, bridge evaluation and rehabilitation, application of composites
Pei Chiu	468 ISE Building	Professor	Stanford University	Environmental transformation, fate of organic pollutants, remediation and water treatment processes
Rachel Davidson	360B DuPont Hall	Professor	Stanford University	Natural disaster risk assessment and management, civil infrastructure systems
Dominic DiToro	356A DuPont Hall	Edward C. Davis Professor	Princeton University	Water quality modeling, development and application of mathematical and statistical
Ardeshir Faghri	360C DuPont Hall	Professor	University of Virginia	Transportation systems, urban congestion, work zone safety, traffic signal control systems
John Gillespie, Jr.	201C Composite Center	Donald C. Phillips Professor	University of Delaware	Composite materials, experimental mechanics, fracture mechanics, infrastructure rehabilitation
Domenico Grasso	343A DuPont Hall	Provost and Professor	University of Michigan	Fate of contaminants in the environment
Tom Hsu	205 Ocean Eng. Lab	Associate Professor	Cornell University	Coastal engineering, sediment transport and environmental fluid mechanics, multi-phase flow

Name	Office	Title	Ph.D.	Areas of Expertise
Chin-Pao Huang	352A DuPont Hall	Donald C. Phillips Professor	Harvard University	Industrial wastewater management, aquatic chemistry, water and wastewater engineering, environmental remediation
Paul Imhoff	344A DuPont Hall	Professor	Princeton University	Transport of fluids and contaminants in multiphase systems; mass transfer processes in soil, groundwater, surface water, and landfills; mathematical modeling
Allen Jayne	307 DuPont	Assistant Professor	University of Delaware	Structural engineering
Victor Kaliakin	360F DuPont Hall	Professor	University of California, Davis	Computational geomechanics, constitutive modeling of geomaterials, numerical simulation of composite materials
James Kirby	201 Ocean Eng. Lab	Edward C. Davis Professor	University of Delaware	Water wave mechanics
Nobuhisa Kobayashi	207 Ocean Eng. Lab	Professor	Massachusetts Institute of Technology	Hydrodynamics, coastal engineering, and arctic engineering
Kalehiwot Manahiloh	360G DuPont Hall	Assistant Professor	Washington State University	Geotechnical engineering, unsaturated soils, constitutive modeling, digital image processing
Earl “Rusty” Lee	308 DuPont Hall	Assistant Professor	Rensselaer Polytechnic Institute	Applied operations research, homeland security, hazards mitigation and vulnerability, technologies for collaborative decision making
Julia Maresca	344B DuPont Hall	Assistant Professor	Penn State University	Environmental microbiology, biogeochemistry, microbial physiology
Jennifer McConnell	360H DuPont Hall	Associate Professor	West Virginia University	Structural and bridge engineering
Sue McNeil	360D DuPont Hall	Professor	Carnegie Mellon University	Transportation infrastructure management, planning and land use
Chris Meehan	355B DuPont Hall	Bentley Systems Inc. Chaired Professor	Virginia Tech University	Geotechnical engineering, shear behavior of soils under static and dynamic loadings
Jack Puleo	203 Ocean Eng. Lab	Associate Professor	University of Florida	Nearshore hydrodynamics and sediment transport

Harry “Tripp” Shenton	301 DuPont Hall	Chair and Professor	Johns Hopkins University	Structural dynamics, structural health monitoring, bridge engineering
Fengyan Shi	204 Ocean Eng. Lab	Associate Professor	Ocean University of Qingdao	Numerical modeling; nearshore processes; coastal ocean hydrodynamics & sediment transport; tsunamis
Edgar Small	353A DuPont Hall	Associate Professor	State University of New York at Buffalo	Construction engineering and management
Allan Zarembski	343B DuPont Hall	Professor of Practice	Princeton University	Railroad engineering and rail safety

Administrative and Support Staff

Name	Position	Office	Phone	Email
Liz Bing	Staff Assistant	301 DuPont Hall	302-831-2442	ebing@udel.edu
Michael Davidson	Senior Electronics Specialist	147 DuPont Hall	302-831-6814	michaeld@udel.edu
Karen Greco	Assistant to the Chair	301A DuPont Hall	302-831-3017	kgreco@udel.edu
Sarah Palmer	Undergraduate Academic Advisor	301 DuPont Hall	302-831-0438	sbpalmer@udel.edu
Chris Reoli	Graduate Academic Advisor	301 DuPont Hall	302-831-6570	creoli@udel.edu
Gary Wenczel	Structures Lab Manager	281 DuPont Hall	302-831-6936	wenczel@udel.edu

Advisement

Students are assigned faculty advisors as soon as they arrive on campus and will normally have the same advisor for the entire time they are enrolled in the undergraduate program in Civil or Environmental Engineering. However, any student can freely select his/her advisor, with the permission of that advisor, as soon as he/she feels ready to do so.

Advisors for the Class of 2020

Student Group	Name	Office	Email
Environmental Eng. Students	Prof. P.Imhoff	344A DuPont Hall	imhoff@udel.edu
Civil Eng. Students A – D	Prof. A. Faghri	360C DuPont Hall	faghri@udel.edu
Civil Eng. Students E – L	Prof. T. Hsu	205 Ocean Eng. Lab	thsu@udel.edu
Civil Eng. Students M – Z	Prof. N. Attoh-Okine	354 DuPont Hall	okine@udel.edu
Civil Eng. Honors Students	Prof. M. Chajes	358A DuPont Hall	chajes@udel.edu
Env. Eng. Honors Students	Prof. D. Cha	346A DuPont Hall	cha@udel.edu

It is suggested that you set up an appointment to meet with your advisor during your first semester and that you seek help from your advisor if you have any questions regarding your schedule or any other problems that may arise.

Every semester there is a two-week advising period, just prior to the time when you will be registering for courses for the following semester. At that time, you are required to sign up for an appointment with your advisor. Schedules will be posted on each faculty member's door, though some faculty set up appointments electronically. The University will assign you a registration appointment, after which you are free to go online, through UDSIS, and request the courses you and your advisor have decided upon.

Computing Facilities

Computers have become an essential tool in engineering, and thus play a central role in engineering education. The University maintains general access computing sites throughout the campus. The list is available at http://www.it.udel.edu/computingsites

Engineering Microcomputer Laboratories

The College maintains microcomputing sites specifically for engineering students. Students can use 046 Colburn Lab, 010 Spencer Lab, and 101-D Pearson Hall when they are not in use for teaching. Computer lounges are located in Spencer Lab as well.

College of Engineering Network

The College of Engineering maintains its own computing network. The network is primarily used for research computing by faculty and graduate students, but is also available to undergraduates working with faculty on their research projects.

Personal Computers

The College of Engineering does not require undergraduates to purchase personal computers. Important information about computing needs and purchasing a computer for student use at the University of Delaware can be found at http://sites.udel.edu/computing-purchases/buy-personal/

AppCAST is a web-based App Store that enables students to download and run any College of Engineering software with a single click on any Windows computer via a new on-demand streaming technology. Because this technology is built for Windows and delivers Windows applications, incoming engineering students are strongly encouraged to purchase Windows computers. It is possible to use a Mac, but only within a Windows virtual machine or Windows BootCamp partition. The user experience will be less than optimal on older Windows and MAC computers. AppCAST will be available in spring 2017 for your personal computer.

Computer-Aided Design (CAD) Software

Computer-Aided Design, otherwise known as CAD, is commonly used today in engineering practice. Years ago engineers would hand off their preliminary designs and sketches to CAD operators or technicians for them to produce a professional drawing. Today, however, having proficiency in CAD as an engineer is as critical as using a word processor, email, or spreadsheet: CAD is simply another tool in the modern engineer's toolbox. Engineering students need to develop a certain level of competency in using CAD programs while they are in school. You will also find that you are more in demand and marketable for internships, summer jobs, co-ops, and full-time employment if you have CAD experience.

There are two major CAD programs in use today in the civil and environmental engineering professions – Bentley Systems Inc. "MicroStation" and AutoDesk's "AutoCAD." Neither is an industry standard, but MicroStation tends to be used more in the transportation and civil/site development fields (the "horizontal" fields) and AutoCAD tends to be used more in the structural/building fields (the "vertical" fields). The platform choice, however, is often dictated by the client, and therefore, consulting firms will frequently run both programs.

Engineering students at the University of Delaware may download and install an academic version of both of these programs on their personal computers. Students should understand the license agreement and limitations that come with these free editions, which limit their use to work related to your courses and educational activities. Civil engineering majors will be introduced to MicroStation in CIEG161 Freshmen Design.

At the end of this document are instructions and information to get you started on how to download and install these programs. The information on MicroStation includes an access code that you will need to activate the software. Students are asked to not copy or distribute this code – it is provided as a benefit to you as a UD student and CEE major and should not be shared with others. Students are encouraged to become familiar with the programs and integrate their use in all of the work that they do.

Frequently Asked Questions

How do the CEE degree programs at UD differ from those offered at other universities?
One important distinction from programs at many other universities is that your coursework is specific to your chosen engineering major. By sophomore year, you will be taking engineering courses taught by faculty in your own department, with a curriculum directed toward your chosen major rather than generalized engineering. This allows you to make the most of a four-year program, being better prepared for in-depth study during your junior and senior years.

Another distinct feature of our department is the availability of a Bachelor's Degree in Environmental Engineering. This degree allows even greater specialization for students desiring training and credentials in this professional direction.

Is it difficult to change to a different major once you have started in one area of engineering?
The process to request a change of major is fairly simple and done entirely online. In UDSIS you will complete a "Change of Major request" form. This form will ask you to select your new major and to provide comments on why you want to change your major. Once submitted, the form is routed to the new major department for a decision.

Note that some majors at UD are restricted because of limitations on capacity. This includes most engineering majors. For a complete list of restricted majors, and the requirements for transfer into the major, see http://www.udel.edu/registrar/students/restmajorsinfo.html.

The further along you are in a degree program, the more difficult it becomes to utilize the credit hours you have already taken toward your preferred major. Transferring students find the availability of our winter and summer sessions to be particularly helpful, because it allows missed courses to be taken without interfering with the course schedule during the regular semesters.

If you decide to transfer to a major outside of the College of Engineering, your credentials will be evaluated by the department you wish to join. Our students are commonly accepted into a variety of non-engineering majors.

What if I don't know what type of engineering I would like to go into?
Freshman engineering majors have the opportunity to learn about and experience all seven of these disciplines through a common first semester and the course EGGG101 - Introduction to Engineering. In this course students have the opportunity to learn about the engineering design process from a team of faculty. EGGG101 will address "grand challenges" in engineering. You will learn more about each of the engineering disciplines as well as the skills needed to be successful in your college career.

You can also speak with faculty who are able to provide more details about the options available. Those who may be undecided about a specific engineering field may find the Civil Engineering major to be a good choice because it opens doors to a variety of specializations later in the curriculum: structural engineering, geotechnical engineering, transportation engineering, coastal engineering, water resources engineering, and environmental engineering.

I'm starting the degree program in Environmental Engineering, but I understand there is also a degree available in Environmental Science. What's the difference?
Environmental Engineering utilizes quantitative and technological tools to address problems of public health and environmental impact brought about by pollution. The profession overlaps with some areas of Environmental Science. For example, the environmental engineer might characterize the chemical impacts of an industrial waste flow on a wetland area and attempt to minimize the impact, while the environmental scientist will address the consequent effects on species diversity. The environmental engineer is often action-oriented, while an environmental scientist may study intrinsic properties of pristine ecosystems. There are also differences in job opportunities and starting salaries; faculty from these two programs can provide more information about these issues. Refer to the Undergraduate Catalog for details on the degree requirements for Environmental Science. (Note: Environmental Studies is a general term, encompassing both of these areas as well as others such as Environmental Policy.)

Will I need to buy a computer before I start courses?
As an engineering student you will be learning to use computer software such as word processors, spreadsheets, computer-aided drafting, and other application-specific software. If you have your own computer with the necessary software, you will be able to do this type of work wherever you are. While very convenient, this is not required as there are computers on campus available for your use.

Is it good to minor in a subject in addition to having a major?
If you have the time and interest, you can take enough courses to have a minor in a subject area. Requirements for a minor can often be met while using many of the same courses to meet the breadth requirements or technical elective requirements for your major degree. Upon graduation, the minor will appear on your transcript and may enhance your job qualifications. Environmental Engineering majors often minor in Civil Engineering, and vice-versa, but non-engineering minors, such as Music and Economics, are also popular. The department offers minors in Sustainable Infrastructure and Environmental Sustainability which are popular among Civil and Environmental Engineering majors.

What is the Fundamentals of Engineering exam, and do I have to take it?
Many engineers, and especially civil and environmental engineers, want to enhance their credentials by earning the license to be a Professional Engineer (P.E.). The requirements vary by state, but the usual path to the P.E. certification is to obtain an ABET accredited engineering degree, pass the Fundamentals of Engineering (F.E.) exam, obtain four years of work experience as an engineer, and then pass the P.E. exam. None of these steps are required as part of any degree program at UD. However, our courses prepare you to do well on the F.E. exam, and most of our students take the exam and pass it during their senior year.

How large are the classes?
You will encounter your largest classes the first several semesters. The enrollment in our senior-level courses averages 40 students. This does not include independent study courses, which are one-on-one. All courses are taught by faculty or, for upper-level courses, qualified professionals. Our Senior Design Project course is taught by five licensed Professional Engineers.

If I have other questions, who can I contact?
When you enroll, you will be assigned a faculty advisor. Generally, this same professor will be available for guidance through your four years on campus. Your faculty advisor will help you select courses and locate other types of assistance for you if needed.

Student Organizations

There are dozens of clubs and organizations on campus. Organizations of specific relevance to Civil and Environmental Engineers are:

Organization	Faculty Advisor	Email
American Society of Civil Engineers (ASCE)	Prof. Allen Jayne	ajayne@udel.edu
Institute of Transportation Engineers (ITE)	Prof. Rusty Lee	elee@udel.edu
Chi Epsilon Civil Engineering Honor Society	Prof. Kalehiwot Manahiloh	knega@udel.edu
Environmental Engineering Student Association (EESA)	Prof. Daniel Cha	cha@udel.edu
Engineers Without Borders (EWB)	Profs. A. Clarke-Sather and Kimberly Bothi	abigail@udel.edu kbothi@udel.edu
American Society of Highway Engineers (ASHE)	Matheu Carter	matheu@udel.edu
National Society of Black Engineers (NSBE)	Marianne Johnson	mtj@udel.edu
Society of Women Engineers (SWE)	Prof. Megan Killian	killianm@udel.edu

For up to date news and information that are important to students, and to also see what is happening in the department, you can also follow the department on Facebook (University of Delaware, Department of Civil and Environmental Engineering).

University Resources

The University of Delaware offers a variety of resources to help all students succeed. Please see below for a list of departments and offices that can help you maximize your college experience. Successful students take advantage of University resources.

Career Services Center, 401 Academy Street: fosters partnerships with employers to increase their participation in providing opportunities for the career development of students
http://www.udel.edu/CSC/

Center for Counseling & Student Development, 261 Perkins Student Center: offers programs designed to contribute to the personal, educational, and career development of our students
http://www.udel.edu/Counseling/

Disability Support Services, Alison Hall 130: works with students who have a physical, medical, or psychological disability, as well as a learning disability or ADHD
http://www.udel.edu/DSS/

Harker ISLL labs: offers drop-in tutoring for a variety of subjects including BISC, CHEM, and PHYS, MATH courses
http://www.cas.udel.edu/isll/learning-community-center/Pages/default.aspx

Math Tutorial Lab, 053 McKinly Lab: provides tutorial support for many introductory math courses, including MATH 010, 117, and 241
http://www.math.udel.edu/resources/ugrad/tutorial_site.html

Office of Academic Enrichment, 148-150 S. College Ave: promotes student success with a variety of programs such as tutoring, skills workshops and courses, and supplemental instruction
http://ae.udel.edu/

Office of the Dean of Students, 101 Hullihen Hall: offers counseling and referrals for students contemplating withdrawal from or re-enrollment to the university
http://www.udel.edu/studentlife/deanofstudents.html

Physics Help Center, 114 Sharp Lab: offers tutoring by graduate students
http://web.physics.udel.edu/undergrad/resources

Student Health Services, Laurel Hall: offers programs and services aimed at maintaining the physical and emotional well-being of University of Delaware students
http://www.udel.edu/studenthealth/

Student Support Services Program, 148-150 S. College Ave: offers federally funded comprehensive support service designed to provide academic assistance and advising, personal counseling, and cultural enrichment opportunities for eligible undergraduate students at the University of Delaware
http://sssp.ae.udel.edu/

Student Wellness & Health Promotion, 231 S. College Ave: engages all members of the University community in health promotion and prevention strategies that empower students to develop skills and competencies which support healthy choices and academic success as a foundation for life-long development
http://www.udel.edu/studentwellness/

University Student Centers, Trabant University Center and Perkins Student Center: enhance student life and complement the academic experience through an extensive variety of cultural, educational, social, and recreational programs
http://www.udel.edu/usc/

Writing Center, 016 Memorial Hall: offers individualized consultations for any level writer at no cost
http://www.english.udel.edu/wc/

University of Delaware

Getting started with Bentley's STUDENTserver:

Faculty and students must first create accounts, using the following **School Code** to set up an individual account:

MH+bPBe6rf8waE7+yKDA6uRE4dnjxFALY9YMPCB3B/3v8baIi8Fh0g==

Visit STUDENTserver at http://apps.bentley.com/StudentServer and click JOIN NOW

Create your account:

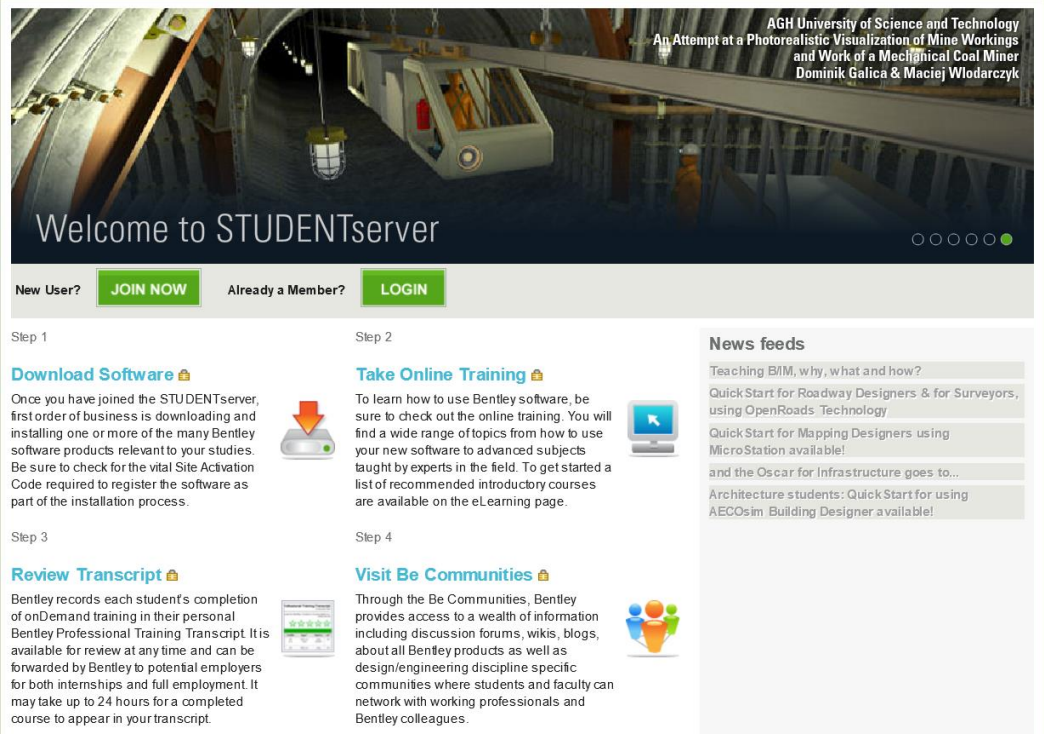
1. Add your School Code to that field, as requested in the registration form.
2. Add your personal information in the other form fields.
3. Submit the form, and an Email will be sent to you from Bentley for further verification. (If you do not see email within a few minutes check you spam/junk folder)

Verify your account:

Click the link in the account verification Email to activate your STUDENTserver account.
Once you verify your new account, you can log in and access all that STUDENTserver has to offer.

Benefits include:

- More than 50 software applications
  *(those with ** after the product name are excluded; products are Country-specific where indicated)*
- On-Demand training
- Training Transcripts, to send to potential employers



How to register for the Autodesk Education Community

The Autodesk Education Community is a password-protected website that provides direct access to student versions of Autodesk software. To register for Education Community, follow the steps below:

Go to the Autodesk Education Community (http://www.autodesk.com/education/home) and click on “Sign In” on the top right corner of the homepage. Select “Education Community” from the drop down menu.

On the Sign In page, select the link “Signing up in easy.” Follow the steps to complete the registration.

Once you are registered you will be able to download and install AutoCAD, along with many other AutoDesk products if you wish.