BACHELOR OF SCIENCE IN ENVIRONMENTAL ENGINEERING

The School of Civil and Environmental Engineering (CEE) offers a BS degree in Environmental Engineering (BS EnvE). The curriculum is designed to provide students with fundamental knowledge of scientific disciplines and engineering principles that are used to address emerging environmental issues such as sustainable air, water, and land resources; human health; and environmental restoration. In the first and second years, students take courses in physics, chemistry, biology, mathematics, English composition, and introductory engineering. The third year incorporates advanced engineering topics, including solid and fluid mechanics, thermodynamics, and laboratories in engineering materials, hydraulic engineering, and environmental monitoring and process engineering. The fourth year is elective based, allowing students to select courses from specific focus areas, including biological processes, sustainability, air pollution, and water resources, in addition to technical and design electives. A senior-level capstone design course serves to integrate principles from a range of disciplines. The curriculum is intended to provide students with the flexibility to develop tailored sequences of electives to meet individual education and career objectives, while ensuring a comprehensive engineering design experience.

Prerequisites and Other Requirements

Although students are not required to take courses during the indicated semester, all prerequisites must be satisfied. In addition to Institute academic requirements for graduation with a BS degree, the following requirements must be satisfied for the BS EnvE:

1. A letter grade of C or better must be earned in
   - MATH 1501 Calculus I 4
   - MATH 1502 Calculus II 4
   - PHYS 2211 Introductory Physics I 4
   - CHEM 1310 General Chemistry 4
   - COE 2001 Statics 2

2. The total number of quality points earned in CEE courses used to satisfy degree requirements must be at least twice the number of credit hours in those courses. If a course is repeated, the most recent grade will be used in applying this rule. No CEE courses may be repeated for the purpose of satisfying this rule if the original grade was a C or higher.

Program Objectives

Graduates will pursue a diverse range of careers that build on their engineering education. During the initial years of their careers, graduates will:

A. apply technical proficiency in the principles and methods essential to modern environmental engineering practice.
B. demonstrate understanding of global, societal, environmental, and sustainability issues related to environmental engineering.
C. exhibit effective communication, teamwork, entrepreneurial, and leadership skills.
D. engage in ethical and responsible practice while pursuing professional growth.

Wellness

- APPH 1040 Scientific Foundations of Health or APPH 10 The Science of Physical Activity and Health 2

Core A - Essential Skills

- ENGL 1101 English Composition I 3
- ENGL 1102 English Composition II 3
- MATH 1552 Integral Calculus 4

Core B - Institutional Options

- CS 1371 Computing for Engineers 3

Core C - Humanities

- Any HUM (http://www.catalog.gatech.edu/academics/undergraduate/core-curriculum/core-area-c) 6

Core D - Science, Math, & Technology

- PHYS 2211 Introductory Physics I 2,3 4
- PHYS 2212 Introductory Physics II 4
- MATH 1551 Differential Calculus 3 2
- MATH 1553 Introduction to Linear Algebra 3 2

Core E - Social Sciences

Select one of the following:

- HIST 2111 The United States to 1877 3
- HIST 2112 The United States since 1877 3
- INTA 1200 American Government in Comparative Perspective
- POL 1101 Government of the United States
- PUBP 3000 American Constitutional Issues
Select one of the following:

- ECON 2100 Economic Analysis and Policy Problems
- ECON 2101 The Global Economy
- ECON 2105 Principles of Macroeconomics
- ECON 2106 Principles of Microeconomics
- Any SS (http://www.catalog.gatech.edu/academics/undergraduate/core-curriculum/core-area-e) 6

Core F - Courses Related to Major

- COE 2001 Statics 3 2
- MATH 2551 Multivariable Calculus 4
- MATH 2552 Differential Equations 4
- CHEM 1310 General Chemistry 3 4
- BIOL 1510 Biological Principles 4
- Ethics Requirement (http://www.catalog.gatech.edu/academics/undergraduate/core-curriculum/ethics) 1

Major Requirements

- CEE 2040 Dynamics 2
- CEE 2300 Environmental Engineering Principles 3
- CEE 3000 Civil Engineering Systems 3
- CEE 3020 Civil Engineering Materials 3
- CEE 3040 Fluid Mechanics 3
- CEE 3340 Environmental Engineering Laboratory 3
- CEE 3770 Statistics and Applications 3
- or ISYE 377 Statistics and Applications
- CEE 4090 Capstone Design 3
Students must earn a minimum of 52 credit hours from the College of Environmental Engineering. All CEE courses must have a minimum grade of C.

### Additional Requirements

- **CHEM 1315** Survey of Organic Chemistry 3
- **EAS 2600** Earth Processes 4

Select one of the following:

- **CHBE 2130** Chemical Engineering Thermodynamics I 3
- **CHEM 3411** Physical Chemistry I 3
- **EAS 3603** Thermodynamics of Earth Systems 3
- **ME 3322** Thermodynamics of Thermodynamics I 3

### Environmental Engineering Technical Elective

Select one of the following:

- **CEE 4210** Hydrology 3
- **CEE 4405** Introduction to Geotechnical Engineering 3
- **CEE 4620** Environmental Impact Assessment 3
- **CEE 4795** Groundwater Hydrology 3

### Design Elective

Select one of the following:

- **CEE 4310** Water Quality Engineering 3
- **CEE 4340** Environmental Modeling and Health Risk Analysis 3
- **CEE 4330** Air Pollution Engineering 3
- **CEE 4395** Environmental Systems Design Project 3

### Technical Elective Focus

**Technical Electives**
- **CHEM 4740** Chemical Engineering Thermodynamics I 3
- **CEE 4310** Water Quality Engineering 3
- **CEE 4340** Environmental Modeling and Health Risk Analysis 3
- **CEE 4330** Air Pollution Engineering 3
- **CEE 4395** Environmental Systems Design Project 3

**Approved Electives**

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| Total Credit Hours | 129 |

No pass-fail allowed, except for CS 1171. CEE 4801 not allowed toward degree.

### Cooperative Plan

Since 1912, Georgia Tech has offered a five-year Undergraduate Cooperative Program to those students who wish to combine career-related experience with classroom studies. The program is the fourth oldest of its kind in the world and the largest optional co-op program in the country.

Students alternate between work assignments and classroom studies until they complete four or five semesters of work. Co-op students with an environmental engineering major complete the same coursework on campus that is completed by regular four-year students. Most co-op students begin the program as freshmen or sophomores and are classified as full-time students regardless of whether they are attending classes on campus or are full-time at an employer’s location.

Students who participate in the program have the opportunity to develop career interests, become more confident in their career choices, and develop human relations skills through their work experience. Graduates of the program receive a bachelor’s degree with a Cooperative Plan Designation.

The Undergraduate Professional Internship Program is for environmental engineering students who do not participate in the Cooperative Program, but want some career-related experience before graduation. Students generally work for one semester, usually in the summer, with an option for more work experiences. Students must have completed at least 30 hours of coursework at Georgia Tech before they can participate in the program. For more details, see: www.upi.gatech.edu (http://www.upi.gatech.edu).

In addition, there is a Work Abroad Program (www.workabroad.gatech.edu), which complements a student’s formal education with paid international work experience directly related to environmental engineering. Participating students typically are juniors and seniors. The international work assignments are designed to include practical training, cross-cultural exposure and learning, and the acquisition of needed skills. This program satisfies requirements for the International Plan, which is available to environmental engineering students.

For more information about all of the programs in the Center for Career Discovery and Development, visit www.careerdiscovery.gatech.edu (http://careerdiscovery.gatech.edu).

### International Plan

The International Plan is a challenging and coherent academic program for undergraduates that develops global competence within the context of a student’s major. It is a degree-long program that integrates international studies and experiences into any participating major at Georgia Tech. It helps to prepare Georgia Tech graduates professionally and personally for successful lives in the twenty-first century.

The International Plan is not intended to replace current international programs; it supplements them. Existing study abroad opportunities continue to be offered. It is also not intended to be an add-on to the current degree programs. It is intended to be another curriculum path to earn a degree in which international competence is integrated into the program of study. The plan can be completed within the normal timeframe of four years of undergraduate study.

The overarching model for the International Plan has four components:

1. International coursework: Three courses to include one from each of the following categories:

   1. Students must complete an Ethics requirement from the following courses: PHIL 4176 (recommended), PHIL 3105, PHIL 3109, or PHIL 3127.
   2. If PHYS 2231 is taken, extra credit hour goes to Free Electives.
   3. Minimum grade of C required.
   4. Technical Electives Focus may be chosen from the following list: BIOL 2335, BIOL 3380, BMED 3400, BMED 4757, BMED 4758, CEE 3010, CEE 4100, CEE 4210, CEE 4225, CEE 4230, CEE 4300, CEE 4310, CEE 4320, CEE 4330, CEE 4340, CEE 4405, CEE 4406, CEE 4600, CEE 4620, CEE 4795, CHBE 3200, CHEM 3281, CHEM 3511, CHEM 4740, CP 4210, CP 4510, EAS 4110, EAS 4300, EAS 4410, EAS 4420, EAS 4430, EAS 4480, EAS 4610, EAS 4625, EAS 4740, ECE 3710, ECE 3741, ME 4171, ME 4172 or ME 4782. A maximum of 3 credit hours of CEE 4699 and CEE 4900.
   5. Maximum 3 credit hours CEE 2699, MATH 1113, PHYS 2XXX (AP Credit), PHYS 2802, one-credit-hour MUSI courses, GT 1000, and FREE XXXX are not allowed.
a. International relations
b. Global economics
c. A course about a specific country or region

2. International experience: Two terms abroad (not less than 26 weeks) engaged in any combination of study abroad, research, or internship

3. Second language proficiency: All students in the program are expected to reach at least the proficiency level equivalent to two years of college-level language study. Students who use the language to study, conduct research, or participate in an internship during their international experience are expected to attain a higher level of proficiency. Language proficiency is determined by testing (not course credits).

4. Culminating course: A capstone course in the major designed to tie the international studies and experiences together with the student’s major.

Completion of the International Plan is recognized by a designation on the student’s diploma indicating completion of the degree with global competence.

For additional information about the International Plan visit www.oie.gatech.edu/internationalplan (http://www.internationalplan.gatech.edu).

Research Option

The Research Option is intended for students who seek a concentrated research experience, culminating in an undergraduate thesis, integrated into their undergraduate studies in environmental engineering. In order to graduate with a BS EnvE – Research Option degree, the students must:

Complete at least nine units of undergraduate research (over at least two, preferably three terms). Research may be for either pay (CEE 2698 or CEE 4698) or credit (CEE 2699 or CEE 4699). Research for credit may be used towards the BS EnvE approved elective requirements. Write an undergraduate thesis/report of research on their findings. This is usually done during the graduating term. The thesis will be published in the Georgia Tech Library.

Take two 1-hour classes: LMC 4701 (typically taken during the first or second semester of research) and LMC 4702 (taken during the thesis-writing semester).

At least six of the nine required credit hours of research should be on the same topic. A research proposal must be approved by a faculty advisor and one other faculty member. This proposal will be completed in LMC 4701 which serves as a prerequisite for LMC 4702. Completion of Research Option is noted on the student’s transcript.

Joint BS/MS Degree Program

The joint BS/MS program is designed to attract the best-of-the-best undergraduate students and is especially intended for students who demonstrate an interest in, and ability for, additional education beyond the bachelor’s degree.

Students will be eligible to apply for the program after completion of 30 semester credit hours at Georgia Tech and appropriate progress in their degree program. As a practical matter, students should apply for the program at least three semesters prior to graduation in order to take graduate-level courses prior to receiving their BS degree. Students must have a Georgia Tech GPA of 3.5 or higher for admission into the BS/MS Program in Environmental Engineering.

This program is available only to those completing a Bachelor’s degree with majors of Civil Engineering or Environmental Engineering.

The key components of this program are intense interaction among students and faculty, including mentoring and undergraduate research, and careful advising and course planning to enable students to begin challenging coursework in their fourth year of study.

Students in the joint BS/MS program remain undergraduates until they meet the requirements for the bachelor’s degree, at which point they will receive the BSEnvE degree. Their status will then be changed to graduate status. Graduate school application fees and the GRE requirements are waived.

Once admitted, a GPA of at least 3.0 must be maintained to remain in the program. Additionally, students in the BS/MS program are eligible to use the Graduate Course Option (http://www.catalog.gatech.edu/academics/graduate/masters-degrees/graduate-course-option) even if their cumulative grade-point average is below 3.5 at the time they complete their bachelor’s degree.