

# 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

Students must satisfy all prerequisites for a particular course. 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

Code	Title	Credit Hours
PHYS 2211	Principles of Physics I	4
MATH 1551	Differential Calculus	2
MATH 1552	Integral Calculus	4
MATH 1553	Introduction to Linear Algebra	2
MATH 1554	Linear Algebra	4
MATH 2552	Differential Equations	4
CHEM 1310	Principles of General Chemistry for Engineers	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 Educational Objectives

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

1. be successfully employed in civil- and environmental-related fields, or other career paths, with prominent companies and organizations

- in industry, government, non-governmental organizations, and entrepreneurial ventures;
2. pursue graduate education and research in civil and environmental engineering, and other fields;
3. be global collaborators, participating in interdisciplinary and culturally diverse teams, and advancing in leadership positions in the profession;
4. continue professional development by obtaining professional licensure or certifications, continuing education credits, or post-graduate study;
5. be active in service to the profession and to the State of Georgia, the nation, and the world.

Code	Title	Credit Hours
<b>Wellness Requirement</b>		
APPH 1040	Scientific Foundations of Health	2
	or APPH 10 The Science of Physical Activity and Health	
	or APPH 10 Flourishing: Strategies for Well-being and Resilience	
<b>Core IMPACTS</b>		
<b>Institutional Priority</b>		
CS 1371	Computing for Engineers	3
<b>Mathematics and Quantitative Skills</b>		
MATH 1552	Integral Calculus <sup>3</sup>	4
<b>Political Science and U.S. History</b>		
HIST 2111	The United States to 1877	3
	or HIST 2112 The United States since 1877	
	or INTA 1200 American Government in Comparative Perspective	
	or POL 1101 Government of the United States	
	or PUBP 3000 American Constitutional Issues	
<b>Arts, Humanities, and Ethics</b>		
Any HUM		6
<b>Communicating in Writing</b>		
ENGL 1101	English Composition I	3
ENGL 1102	English Composition II	3
<b>Technology, Mathematics, and Sciences</b>		
PHYS 2211	Principles of Physics I <sup>2,3</sup>	4
PHYS 2212	Principles of Physics II	4
MATH 1551	Differential Calculus <sup>3</sup>	2
MATH 1553	Introduction to Linear Algebra <sup>3</sup>	2
	or MATH 1554 Linear Algebra	
	or MATH 1555 Linear Algebra with Abstract Vector Spaces	
<b>Social Sciences</b>		
Any SS		9
<b>Field of Study</b>		
COE 2001	Statics <sup>3</sup>	2
MATH 2551	Multivariable Calculus	4
MATH 2552	Differential Equations <sup>3</sup>	4
CHEM 1310	Principles of General Chemistry for Engineers <sup>3</sup>	4
BIOS 1107 & 1107L	Biological Principles and Biological Principles Laboratory	4
<b>Major Requirements</b>		
Ethics Requirement <sup>1</sup>		
Economics Requirement <sup>6</sup>		

CEE 1070	Engineering Graphics for Civil and Environmental Engineering	1
CEE 1090	Exploring Civil and Environmental Engineering	2
CEE 2040	Dynamics	2
CEE 2090	Civil and Environmental Engineering Systems	3
CEE 2300	Environmental Engineering Principles	3
CEE 3040	Fluid Mechanics	3
CEE 3090	Data Analytics in Civil and Environmental Engineering	3
CEE 3340	Environmental Engineering Laboratory	3
CEE 3770	Statistics and Applications	3
or ISYE 3770	Statistics and Applications	
CEE 4090	Capstone Design	3
CEE 4200	Hydraulic Engineering	3
COE 3001	Mechanics of Deformable Bodies	3
<b>Additional Requirements</b>		
CHEM 1315	Survey of Organic Chemistry for Engineers	3
EAS 2600	Earth Processes	4
Select one of the following:		3
CHBE 2130	Chemical Engineering Thermodynamics I	
CHEM 3411	Physical Chemistry I	
EAS 3603	Thermodynamics of Earth Systems	
ME 3322	Thermodynamics	
<b>Environmental Engineering Technical Elective</b>		
Select one of the following:		3
CEE 4210	Hydrology	
CEE 3400	Introduction to Geotechnical Engineering	
CEE 4620	Environmental Impact Assessment	
CEE 4795	Groundwater Hydrology	
<b>Design Elective</b>		
Select one of the following:		3
CEE 4310	Water Quality Engineering	
CEE 4320	Hazardous Substance Remediation	
CEE 4330	Air Pollution Engineering	
CEE 4340	Environmental Modeling and Health Risk Analysis	
CEE 4370	Industrial Wastewater Process Engineering and Design	
CEE 4395	Environmental Systems Design Project	
<b>Technical Elective Focus</b>		
Technical Electives <sup>4</sup>		12
<b>Approved Electives</b>		
Approved Electives <sup>5</sup>		6
<b>Total Credit Hours</b>		<b>129</b>

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

Students must earn a 2.0 average in all CEE courses.

Students must earn a minimum of 49 credit hours from the College of Engineering. (40 credit hours of required courses plus a minimum of nine credit hours from electives.)

- <sup>1</sup> Students must complete one Ethics course during their program. For a complete list of Ethics courses, please see: Ethics
- <sup>2</sup> If PHYS 2231 is taken, extra credit hour goes to Free Electives.
- <sup>3</sup> Minimum grade of C required.
- <sup>4</sup> Technical Electives Focus may be chosen from the following list: BIOS 3380, BMED 3400, BMED 4757, BMED 4758, CEE 3010, CEE 3020, CEE 3051, CEE 3052, CEE 3400, CEE 4000, CEE 4005, CEE 4100, CEE 4160, CEE 4180, CEE 4210, CEE 4211, CEE 4225, CEE 4300, CEE 4310, CEE 4320, CEE 4330, CEE 4340, CEE 4350, CEE 4360, CEE 4370, CEE 4395, CEE 4405, CEE 4420, CEE 4360, CEE 4430, CEE 4460, CEE 4560, CEE 4600, CEE 4620, CEE 4660, CEE 4670, 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.
- <sup>5</sup> Maximum 3 credit hours CEE 2699. MATH 1113, PHYS 2XXX (AP Credit).
- <sup>6</sup> Students must complete one course from the following list that includes appropriate economic content relevant to the program: ECON 2100, ECON 2101, ECON 2105, or ECON 2106. Note that ECON 2100, ECON 2101, ECON 2105, ECON 2106 may also be applied toward Core IMPACTS Social Science credit hours. You should discuss this with your academic advisor to ensure that you are taking the most efficient path to complete both areas.

## 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: <http://career.gatech.edu/internships>.

In addition, there is a Work Abroad Program ([www.workabroad.gatech.edu](http://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://www.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:
  - 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.oie.gatech.edu/internationalplan).

## 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 even if their cumulative grade-point average is below 3.5 at the time they complete their bachelor's degree.

### BSMS Option Undergraduate College of Engineering and Computer Science majors and Master of Science with a major in Management

This option is open to all undergraduate College of Engineering and Computer Science students. Students must submit a BSMS application meet admissions criteria to be considered for the option.

Students may double count up to 6 credit hours of letter-grade 4000-level College of Engineering (if COE major) or Computer Science (if CS major) courses towards electives in the Master of Science with a major in Management (MS-MGT) program. Course selection for double-counted 4000-level courses must be approved by the MS-MGT program advisor. Students must still complete the 12 credit hour MS-MGT core.

Students are encouraged to reach out to the Scheller College of Business for more information.