Bachelor of Science in Civil Engineering - Construction and Infrastructure Systems Engineering

The four-year curriculum leading to the Bachelor of Science in Civil Engineering (BS CE) enables the graduate to enter professional practice as an engineer or to continue their studies in programs leading to advanced degrees in the following broad fields of specialization:

- Construction Engineering,
- Environmental and Water Systems,
- Geotechnical Systems,
- Structural Systems,
- Transportation Systems.

The BS CE degree program is designed to offer depth in course material considered essential for all civil engineers, as well as flexibility in selecting elective courses that offer breadth of topic exposure. Civil engineers contribute to society in numerous ways; thus, the School's philosophy is to provide the student with a range of electives that meet student interests. Civil engineers must not only be technically proficient, but also must be effective in working with people and with professionals in other disciplines.

Prerequisites and Other Requirements

Although students are not obligated to take the courses during the semester indicated, they must satisfy all prerequisites for a particular course. In addition to campus-wide academic requirements for graduation with a bachelor's degree, the following are also required for the BS CE degree:

A C or better must have been earned in the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 1501</td>
<td>Calculus I</td>
<td>4</td>
</tr>
<tr>
<td>MATH 1502</td>
<td>Calculus II</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 2211</td>
<td>Introductory Physics I</td>
<td>4</td>
</tr>
<tr>
<td>CHEM 1310</td>
<td>General Chemistry</td>
<td>4</td>
</tr>
<tr>
<td>COE 2001</td>
<td>Statics</td>
<td>2</td>
</tr>
</tbody>
</table>

The number of quality points earned in CEE courses taken toward the degree must be at least twice the number of credit hours in those courses. If a course is repeated, the latest grade will be included in applying this rule. No CEE course 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.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>APPH 1040</td>
<td>Scientific Foundations of Health</td>
<td>2</td>
</tr>
<tr>
<td>or APPH 10</td>
<td>The Science of Physical Activity and Health</td>
<td></td>
</tr>
</tbody>
</table>

Core A - Essential Skills

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 1101</td>
<td>English Composition I</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 1102</td>
<td>English Composition II</td>
<td>3</td>
</tr>
<tr>
<td>MATH 1552</td>
<td>Integral Calculus</td>
<td>4</td>
</tr>
</tbody>
</table>

Core B - Institutional Options

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CS 1371</td>
<td>Computing for Engineers</td>
<td>3</td>
</tr>
</tbody>
</table>

Core C - Humanities

Any HUM [http://www.catalog.gatech.edu/academics/undergraduate/core-curriculum/core-area-c/]

Core D - Science, Math, & Technology

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHYS 2211</td>
<td>Introductory Physics I</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 2212</td>
<td>Introductory Physics II</td>
<td>4</td>
</tr>
<tr>
<td>MATH 1551</td>
<td>Differential Calculus</td>
<td>2</td>
</tr>
<tr>
<td>MATH 1553</td>
<td>Introduction to Linear Algebra</td>
<td>2</td>
</tr>
<tr>
<td>or MATH 1554</td>
<td>Linear Algebra</td>
<td></td>
</tr>
<tr>
<td>or MATH 1564</td>
<td>Linear Algebra with Abstract Vector Spaces</td>
<td></td>
</tr>
</tbody>
</table>

Core E - Social Sciences

Select one of the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>HIST 2111</td>
<td>The United States to 1877</td>
<td>3</td>
</tr>
<tr>
<td>HIST 2112</td>
<td>The United States since 1877</td>
<td></td>
</tr>
<tr>
<td>INTA 1200</td>
<td>American Government in Comparative Perspective</td>
<td></td>
</tr>
<tr>
<td>POL 1101</td>
<td>Government of the United States</td>
<td></td>
</tr>
<tr>
<td>PUBP 3000</td>
<td>American Constitutional Issues</td>
<td></td>
</tr>
</tbody>
</table>

Select one of the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECON 2100</td>
<td>Economic Analysis and Policy Problems</td>
<td></td>
</tr>
<tr>
<td>ECON 2101</td>
<td>The Global Economy</td>
<td></td>
</tr>
<tr>
<td>ECON 2105</td>
<td>Principles of Macroeconomics</td>
<td></td>
</tr>
<tr>
<td>ECON 2106</td>
<td>Principles of Microeconomics</td>
<td></td>
</tr>
</tbody>
</table>

Any SS [http://www.catalog.gatech.edu/academics/undergraduate/core-curriculum/core-area-e/]

Core F - Courses Related to Major

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>COE 2001</td>
<td>Statics</td>
<td>2</td>
</tr>
<tr>
<td>MATH 2551</td>
<td>Multivariable Calculus</td>
<td>4</td>
</tr>
</tbody>
</table>
Bachelor of Science in Civil Engineering - Construction and Infrastructure Systems Engineering

MATH 2552  Differential Equations  4
CHEM 1310  General Chemistry  4
Select one of the following:  4
BIOS 1107  Biological Principles
& 1107L  and Biological Principles Laboratory
BIOS 1108  Organismal Biology
& 1108L  and Organismal Biology Laboratory
EAS 2600  Earth Processes
Ethics Requirement (Civil Engineering approved)  1

Major Requirements
CEE 1770  Introduction to Engineering Graphics and Visualization  3
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
Select one of the following:  3
CEE 3770  Statistics and Applications
ISYE 3770  Statistics and Applications
MATH 3670  Probability and Statistics with Applications
CEE 4090  Capstone Design  3

College of Engineering Requirements
COE 3001  Mechanics of Deformable Bodies  3
Select one of the following:  3
CHBE 2130  Chemical Engineering Thermodynamics I
ME 3322  Thermodynamics
MSE 3001  Chemical Thermodynamics of Materials

Construction and Infrastructure Systems Engineering Concentration
CEE 4100  Construction Engineering and Management  3
Concentration electives  9
CEE 4110  Construction Planning, Estimating, and Scheduling
CEE 4120  Construction Equipment and Methods
CEE 4130  Construction Safety and Health
CEE 4140  Building Information Modeling (BIM) in Construction
CEE 4150  Construction Management & Megaprojects
CEE 4160  Smart and Sustainable Cities
CEE 4803  Special Topics (Entrepreneurship in CEE)
CEE 8813  Special Topics (Data Analytics for CEE Systems)
CEE 8813  Special Topics (Sustainable Buildings)

CE Breadth Electives
Select two of the following:  6
CEE 3051  Introduction to Structural Engineering
CEE 4200  Hydraulic Engineering
CEE 4300  Environmental Engineering Systems
CEE 4405  Introduction to Geotechnical Engineering
CEE 4600  Transportation Planning, Operations, and Design
CEE 4200  Hydraulic Engineering  3

or CEE 4405  Introduction to Geotechnical Engineering

CE Technical Electives
CE Electives  4
Approved Electives
Approved Electives  5
Total Credit Hours  128

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.

1 Students must complete an Ethics requirement from the following courses: PHIL 3105, PHIL 3109, or PHIL 3127.
2 If PHYS 2231 is taken, extra credit hours go to Free Electives.
3 Minimum grade of C is required.
4 Any 3000-level or higher CEE course, with the exception of CEE 4801, CEE 8811, and CEE 8812. Maximum of 3 credit hours of CEE 4699 and CEE 4900. Only one non-CEE course allowed: COA 4010, CP 4010, CP 4020, CP 4310, and CP 4510.
5 Maximum 3 credit hours CEE 2699 allowed. MATH 1113, PHYS 2802, PHYS 2XXX (AP credit), one-hour MUSI courses, GT 1000, and FREE XXXX are not allowed.

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 a civil 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 Georgia Tech Internship Program is for civil 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, visit www.gtip.gatech.edu/ (http://www.gtip.gatech.edu/).

In addition, there is the 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 civil 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 civil 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:
   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) or visit 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 civil engineering. In order to graduate with a BSC.E – 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 CE 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.

**BS/MS Option - Civil Engineering**
The BS/MS Option 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 Civil Engineering.

This program is available only to those completing a Bachelor’s degree with the School of Civil and Environmental Engineering.

Students in the BS/MS Option remain undergraduates until they meet the requirements for the bachelor’s degree, at which point they will receive the BSCE or 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/undergraduate/credit-tests-scores/undergraduate-students-taking-graduate-courses/) even if their cumulative grade-point average is below 3.5 at the time they complete their bachelor’s degree.