CIVIL ENGINEERING, B.S.E.

The BSE Civil Engineering program is accredited by the Engineering Accreditation Commission of ABET, https://www.abet.org, under the General Criteria and the Civil and Similarly Named Engineering Programs Criteria.

Learning Outcomes
1. Graduates of the program will have an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
2. Graduates will have an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors
3. Graduates will have an ability to communicate effectively with a range of audiences
4. Graduates will have an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts
5. Graduates will have an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives
6. Graduates will have an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions
7. Graduates will have an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

Academic Standards

Entrance Requirements
See College of Engineering and Computing for progression requirements, and special academic opportunities.

Program GPA
Program GPA requirement policies are described in the College of Engineering and Computing section of this bulletin. For the purpose of these policies, the following courses are used to determine the Program GPA for the Civil Engineering B.S.E. program: all Civil Engineering Lower Division courses, all Civil Engineering Major courses and all courses used to satisfy an ECIV Laboratory Elective, ECIV Distribution Elective, and ECIV Elective.

Professional Development Requirement
Communications and Ethics: This requirement is satisfied by completing one or more program-accepted Carolina Core courses for CMS and VSR.

Admissions

Entrance Requirements
Admission requirements and processes for freshman, transfer students, and former students seeking readmission are managed by the Office of Undergraduate Admissions (http://sc.edu/about/offices_and_divisions/undergraduate_admissions/).
Transfer applicants from regionally accredited colleges and universities must have a cumulative 2.75 GPA on a 4.00 scale to enter the College of Engineering and Computing. In addition, transfer applicants for the Aerospace Engineering, Biomedical Engineering, Chemical Engineering, Civil Engineering, Computer Engineering, Electrical Engineering, or Mechanical Engineering majors must also have completed a four semester-hour calculus course equivalent to MATH 141 with a grade of “C” or better.

Current University of South Carolina students who wish to enter the College of Engineering and Computing, and former students seeking readmission, must have an institutional GPA of 2.50 or better on at least 15 hours earned at USC. In addition, such applicants for the Aerospace Engineering, Biomedical Engineering, Chemical Engineering, Civil Engineering, Computer Engineering, Electrical Engineering, or Mechanical Engineering majors must also have completed a four semester-hour calculus course equivalent to MATH 141 with a grade of “C” or better.

Communications and Ethics
This requirement is satisfied by completing one or more program-accepted Carolina Core courses for CMS and VSR.

Degree Requirements (124-142 hours)
See College of Engineering and Computing (https://academicbulletins.sc.edu/undergraduate/engineering-computing/) for progression requirements and special academic opportunities.

Program of Study

<table>
<thead>
<tr>
<th>Requirements</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Carolina Core</td>
<td>34-46</td>
</tr>
<tr>
<td>2. College Requirements</td>
<td>0</td>
</tr>
<tr>
<td>3. Program Requirements</td>
<td>65-71</td>
</tr>
<tr>
<td>4. Major Requirements</td>
<td>25</td>
</tr>
</tbody>
</table>

Founding Documents Requirement

All undergraduate students must take a 3-credit course or its equivalent with a passing grade in the subject areas of History, Political Science, or African American Studies that covers the founding documents including the United State Constitution, the Declaration of Independence, the Emancipation Proclamation and one or more documents that are foundational to the African American Freedom struggle, and a minimum of five essays from the Federalist papers. This course may count as a requirement in any part of the program of study including the Carolina Core, the major, minor or cognate, or as a general elective. Courses that meet this requirement are listed here (https://academicbulletins.sc.edu/undergraduate/founding-document-courses/).

1. Carolina Core Requirements (34-46 hours)

CMW – Effective, Engaged, and Persuasive Communication: Written (6 hours)
- ENGL 101
- ENGL 102

ARP – Analytical Reasoning and Problem Solving (8 hours)
- MATH 141
- MATH 142
SCI – Scientific Literacy (8 hours)
• CHEM 111 & CHEM 111L
• PHYS 211 & PHYS 211L

GFL – Global Citizenship and Multicultural Understanding: Foreign Language (0-6 hours)
Score two or better on foreign language placement test; or complete the 109 and 110 courses in FREN, GERM, LATN or SPAN; or complete the 121 course in another foreign language.
• CC-GFL courses (https://academicbulletins.sc.edu/undergraduate/carolina-core-courses/)

GHS – Global Citizenship and Multicultural Understanding: Historical Thinking (3 hours)
• any CC-GHS course (https://academicbulletins.sc.edu/undergraduate/carolina-core-courses/)

GSS – Global Citizenship and Multicultural Understanding: Social Sciences (3 hours)
• any CC-GSS course (https://academicbulletins.sc.edu/undergraduate/carolina-core-courses/)

AIU – Aesthetic and Interpretive Understanding (3 hours)
• any CC-AIU course (https://academicbulletins.sc.edu/undergraduate/carolina-core-courses/)

CMS – Effective, Engaged, and Persuasive Communication: Spoken Component 1 (0-3 hours)
Select from the following:
• PHIL 325 (CMS/VSR overlay)
• SPCH 140
• any overlay or stand-alone CC-CMS course (https://academicbulletins.sc.edu/undergraduate/carolina-core-courses/)

INF – Information Literacy 1 (0-3 hours)
• any overlay or stand-alone CC-INF course (https://academicbulletins.sc.edu/undergraduate/carolina-core-courses/)

VSR – Values, Ethics, and Social Responsibility 1 (0-3 hours)
Select from the following:
• PHIL 325 (CMS/VSR overlay)
• PHIL 322
• any overlay or stand-alone CC-VSR course (https://academicbulletins.sc.edu/undergraduate/carolina-core-courses/)

1 Carolina Core Stand Alone or Overlay Eligible Requirements – Overlay-approved courses offer students the option of meeting two Carolina Core components in a single course. A maximum of two overlays is allowed. The total Carolina Core credit hours for this program must add up to a minimum of 34 hours.

2. College Requirements (0 hours)
No college-required courses for this program.

3. Program Requirements (65-71 hours)
Supporting Courses (65-71 hours)

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 242</td>
<td>Elementary Differential Equations</td>
<td>3</td>
</tr>
<tr>
<td>STAT 509</td>
<td>Statistics for Engineers</td>
<td>3</td>
</tr>
<tr>
<td>STAT 511</td>
<td>Probability</td>
<td>3</td>
</tr>
</tbody>
</table>

Foundational Required Courses 6

Foundational Math Elective 3
Select one from the following:
• MATH 241 Vector Calculus
• MATH 300 Transition to Advanced Mathematics
• MATH 344 Applied Linear Algebra

Foundational Math/Science Elective 3-4
Select one from the following:
• CHEM 112 General Chemistry II & 112L and General Chemistry II Lab
• PHYS 212 Essentials of Physics II & 212L and Essentials of Physics II Lab

Lower Division Engineering 18

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
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</thead>
<tbody>
<tr>
<td>ECIV 101</td>
<td>Introduction to Civil Engineering</td>
</tr>
<tr>
<td>or ENCP 101 Introduction to Engineering</td>
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</tr>
<tr>
<td>ECIV 111</td>
<td>Introduction to Engineering Graphics and Visualization</td>
</tr>
<tr>
<td>or ENCP 102 Introduction to Computer-Aided Design</td>
<td></td>
</tr>
<tr>
<td>ECIV 200</td>
<td>Statics</td>
</tr>
<tr>
<td>or ENCP 200 Statics</td>
<td></td>
</tr>
<tr>
<td>ECIV 201</td>
<td>Computational Methods for Civil Engineering</td>
</tr>
<tr>
<td>or ENCP 201 Introduction to Applied Numerical Methods</td>
<td></td>
</tr>
<tr>
<td>ECIV 220</td>
<td>Mechanics of Solids</td>
</tr>
<tr>
<td>or ENCP 260 Introduction to the Mechanics of Solids</td>
<td></td>
</tr>
<tr>
<td>ECIV 360</td>
<td>Fluid Mechanics</td>
</tr>
<tr>
<td>or ENCP 360 Fluid Mechanics</td>
<td></td>
</tr>
</tbody>
</table>

ECIV Laboratory Courses 2
Select two from the following:
• ECIV 303L Civil Engineering Materials Laboratory
• ECIV 330L Geotechnical Laboratory
• ECIV 340L Transportation Engineering Laboratory
• ECIV 350L Introduction to Environmental Engineering Laboratory
• ECIV 362L Introduction to Water Resources Engineering Laboratory

ECIV Distribution Courses 12
Select one course from four of the following five areas:
Environmental Engineering
• ECIV 551 Elements of Water and Wastewater Treatment
• ECIV 555 Principles of Municipal Solid Waste Engineering
• ECIV 556 Air Pollution Control Engineering
• ECIV 557 Sustainable Construction for Engineers
• ECIV 558 Environmental Engineering Process Modeling
Structural Engineering
• ECIV 325 Structural Steel Design
ECIV 327 Reinforced Concrete Design
Transportation Engineering
ECIV 540 Transportation Systems Planning
ECIV 541 Highway Design
ECIV 542 Traffic Engineering
ECIV 580 Railway Engineering I
Geotechnical Engineering
ECIV 530 Foundation Analysis and Design
ECIV 531 Design of Earth Structures
Water Resources Engineering
ECIV 560 Open Channel Hydraulics
ECIV 562 Engineering Hydrology
ECIV 563 Subsurface Hydrology

Basic Science Elective 3-4
Select one from the following:
BIOL 110 General Biology
BIOL 270 Introduction to Environmental Biology
ENVR 101 Introduction to the Environment
ENVR 321 Environmental Pollution and Health
GEOG 347 Water as a Resource
GEOG 563 Advanced Geographic Information Systems
GEOL 302 Rocks and Minerals (or above)

Engineering, Science, or Mathematics (ESM) Electives 12-14
Select from the following:
Additional courses from Foundational Math Elective category,
Foundational Math/Science Elective category, Basic Science
category and ESM Elective category.
Additional ECIV courses 300 level and higher

Total Credit Hours 65-69

4. Major Requirements (25 hours)

Major Courses

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECIV 303</td>
<td>Civil Engineering Materials</td>
<td>3</td>
</tr>
<tr>
<td>ECIV 307</td>
<td>Professional Development for Civil Engineers</td>
<td>3</td>
</tr>
<tr>
<td>ECIV 320</td>
<td>Structural Analysis I</td>
<td>3</td>
</tr>
<tr>
<td>ECIV 330</td>
<td>Introduction to Geotechnical Engineering</td>
<td>3</td>
</tr>
<tr>
<td>ECIV 340</td>
<td>Introduction to Transportation Engineering</td>
<td>3</td>
</tr>
<tr>
<td>ECIV 350</td>
<td>Introduction to Environmental Engineering</td>
<td>3</td>
</tr>
<tr>
<td>ECIV 362</td>
<td>Introduction to Water Resources Engineering</td>
<td>3</td>
</tr>
<tr>
<td>ECIV 470</td>
<td>Civil Engineering Design</td>
<td>4</td>
</tr>
</tbody>
</table>

Total Credit Hours 25

Major Map

A major map is a layout of required courses in a given program of study, including critical courses and suggested course sequences to ensure a clear path to graduation.

Major maps are only a suggested or recommended sequence of courses required in a program of study. Please contact your academic advisor
Civil Engineering, B.S.E.

for assistance in the application of specific coursework to a program of study and course selection and planning for upcoming semesters.

Civil Engineering, B.S.E.