Civil Engineering, B.S.E.

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>6</td>
</tr>
<tr>
<td>STAT 509</td>
<td>Statistics for Engineers or STAT 511 Probability</td>
<td>3</td>
</tr>
</tbody>
</table>

Select one from the following:
- MATH 241 | Vector Calculus |
### Civil Engineering, B.S.E.

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 300</td>
<td>Transition to Advanced Mathematics</td>
</tr>
<tr>
<td>MATH 344</td>
<td>Applied Linear Algebra</td>
</tr>
</tbody>
</table>

**Foundational Math/Science Elective**

3-4

Select one from the following:

- Additional course from Foundational Math Elective category
- CHEM 112 General Chemistry II
- & 112L General Chemistry II Lab
- PHYS 212 Essentials of Physics II
- & 212L Essentials of Physics II Lab

**Lower Division Engineering**

18

- ECIV 101 Introduction to Civil Engineering
- or ENCP 101 Introduction to Engineering I
- ECIV 111 Introduction to Engineering Graphics and Visualization
- or ENCP 102 Introduction to Engineering II
- ECIV 200 Statics
- or ENCP 200 Statics
- ECIV 201 Computational Methods for Civil Engineering
- or ENCP 201 Introduction to Applied Numerical Methods
- ECIV 220 Mechanics of Solids
- or ENCP 260 Introduction to the Mechanics of Solids
- ECIV 360 Fluid Mechanics
- or ENCP 360 Fluid Mechanics

**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**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECIV 562</td>
<td>Engineering Hydrology</td>
</tr>
<tr>
<td>ECIV 563</td>
<td>Subsurface Hydrology</td>
</tr>
</tbody>
</table>

**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
- GEOL 101 Introduction to the Earth
- GEOL 103 Environment of the Earth
- MSCI 210 Oceans and Society
- MSCI 215 Coastal Environments of the Southeastern US

**Engineering, Science, or Mathematics (ESM) Electives**

12-14

Select four courses from the following:

- Additional courses from Foundational Math Elective category, Foundational Math/Science Elective category and Basic Science
- Additional ECIV courses 300 level and higher
- BIOL 101 Biological Principles I
- BIOL 102 Biological Principles II
- BIOL 250 Microbiology (and higher)
- BMEN 212 Fundamentals of Biomedical Systems (and higher)
- CHEM 118 Computational Chemistry I (and higher)
- CSCE 145 Algorithmic Design I
- CSCE 146 Algorithmic Design II
- CSCE 201 Introduction to Computer Security
- CSCE 206 Scientific Applications Programming
- CSCE 211 Digital Logic Design
- ECHE 300 Chemical Process Principles (and higher)
- ECIV 210 Dynamics
- or ENCP 210 Dynamics
- ELCT 220 Electrical Engineering for Non-Majors
- ELCT 221 Circuits (and higher)
- EMCH 290 Thermodynamics (or higher (but not ENCP 360)
- ENCP 290 Thermodynamic Fundamentals (and higher (but not ENCP 360)
- ENVR 331 Integrating Sustainability (and higher (but not ENCP 360)
- ENVR 501 Special Topics in the Environment
- ENVR 533 Sustainability Projects Course
- GEOG 347 Water as a Resource
- GEOG 563 Advanced Geographic Information Systems
- GEOL 302 Rocks and Minerals (or above)
- ITEC 233 Introduction to Computer Hardware and Software (or higher)
- MATH 520 Ordinary Differential Equations
- MATH 521 Boundary Value Problems and Partial Differential Equations
- MATH 544 Linear Algebra
- MATH 550 Vector Analysis
- MSCI 305 Ocean Data Analysis (and above)
- NAVY 201 Naval Ships Systems I (and higher)
- NAVY 202 Naval Ships Systems II
<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHYS 291</td>
<td>Einstein’s Relativity: Understanding by Example (and higher)</td>
<td></td>
</tr>
<tr>
<td>NAVY 301</td>
<td>Navigation/Naval Operations I</td>
<td></td>
</tr>
<tr>
<td>STAT 511</td>
<td>Probability</td>
<td></td>
</tr>
<tr>
<td>STAT 512</td>
<td>Mathematical Statistics</td>
<td></td>
</tr>
<tr>
<td>STAT 513</td>
<td>Theory of Statistical Inference</td>
<td></td>
</tr>
<tr>
<td>STAT 516</td>
<td>Statistical Methods II</td>
<td></td>
</tr>
<tr>
<td>STAT 520</td>
<td>Forecasting and Time Series</td>
<td></td>
</tr>
<tr>
<td>STAT 587</td>
<td>Big Data Analytics</td>
<td></td>
</tr>
</tbody>
</table>

**Other Electives**

Select two courses 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
- ACCT 222 Survey of Accounting
- ECON 224 Introduction to Economics
- FINA 333 Finance and Markets
- MGMT 371 Principles of Management
- MGS 290 Computer Information Systems in Business
- MKTG 350 Principles of Marketing

**Total Credit Hours** 59-63

### 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