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/archives/2021-2022/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/archives/2021-2022/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/archives/2021-2022/undergraduate/carolina-core-courses/)

GHS – Global Citizenship and Multicultural Understanding: Historical Thinking (3 hours)
- any CC-GHS course (https://academicbulletins.sc.edu/archives/2021-2022/undergraduate/carolina-core-courses/)

GSS – Global Citizenship and Multicultural Understanding: Social Sciences (3 hours)
- any CC-GSS course (https://academicbulletins.sc.edu/archives/2021-2022/undergraduate/carolina-core-courses/)

AIU – Aesthetic and Interpretive Understanding (3 hours)
- any CC-AIU course (https://academicbulletins.sc.edu/archives/2021-2022/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/archives/2021-2022/undergraduate/carolina-core-courses/)

INF – Information Literacy 1 (0-3 hours)
- any overlay or stand-alone CC-INF course (https://academicbulletins.sc.edu/archives/2021-2022/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/archives/2021-2022/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>
</tbody>
</table>
Civil Engineering, B.S.E.

or STAT 511  Probability

**Foundational Math Elective**  3
Select one of 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 of the following:
- CHEM 112 & 112L  General Chemistry II and General Chemistry II Lab
- PHYS 212 & 212L  Essentials of Physics II and Essentials of Physics II Lab
- MATH 241  Vector Calculus
- MATH 300  Transition to Advanced Mathematics
- MATH 344  Applied Linear Algebra

**Lower Division Engineering**
- ECIV 101  Introduction to Civil Engineering  3
  or ENCP 101  Introduction to Engineering I
- ECIV 111  Introduction to Engineering Graphics and Visualization  3
  or ENCP 102  Introduction to Engineering II
- ECIV 200  Statics  3
  or ENCP 200  Statics
- ECIV 201  Computational Methods for Civil Engineering  3
  or ENCP 201  Introduction to Applied Numerical Methods
- ECIV 220  Mechanics of Solids  3
  or ENCP 260  Introduction to the Mechanics of Solids
- ECIV 360  Fluid Mechanics  3
  or ENCP 360  Fluid Mechanics

**ECIV Laboratory Courses**
Select two of the following:  2
- 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**
Select one course from four of the following five areas:  12
- 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
- Geotechnical 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**
Select one of the following:  3-4
- 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**
Select four of the following:  12-14
- BIOL 101  Biological Principles I
- BIOL 102  Biological Principles II
- BIOL 110  General Biology
- BIOL 250  Microbiology
- BIOL 211 and above
- BMEN 211 and above
- CHEM 112 and above
- 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 310  Introductory Chemical Engineering Thermodynamics (or above)
- ECIV 210  Dynamics
  Additional ECIV courses 300-level and above
- ELCT 220  Electrical Engineering for Non-Majors
- ELCT 221  Circuits (or above)
- EMCH 290  Thermodynamics (or above)
- ENCP 210  Dynamics
- ENCP 290  Thermodynamic Fundamentals (or above)
- ENVR 331  Integrating Sustainability
- 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 above)
- MATH 241  Vector Calculus
- MATH 300  Transition to Advanced Mathematics
- MATH 344  Applied Linear Algebra
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<tr>
<td>MATH 520</td>
<td>Ordinary Differential Equations</td>
<td></td>
</tr>
<tr>
<td>MATH 521</td>
<td>Boundary Value Problems and Partial Differential Equations</td>
<td></td>
</tr>
<tr>
<td>MATH 544</td>
<td>Linear Algebra</td>
<td></td>
</tr>
<tr>
<td>MATH 550</td>
<td>Vector Analysis</td>
<td></td>
</tr>
<tr>
<td>MSCI 305</td>
<td>Ocean Data Analysis (and above)</td>
<td></td>
</tr>
<tr>
<td>NAVY 201</td>
<td>Naval Ships Systems I</td>
<td></td>
</tr>
<tr>
<td>NAVY 202</td>
<td>Naval Ships Systems II</td>
<td></td>
</tr>
<tr>
<td>NAVY 301</td>
<td>Navigation/Naval Operations I</td>
<td></td>
</tr>
<tr>
<td>PHYS 212</td>
<td>Essentials of Physics II (or above)</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 of the following: 6-8

- Additional courses from the ESM Elective category
- ACCT 222 Survey of Accounting
- ECON 224 Introduction to Economics
- FINA 333 Finance and Markets
- MGMT 371 Principles of Management
- MGSC 290 Computer Information Systems in Business
- MKTG 350 Principles of Marketing
- OR any courses from the ESM Elective category

**Total Credit Hours** 65-71

1. Not EMCH 360.
2. Not ENCP 360.

### 4. Major Requirements (25 hours)

**Major Courses**

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<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
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</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