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 States 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 (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 (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 (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>or STAT 511</td>
<td>Probability</td>
<td></td>
</tr>
</tbody>
</table>

Foundational Math Elective
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 General Chemistry II & 112L and General Chemistry II Lab
PHYS 212 Essentials of Physics II & 212L 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 or ENCP 101 Introduction to Engineering I 3
ECIV 111 Introduction to Engineering Graphics and Visualization or ENCP 102 Introduction to Engineering II 3
ECIV 200 Statics or ENCP 200 Statics 3
ECIV 201 Computational Methods for Civil Engineering or ENCP 201 Introduction to Applied Numerical Methods 3
ECIV 220 Mechanics of Solids or ENCP 260 Introduction to the Mechanics of Solids 3
ECIV 360 Fluid Mechanics or ENCP 360 Fluid Mechanics 3

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
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
BMEN 211 or above
CHEM 112 or above

CSCE 145 Algorithmic Design I
or CSCE 146 Algorithmic Design II
or CSCE 201 Introduction to Computer Security
or CSCE 206 Scientific Applications Programming
or 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) 1
ENCP 210 Dynamics
ENCP 290 Thermodynamic Fundamentals (or above) 2
ENVR 331 Integrating Sustainability
ENVR 501 Special Topics in the Environment
ENVR 533 Sustainability Projects Course
GEOL 302 Rocks and Minerals (or above)
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
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
NAVY 202  Naval Ships Systems II
NAVY 301  Navigation/Naval Operations I
PHYS 212  Essentials of Physics II (or above)
STAT 511  Probability
STAT 512  Mathematical Statistics
STAT 513  Theory of Statistical Inference
STAT 516  Statistical Methods II
STAT 520  Forecasting and Time Series
STAT 587  Big Data Analytics

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

<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