MECHANICAL ENGINEERING, B.S.E.

Degree Requirements (125 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>
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<tbody>
<tr>
<td>1. Carolina Core</td>
<td>34-46</td>
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<tr>
<td>2. College Requirements</td>
<td>0</td>
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<td>3. Program Requirements</td>
<td>48</td>
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<td>4. Major Requirements</td>
<td>43</td>
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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 - must be passed with a grade of C or higher.
- ENGL 102

ARP – Analytical Reasoning and Problem Solving (8 hours)
Must be passed with a grade of C or higher.
- MATH 141
- MATH 142

SCI – Scientific Literacy (8 hours)
Must be passed with a grade of C or higher.
- 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)
- any overlay or stand-alone CC-CMS course (https://academicbulletins.sc.edu/undergraduate/carolina-core-courses/)

INF – Information Literacy 1 (0-3 hours)
Select from the following:
- ENGL 102 (CMW/INF overlay)
- 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)
- 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 (48 hours)
Supporting Courses (42 hours)

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>CSCE 206</td>
<td>Scientific Applications Programming</td>
<td>3</td>
</tr>
<tr>
<td>MATH 241</td>
<td>Vector Calculus</td>
<td>3</td>
</tr>
<tr>
<td>MATH 242</td>
<td>Elementary Differential Equations</td>
<td>3</td>
</tr>
</tbody>
</table>

Select Math/Science Elective 1 6
Any BIOL 110 or BIOL 301 and above, CHEM 112 or higher, MATH 300 or higher, PHYS 212 or higher, STAT 506 or higher course.

Lower Division Engineering

EMCH 101 Introduction to Mechanical Engineering 3
or ENCP 101 Introduction to Engineering I 3
EMCH 111 Introduction to Computer-Aided Design 3
or ENCP 102 Introduction to Engineering II 3
EMCH 200 Statics (must be passed with a grade of C or higher) 3
or ENCP 200 Statics 3
EMCH 201 Introduction to Applied Numerical Methods 3
or ENCP 201 Introduction to Applied Numerical Methods 3
EMCH 260 Solid Mechanics 3
or ENCP 260 Introduction to the Mechanics of Solids 3
EMCH 290 Thermodynamics 3
or ENCP 290 Thermodynamic Fundamentals 3
ELCT 220 Electrical Engineering for Non-Majors 3
or ELCT 221 Circuits 3

Mechanical Engineering Electives

Select six hours of the following: 6
EMCH 308 Introduction to Finite Element Stress Analysis
EMCH 441 Automotive System Fundamentals
EMCH 460 Special Problems
EMCH 497 Design of Thermal Systems
Any EMCH course numbered 500 or higher

Total Credit Hours 42

Elective (6 hours)

Any course taken at the University or transferred in as a University course that does not essentially duplicate a course otherwise applied to the degree. A list of such courses that cannot be used as a free elective is maintained in the department office. Courses that cannot be used includes:

<table>
<thead>
<tr>
<th>Course</th>
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<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENCP 101</td>
<td>Introduction to Engineering I</td>
<td>3</td>
</tr>
<tr>
<td>ENCP 102</td>
<td>Introduction to Engineering II</td>
<td>3</td>
</tr>
<tr>
<td>ENCP 200</td>
<td>Statics</td>
<td>3</td>
</tr>
<tr>
<td>ENCP 201</td>
<td>Introduction to Applied Numerical Methods</td>
<td>3</td>
</tr>
<tr>
<td>ENCP 210</td>
<td>Dynamics</td>
<td>3</td>
</tr>
<tr>
<td>ENCP 260</td>
<td>Introduction to the Mechanics of Solids</td>
<td>3</td>
</tr>
<tr>
<td>ENCP 290</td>
<td>Thermodynamic Fundamentals</td>
<td>3</td>
</tr>
<tr>
<td>ENCP 330</td>
<td>Introduction to Vibrations</td>
<td>3</td>
</tr>
<tr>
<td>ENCP 360</td>
<td>Fluid Mechanics</td>
<td>3</td>
</tr>
<tr>
<td>ENCP 491</td>
<td>Capstone Design Project I</td>
<td>3</td>
</tr>
<tr>
<td>ENCP 492</td>
<td>Capstone Design Project II</td>
<td>3</td>
</tr>
<tr>
<td>ECHE 101</td>
<td>Introduction to Chemical Engineering</td>
<td>2</td>
</tr>
<tr>
<td>ECHE 310</td>
<td>Introductory Chemical Engineering</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Thermodynamics</td>
<td></td>
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<tr>
<td>ECHE 320</td>
<td>Chemical Engineering Fluid Mechanics</td>
<td>3</td>
</tr>
<tr>
<td>ECHE 321</td>
<td>Heat-Flow Analysis</td>
<td>3</td>
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</table>

4. Major Requirements (43 hours)

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EMCH 310</td>
<td>Dynamics</td>
<td>3</td>
</tr>
<tr>
<td>or ENCP 210</td>
<td>Dynamics</td>
<td></td>
</tr>
<tr>
<td>EMCH 332</td>
<td>Kinematics</td>
<td>3</td>
</tr>
<tr>
<td>EMCH 354</td>
<td>Heat Transfer</td>
<td>3</td>
</tr>
<tr>
<td>EMCH 360</td>
<td>Fluid Mechanics</td>
<td>3</td>
</tr>
<tr>
<td>or ENCP 360</td>
<td>Fluid Mechanics</td>
<td></td>
</tr>
<tr>
<td>EMCH 361</td>
<td>Laboratory I</td>
<td>3</td>
</tr>
<tr>
<td>EMCH 362</td>
<td>Laboratory II</td>
<td>3</td>
</tr>
<tr>
<td>EMCH 367</td>
<td>Controls</td>
<td>3</td>
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<tr>
<td>EMCH 368</td>
<td>Mechatronics</td>
<td>4</td>
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<tr>
<td>EMCH 371</td>
<td>Materials</td>
<td>3</td>
</tr>
<tr>
<td>EMCH 377</td>
<td>Manufacturing</td>
<td>3</td>
</tr>
<tr>
<td>EMCH 380</td>
<td>Project Management</td>
<td>3</td>
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<tr>
<td>EMCH 427</td>
<td>Design I</td>
<td>3</td>
</tr>
<tr>
<td>EMCH 428</td>
<td>Design II</td>
<td>3</td>
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</tbody>
</table>

Mechanical Design elective:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EMCH 327</td>
<td>Machine Design</td>
<td>3</td>
</tr>
<tr>
<td>or EMCH 394</td>
<td>Applied Thermodynamics</td>
<td></td>
</tr>
</tbody>
</table>

Total Credit Hours 43