

MECHANICAL ENGINEERING, B.S.E.

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

Learning Outcomes

1. An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
2. 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. An ability to communicate effectively with a range of audiences
4. 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. 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. An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions
7. An ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

Academic Standards

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 Mechanical Engineering B.S.E. program: All Lower Division Engineering courses, all Mechanical Engineering Major courses, and all courses used to satisfy a Mechanical Engineering Elective.

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.

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

Requirements	Credit Hours
1. Carolina Core	34-46
2. College Requirements	0
3. Program Requirements	48
4. Major Requirements	43

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)

Course	Title	Credits
Foundational Courses		
CSCE 106	Scientific Applications Programming	3
MATH 241	Vector Calculus	3
MATH 242	Elementary Differential Equations	3

Select Math/Science Electives

6

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

Course	Title	Credits
BMEN 101	Introduction to Biomedical Engineering	1
ECHE 101	Introduction to Chemical Engineering	2
ECHE 310	Introductory Chemical Engineering Thermodynamics	3
ECHE 320	Chemical Engineering Fluid Mechanics	3
ECHE 321	Heat-Flow Analysis	3
ECIV 101	Introduction to Civil Engineering	3
ECIV 111	Introduction to Engineering Graphics and Visualization	3
ECIV 200	Statics	3
ECIV 201	Computational Methods for Civil Engineering	3
ECIV 210	Dynamics	3
ECIV 220	Mechanics of Solids	3
ECIV 360	Fluid Mechanics	3
ELCT 101	Electrical and Electronics Engineering	1
ENCP 101	Introduction to Engineering	3
ENCP 102	Introduction to Computer-Aided Design	3

ENCP 200	Statics	3
ENCP 201	Introduction to Applied Numerical Methods	3
ENCP 210	Dynamics	3
ENCP 260	Introduction to the Mechanics of Solids	3
ENCP 290	Thermodynamic Fundamentals	3
ENCP 330	Introduction to Vibrations	3
ENCP 360	Fluid Mechanics	3
ENCP 491	Capstone Design Project I	3
ENCP 492	Capstone Design Project II	3

4. Major Requirements (43 hours)

Course	Title	Credits
EMCH 310	Dynamics	3
or ENCP 210	Dynamics	
EMCH 332	Kinematics	3
EMCH 354	Heat Transfer	3
EMCH 360	Fluid Mechanics	3
or ENCP 360	Fluid Mechanics	
EMCH 361	Laboratory I	3
EMCH 362	Laboratory II	3
EMCH 367	Controls	3
EMCH 368	Mechatronics	4
EMCH 371	Materials	3
EMCH 377	Manufacturing	3
EMCH 380	Project Management	3
EMCH 427	Design I	3
EMCH 428	Design II	3
Mechanical Design elective:		
EMCH 327	Machine Design	3
or EMCH 394	Applied Thermodynamics	
Total Credit Hours		43

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

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