BACHELOR OF SCIENCE IN MECHANICAL ENGINEERING (BSME) DEGREE

The program leading to the BSME degree is accredited by the Engineering Accreditation Commission (EAC) of ABET, http://www.abet.org.

Program Learning Outcomes (Student Outcomes) for the BSME Degree

Upon completing the BSME degree, students will demonstrate:

1. An ability to apply knowledge of mathematics, science, and engineering.
2. An ability to design and conduct experiments, as well as to analyze and interpret data.
3. An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.
4. An ability to function on multidisciplinary teams.
5. An ability to identify, formulate, and solve engineering problems.
6. An understanding of professional and ethical responsibility.
7. An ability to communicate effectively.
8. The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context.
10. A knowledge of contemporary issues.
11. An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

Program Educational Objectives for the BSME Degree

Within 3-5 years of graduation, Bachelor of Science in Mechanical Engineering (BSME) degree alumni from Rice will be exceptional engineers who are:

1. Successful and on track to become leaders in the global workforce, and/or
2. Students in top-rated post-graduate programs.

Requirements for the BSME Degree

For general university requirements, see Graduation Requirements (ga.rice.edu/undergraduate-students/academic-policies-procedures/graduation-requirements). Students pursuing the BSME degree must complete:

- A minimum of 36 courses (94 credit hours) to satisfy major requirements.
- A minimum of 132 credit hours to satisfy degree requirements.
- A minimum of 21 courses (57 credit hours) taken at the 300-level or above.

The BSME degree prepares students for the professional practice of engineering. The degree program’s goals and objectives are available on the departmental website. Lists of representative undergraduate courses and the usual order in which they are taken are available from the department.

The courses listed below satisfy the requirements for this major. In certain instances, courses not on this official list may be substituted upon approval of the major’s academic advisor (or official certifier). Students and their academic advisors should identify and clearly document the courses to be taken.

### Summary

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credit Hours</th>
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<tbody>
<tr>
<td></td>
<td>Total Credit Hours Required for the Major in Mechanical Engineering</td>
<td>94</td>
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<tr>
<td></td>
<td>Total Credit Hours Required for the BSME Degree</td>
<td>132</td>
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### Degree Requirements

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<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credit Hours</th>
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<tbody>
<tr>
<td></td>
<td>Core Requirements</td>
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<tr>
<td></td>
<td>Basic Math and Science Courses (Required Pre-Requisites)</td>
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<tr>
<td>CHEM 121</td>
<td>GENERAL CHEMISTRY I &amp; GENERAL CHEMISTRY LABORATORY I</td>
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<tr>
<td>CHEM 122</td>
<td>GENERAL CHEMISTRY II &amp; GENERAL CHEMISTRY LABORATORY II</td>
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<td>MATH 101</td>
<td>SINGLE VARIABLE CALCULUS I</td>
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<tr>
<td>MATH 102</td>
<td>SINGLE VARIABLE CALCULUS II</td>
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<tr>
<td>MATH 211</td>
<td>ORDINARY DIFFERENTIAL EQUATIONS AND LINEAR ALGEBRA</td>
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<td>MATH 212</td>
<td>MULTIVARIABLE CALCULUS</td>
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<td>MSNE 301</td>
<td>MATERIALS SCIENCE</td>
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<td>PHYS 101</td>
<td>MECHANICS (WITH LAB) &amp; MECHANICS DISCUSSION</td>
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<tr>
<td>PHYS 102</td>
<td>ELECTRICITY &amp; MAGNETISM (WITH LAB) &amp; ELECTRICITY AND MAGNETISM DISCUSSION</td>
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<tr>
<td></td>
<td>Computational and Applied Mathematics</td>
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<td>CAAM 210</td>
<td>INTRODUCTION TO ENGINEERING COMPUTATION</td>
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<td>CAAM 335</td>
<td>MATRIX ANALYSIS</td>
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<td>CAAM 336</td>
<td>DIFFERENTIAL EQUATIONS IN SCIENCE AND ENGINEERING</td>
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<td>Senior Design</td>
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<td>MECH 407</td>
<td>CAPSTONE DESIGN PROJECT I</td>
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<tr>
<td>MECH 408</td>
<td>CAPSTONE DESIGN PROJECT II</td>
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<td>Laboratory Courses</td>
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<td>MECH 331</td>
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<td>MECH 332</td>
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<tr>
<td>MECH 431</td>
<td>SENIOR LABORATORY I</td>
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<td>MECH 200</td>
<td>CLASSICAL THERMODYNAMICS</td>
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MECH 211 / CEVE 211  
ENGINEERING MECHANICS 3

MECH 311 / CEVE 311  
MECHANICS OF SOLIDS AND STRUCTURES 3

MECH 343  
MODELING OF DYNAMIC SYSTEMS 4

MECH 371  
FLUID MECHANICS I 3

MECH 401  
MECHANICAL DESIGN APPLICATIONS 3

MECH 412  
VIBRATIONS 3

MECH 420 / ELEC 436  
FUNDAMENTALS OF CONTROL SYSTEMS 3

MECH 472  
THERMAL SYSTEMS DESIGN 3

MECH 481  
HEAT TRANSFER 3

Elective Requirements

Limited Electives

Select 1 from the following: 3

- STAT 305  INTRODUCTION TO STATISTICS FOR BIOSCIENCES
- STAT 310 / ECON 307  PROBABILITY AND STATISTICS

Technical Electives 2

Group A

Select 2 from the following: 6

- MECH 400 / CEVE 400  ADVANCED MECHANICS OF MATERIALS
- MECH 403  COMPUTER AIDED DESIGN
- MECH 411  DYNAMICS AND CONTROL OF MECHANICAL SYSTEMS
- MECH 417 / CEVE 417  FINITE ELEMENT ANALYSIS
- MECH 454 / BIOE 454 / CEVE 454  COMPUTATIONAL FLUID MECHANICS
- MECH 474  ADVANCED COMPUTATIONAL MECHANICS OR MECH 554: COMPUTATIONAL FLUID-STRUCTURE INTERACTION
- MECH 488  DESIGN OF MECHATRONIC SYSTEMS
- MECH 498 / COMP 498 / ELEC 499  INTRODUCTION TO ROBOTICS
- MECH 594  INTRODUCTION TO AERONAUTICS
- MSNE 402  MECH PROPERTIES OF MATERIALS

Group B

Select an additional course from Group A or 1 course at the 300-level or above from School of Engineering departmental course offering, including any ENGI course offerings. 3

Total Credit Hours Required for the Major in Mechanical Engineering 94

University Graduation Requirements (ga.rice.edu/undergraduate-students/academic-policies-procedures/graduation-requirements) 38

Total Credit Hours 132

Footnotes and Additional Information

* Includes coursework completed as distribution credit, FWIS, LPAP, upper-level, residency (hours taken at Rice), 60 hours outside of the major (if applicable), and any additional academic program requirements. The “hours outside of the major” requirement may include all of the above university requirements.

1 During their senior year, mechanical engineering students in the BSME program complete these courses in design application while completing a major design project.

2 Students must complete a total of 3 technical electives (9 credit hours). A minimum of two of these courses must come from Group A. The remaining course can come from Group A or B. Group A courses are fundamental courses in the following focus areas: aerospace engineering (AE), computational engineering (CompE), fluid mechanics and thermal science (FT), solid mechanics and materials (SMM), and system dynamics and control (SDC). Group B courses are additional technical electives that complement the focus areas listed above.

Policies for the BSME Degree

Transfer Credit

For Rice University’s policy regarding transfer credit, see Transfer Credit (ga.rice.edu/undergraduate-students/academic-policies-procedures/transfer-credit). Some departments and programs have additional restrictions on transfer credit. The Office of Academic Advising maintains the university’s official list of transfer credit advisors on their website: http://oaa.rice.edu. Students are encouraged to meet with their academic program’s transfer credit advisor when considering transfer credit possibilities.

Departmental Transfer Credit Guidelines

Students pursuing the BSME degree should be aware of the following departmental transfer credit guidelines:

- Requests for transfer credit will be considered by the program director (and/or the program’s official transfer credit advisor) on an individual case-by-case basis.

For additional information, please see the Mechanical Engineering website: https://mech.rice.edu/

Opportunities for the BSME Degree

Academic Honors

The university recognizes academic excellence achieved over an undergraduate’s academic history at Rice. For information on university honors, please see Latin Honors (ga.rice.edu/undergraduate-students/honors-distinctions/university) (summa cum laude, magna cum laude, and cum laude) and Distinction in Research and Creative Work (ga.rice.edu/undergraduate-students/honors-distinctions/university). Some departments have department-specific Honors awards or designations.

Fifth-Year MME Degree Option for Rice Undergraduates

Rice undergraduate students have the option to earn the Master of Mechanical Engineering (MME) degree by adding an additional year after completing their bachelor’s degree. Advanced Rice undergraduate students in good academic standing may apply to the graduate program during their junior or senior year. Upon acceptance, depending on course load, financial aid status, and other variables, they may complete part of the course requirements for the MME program during their senior
year. A plan of study based on their particular focus area will need to be approved by the program director and the MME advisor.

As part of this option and opportunity, Rice undergraduate students:

- must complete the requirements for their bachelor’s degree and the MME degree independently of each other (i.e. no course may be counted toward the fulfillment of both degrees).
- should be aware of the financial aid implications, if the conversion of undergraduate coursework to that of graduate level reduces their earned undergraduate credit for any semester below that of full-time status (12 credit hours).

For additional information, please see the Mechanical Engineering website: https://mech.rice.edu/