MECHANICAL ENGINEERING, BS

REQUIREMENTS

UNIVERSITY GENERAL EDUCATION REQUIREMENTS

All undergraduate students at the University of Wisconsin–Madison are required to fulfill a minimum set of common university general education requirements to ensure that every graduate acquires the essential core of an undergraduate education. This core establishes a foundation for living a productive life, being a citizen of the world, appreciating aesthetic values, and engaging in lifelong learning in a continually changing world. Various schools and colleges will have requirements in addition to the requirements listed below. Consult your advisor for assistance, as needed. For additional information, see the university Undergraduate General Education Requirements (http://guide.wisc.edu/undergraduate/#requirementsforundergraduatestudytext) section of the Guide.

General Education

- Breadth—Humanities/Literature/Arts: 6 credits
- Breadth—Natural Science: 4 to 6 credits, consisting of one 4- or 5-credit course with a laboratory component; or two courses providing a total of 6 credits
- Breadth—Social Studies: 3 credits
- Communication Part A Part B *
- Ethnic Studies *
- Quantitative Reasoning Part A Part B *

* The mortarboard symbol appears before the title of any course that fulfills one of the Communication Part A or Part B, Ethnic Studies, or Quantitative Reasoning Part A or Part B requirements.

SUMMARY OF REQUIREMENTS

The following curriculum applies to students admitted to the Mechanical Engineering degree program.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 221</td>
<td>Calculus and Analytic Geometry 1</td>
<td>5</td>
</tr>
<tr>
<td>MATH 222</td>
<td>Calculus and Analytic Geometry 2</td>
<td>4</td>
</tr>
<tr>
<td>MATH 234</td>
<td>Calculus—Functions of Several Variables</td>
<td>4</td>
</tr>
<tr>
<td>MATH 320</td>
<td>Linear Algebra and Differential Equations</td>
<td>3</td>
</tr>
<tr>
<td>STAT 324</td>
<td>Introductory Applied Statistics for Engineers</td>
<td>3</td>
</tr>
<tr>
<td>or I SY E 210</td>
<td>Introduction to Industrial Statistics</td>
<td></td>
</tr>
</tbody>
</table>

Total Credits 19

1 All students must have the equivalent of the above courses. If the above requirement is fulfilled with fewer than 19 credits, additional math/science credits may be needed to meet the math/science auxiliary credit condition.

Transfer students may fulfill the statistics requirement with other statistics courses having a calculus prerequisite and the approval of the mechanical engineering department via a Course Substitution Form.

BASIC SCIENCE

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 103</td>
<td>General Chemistry I</td>
<td></td>
</tr>
<tr>
<td>CHEM 109</td>
<td>Advanced General Chemistry</td>
<td></td>
</tr>
<tr>
<td>COMP SCI 220</td>
<td>Data Science Programming I</td>
<td>4</td>
</tr>
<tr>
<td>PHYSICS 202</td>
<td>General Physics 2</td>
<td>5</td>
</tr>
</tbody>
</table>

Total Credits 13-14

1 Basic science courses, excluding Computer Science courses, are included in the math/science auxiliary credit condition.

2 Students following the normal ME course sequence need not take PHYSICS 201 General Physics to satisfy the prerequisites for PHYSICS 202 General Physics.

NON-MECHANICAL ENGINEERING

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>E M A 201</td>
<td>Statics (with a grade of C or better)</td>
<td>3</td>
</tr>
<tr>
<td>M S &amp; E 350</td>
<td>Introduction to Materials Science</td>
<td>3</td>
</tr>
</tbody>
</table>

Total Credits 6

MECHANICAL ENGINEERING CORE

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>E M A 202</td>
<td>Dynamics (with a grade of C or better)</td>
<td>3</td>
</tr>
<tr>
<td>E M A 303</td>
<td>Mechanics of Materials (with a grade of C or better)</td>
<td>3</td>
</tr>
<tr>
<td>M E 201</td>
<td>Introduction to Mechanical Engineering</td>
<td>3</td>
</tr>
<tr>
<td>M E 231</td>
<td>Geometric Modeling for Design and Manufacturing</td>
<td>3</td>
</tr>
<tr>
<td>M E/E M A 307</td>
<td>Mechanics of Materials Lab</td>
<td>1</td>
</tr>
<tr>
<td>M E 310</td>
<td>Manufacturing: Polymer Processing and Engineering</td>
<td>3</td>
</tr>
<tr>
<td>M E 311</td>
<td>Manufacturing: Metals and Automation</td>
<td>3</td>
</tr>
<tr>
<td>M E 331</td>
<td>Computer-Aided Engineering</td>
<td>3</td>
</tr>
<tr>
<td>M E 340</td>
<td>Dynamic Systems</td>
<td>3</td>
</tr>
<tr>
<td>Code</td>
<td>Title</td>
<td>Credits</td>
</tr>
<tr>
<td>-----------</td>
<td>-------------------------------------------------</td>
<td>---------</td>
</tr>
<tr>
<td>M E 342</td>
<td>Design of Machine Elements</td>
<td>3</td>
</tr>
<tr>
<td>M E 351</td>
<td>Interdisciplinary Experiential Design Projects I</td>
<td>6</td>
</tr>
<tr>
<td>&amp; M E 352</td>
<td>and Interdisciplinary Experiential Design Projects II</td>
<td>6</td>
</tr>
<tr>
<td>M E 361</td>
<td>Thermodynamics (with a grade of C or better)</td>
<td>3</td>
</tr>
<tr>
<td>M E 363</td>
<td>Fluid Dynamics</td>
<td>3</td>
</tr>
<tr>
<td>M E 364</td>
<td>Elementary Heat Transfer</td>
<td>3</td>
</tr>
<tr>
<td>M E 368</td>
<td>Engineering Measurements and Instrumentation</td>
<td>4</td>
</tr>
<tr>
<td>M E 370</td>
<td>Energy Systems Laboratory</td>
<td>3</td>
</tr>
<tr>
<td>M E 376</td>
<td>Introduction to Mechatronics</td>
<td>4</td>
</tr>
<tr>
<td>CNSR SCI 657</td>
<td>Consumer Behavior</td>
<td>3</td>
</tr>
<tr>
<td>COMP SCI 300</td>
<td>Programming II</td>
<td>3</td>
</tr>
<tr>
<td>COMP SCI 320</td>
<td>Data Science Programming II</td>
<td>4</td>
</tr>
<tr>
<td>COMP SCI/ E C E 354</td>
<td>Machine Organization and Programming</td>
<td>3</td>
</tr>
<tr>
<td>DS 341</td>
<td>Design Thinking for Transformation</td>
<td>3</td>
</tr>
<tr>
<td>E C E 320</td>
<td>Electrodynamics II</td>
<td>3</td>
</tr>
<tr>
<td>E C E 330</td>
<td>Signals and Systems</td>
<td>3</td>
</tr>
<tr>
<td>E C E 340</td>
<td>Electronic Circuits I</td>
<td>3</td>
</tr>
<tr>
<td>E C E 342</td>
<td>Electronic Circuits II</td>
<td>3</td>
</tr>
<tr>
<td>E C E/ COMP SCI 352</td>
<td>Digital System Fundamentals</td>
<td>3</td>
</tr>
<tr>
<td>E C E 353</td>
<td>Introduction to Microprocessor Systems</td>
<td>3</td>
</tr>
<tr>
<td>E C E/ COMP SCI 354</td>
<td>Machine Organization and Programming</td>
<td>3</td>
</tr>
<tr>
<td>E C E 355</td>
<td>Electromechanical Energy Conversion</td>
<td>3</td>
</tr>
<tr>
<td>E C E 356</td>
<td>Electric Power Processing for Alternative Energy Systems</td>
<td>3</td>
</tr>
<tr>
<td>E P 272</td>
<td>Engineering Problem Solving Using Maple</td>
<td>1</td>
</tr>
<tr>
<td>E P D 660</td>
<td>Core Competencies of Sustainability</td>
<td>3</td>
</tr>
<tr>
<td>INFO SYS 371</td>
<td>Technology of Computer-Based Business Systems</td>
<td>3</td>
</tr>
<tr>
<td>INTEREGR 303</td>
<td>Applied Leadership Competencies in Engineering</td>
<td>3</td>
</tr>
<tr>
<td>I SY E 315</td>
<td>Production Planning and Control</td>
<td>3</td>
</tr>
<tr>
<td>I SY E 323</td>
<td>Operations Research-Deterministic Modeling</td>
<td>3</td>
</tr>
<tr>
<td>I SY E 348</td>
<td>Introduction to Human Factors Engineering Laboratory</td>
<td>1</td>
</tr>
<tr>
<td>I SY E/PSYCH 349</td>
<td>Introduction to Human Factors</td>
<td>3</td>
</tr>
<tr>
<td>MATH 321</td>
<td>Applied Mathematical Analysis</td>
<td>3</td>
</tr>
<tr>
<td>MATH 322</td>
<td>Applied Mathematical Analysis</td>
<td>3</td>
</tr>
<tr>
<td>M E 273</td>
<td>Engineering Problem Solving with EES</td>
<td>1</td>
</tr>
<tr>
<td>M S &amp; E 330</td>
<td>Thermodynamics of Materials</td>
<td>4</td>
</tr>
<tr>
<td>M S &amp; E 332</td>
<td>Macroprocessing of Materials</td>
<td>3</td>
</tr>
<tr>
<td>M S &amp; E 352</td>
<td>Materials Science-Transformation of Solids</td>
<td>3</td>
</tr>
<tr>
<td>NAV SCI 301</td>
<td>Naval Engineering</td>
<td>3</td>
</tr>
<tr>
<td>N E 305</td>
<td>Fundamentals of Nuclear Engineering</td>
<td>3</td>
</tr>
<tr>
<td>PHYSICS 205</td>
<td>Modern Physics for Engineers</td>
<td>3</td>
</tr>
<tr>
<td>PHYSICS 241</td>
<td>Introduction to Modern Physics</td>
<td>3</td>
</tr>
<tr>
<td>PHYSICS 311</td>
<td>Mechanics</td>
<td>3</td>
</tr>
<tr>
<td>PHYSICS 321</td>
<td>Electric Circuits and Electronics</td>
<td>4</td>
</tr>
<tr>
<td>PHYSICS 322</td>
<td>Electromagnetic Fields</td>
<td>3</td>
</tr>
<tr>
<td>PHYSICS 325</td>
<td>Optics</td>
<td>4</td>
</tr>
<tr>
<td>STAT 311</td>
<td>Introduction to Theory and Methods of Mathematical Statistics I</td>
<td>3</td>
</tr>
<tr>
<td>STAT 312</td>
<td>Introduction to Theory and Methods of Mathematical Statistics II</td>
<td>3</td>
</tr>
<tr>
<td>STAT 333</td>
<td>Applied Regression Analysis</td>
<td>3</td>
</tr>
</tbody>
</table>
Up to 3 technical elective credits may be obtained for non-formal courses such as independent study courses (M E 489, M E 491, M E 492, and other engineering independent study courses numbered 399 and higher); Cooperative Education (M E 1); and E P D 690, "Wisconsin Engineer Magazine." Students may propose a course that they feel will benefit their mechanical engineering education path. To be a strong candidate, the proposed course should have pre-requisites of two physics or calculus courses. For these courses, the ME curriculum committee will review the request and if approved, recommend a DARS substitution.

MATH/SCIENCE ELECTIVES

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>The mechanical engineering curriculum requires 3 credits of math/science electives. CHEM 104 or CHEM 109, any formal course listed as a biological science and numbered 100 or higher, any non-engineering formal course listed with physical or natural science breadth and numbered 200 or higher will satisfy this requirement. If the math/science auxiliary credit condition is met with additional coursework, the math/science elective requirement may be met with a formal course offered by an engineering department numbered 200 and above (except INTEREGR and E P D).</td>
<td></td>
</tr>
</tbody>
</table>

Total Credits 3

COMMUNICATION SKILLS

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 100</td>
<td>Introduction to College Composition</td>
<td>3</td>
</tr>
<tr>
<td>or LSC 100</td>
<td>Science and Storytelling</td>
<td></td>
</tr>
<tr>
<td>or COM ARTS 100</td>
<td>Introduction to Speech Composition</td>
<td></td>
</tr>
<tr>
<td>or ESL 118</td>
<td>Academic Writing II</td>
<td></td>
</tr>
<tr>
<td>INTEREGR 397</td>
<td>Engineering Communication</td>
<td>3</td>
</tr>
</tbody>
</table>

Total Credits 6

LIBERAL ELECTIVES

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>The Mechanical Engineering curriculum requires 15 credits of liberal elective courses. See College of Engineering Liberal Studies Requirements for details. Complete Requirements (<a href="http://guide.wisc.edu/undergraduate/engineering/#requirementtext">http://guide.wisc.edu/undergraduate/engineering/#requirementtext</a>)</td>
<td></td>
</tr>
</tbody>
</table>

Total Credits 15

ADDITIONAL INFORMATION

Students fulfilling all course requirements with fewer than 128 credits must comply with the credit minimum by taking additional free elective credits. Students must meet the math/science auxiliary credit condition with a minimum of 30 credits. Students in good academic standing may take free elective courses pass/fail (see the College of Engineering Official Regulations (http://guide.wisc.edu/undergraduate/engineering/#policiesandregulationstext) for details). Pass/fail courses do not count toward specific degree requirements.

Independent Studies and projects courses:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>M E 291</td>
<td>Undergraduate Mechanical Engineering Projects</td>
<td>1-3</td>
</tr>
<tr>
<td>M E 299</td>
<td>Independent Study</td>
<td>1-3</td>
</tr>
<tr>
<td>M E 489</td>
<td>Honors in Research</td>
<td>1-3</td>
</tr>
<tr>
<td>M E 491</td>
<td>Mechanical Engineering Projects I</td>
<td>1-3</td>
</tr>
<tr>
<td>M E 492</td>
<td>Mechanical Engineering Projects II</td>
<td>1-3</td>
</tr>
</tbody>
</table>

Students must have a cumulative 2.5 GPA or a 3.0 GPA for their previous two semesters and have written permission to enroll from their research advisor.

For information on credit loads, adding or dropping courses, course substitutions, pass/fail, auditing courses, dean’s honor list, repeating courses, probation, and graduation, see the College of Engineering Official Regulations (http://guide.wisc.edu/undergraduate/engineering/#policiesandregulationstext).

HONORS IN RESEARCH PROGRAM

The ME Department’s Undergraduate Honors in Research Program allows students to participate in the creation of new knowledge and experience the excitement of the research process. Students in the program write and submit a senior thesis. Admission requirements include:

- At least two semesters completed on the Madison campus with a cumulative GPA of at least 3.5;
- Majoring in Mechanical Engineering;
- Approval of an appropriate professor who will serve as the thesis advisor.

The "Honors in Research" designation will be awarded to graduates who meet the following requirements:

- Satisfaction of the requirements for an undergraduate degree in Mechanical Engineering;
- A cumulative GPA of at least 3.3;
- Completion of a total of at least 6 credits of M E 489 Honors in Research;
- Receive a final grade of at least "B" in M E 489;
- Completion of senior thesis.

Students must certify completion of the program with their M E 489 advisor the term they intend to graduate. To certify program completion students must complete the appropriate form and submit to student services.

UNIVERSITY DEGREE REQUIREMENTS

To receive a bachelor's degree from UW–Madison, students must earn a minimum of 120 degree credits. The requirements for some programs may exceed 120 degree credits. Students should consult with their college or department advisor for information on specific credit requirements.
<table>
<thead>
<tr>
<th>Residency</th>
<th>Degree candidates are required to earn a minimum of 30 credits in residence at UW–Madison. &quot;In residence&quot; means on the UW–Madison campus with an undergraduate degree classification. &quot;In residence&quot; credit also includes UW–Madison courses offered in distance or online formats and credits earned in UW–Madison Study Abroad/Study Away programs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quality of Work</td>
<td>Undergraduate students must maintain the minimum grade point average specified by the school, college, or academic program to remain in good academic standing. Students whose academic performance drops below these minimum thresholds will be placed on academic probation.</td>
</tr>
</tbody>
</table>