MECHANICAL ENGINEERING, B.S. (ALTOONA)

Begin Campus: Any Penn State Campus

End Campus: Altoona

Degree Requirements

For the Bachelor of Science degree in Mechanical Engineering, a minimum of 131 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>113-114</td>
</tr>
</tbody>
</table>

27 of the 45 credits for General Education are included in the Requirements for the Major. This includes: 9 credits of GN courses; 6 credits of GQ courses; 3 credits of GS courses; 9 credits of GWS courses.

Requirements for the Major

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (https://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>IE 312</td>
<td>Product Design and Manufacturing Processes</td>
<td>3</td>
</tr>
<tr>
<td>MATH 231</td>
<td>Calculus of Several Variables</td>
<td>2</td>
</tr>
<tr>
<td>MATSE 259</td>
<td>Properties and Processing of Engineering Materials</td>
<td>3</td>
</tr>
<tr>
<td>ME 390</td>
<td>Academic and Career Development for Mechanical Engineers</td>
<td>0.5</td>
</tr>
<tr>
<td>ME 490</td>
<td>Professional Development for Mechanical Engineers</td>
<td>0.5</td>
</tr>
</tbody>
</table>

Prescribed Courses: Require a grade of C or better

- CHEM 110 Chemical Principles I
- EDSGN 100 Cornerstone Engineering Design
- EMCH 211 Statics
- EMCH 212 Dynamics
- EMCH 213 Strength of Materials
- ENGL 202C Effective Writing: Technical Writing
- MATH 140 Calculus With Analytic Geometry I
- MATH 141 Calculus with Analytic Geometry II
- MATH 220 Matrices
- MATH 251 Ordinary and Partial Differential Equations
- ME 300 Engineering Thermodynamics I
- ME 320 Fluid Flow
- ME 330 Computational Tools
- ME 340 Mechanical Engineering Design Methodology
- ME 348 Circuit Analysis, Instrumentation, and Statistics
- ME 360 Mechanical Design
- ME 370 Vibration of Mechanical Systems
- ME 410 Heat Transfer
- ME 435 Mechanical Engineering Systems Lab
- ME 450 Modeling of Dynamic Systems
- ME 454 Mechatronics
- PHYS 211 General Physics: Mechanics
- PHYS 212 General Physics: Electricity and Magnetism

Additional Courses

Select 1 credit of First-Year Seminar

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<tr>
<th>Code</th>
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</tr>
</thead>
<tbody>
<tr>
<td>CMPSC 200</td>
<td>Programming for Engineers with MATLAB</td>
<td>3</td>
</tr>
<tr>
<td>or CMPSC 201</td>
<td>Programming for Engineers with C++</td>
<td>3</td>
</tr>
<tr>
<td>ME 440W</td>
<td>Mechanical Systems Design Project</td>
<td>3</td>
</tr>
<tr>
<td>or ME 441W</td>
<td>Thermal Systems Design Project</td>
<td>3</td>
</tr>
</tbody>
</table>

Select 3 credits from the following:

- BIOL 141 Introduction to Human Physiology
- BIOL 161 Human Anatomy and Physiology I - Lecture
- CHEM 111 & PHYS 214 Experimental Chemistry I and General Physics: Wave Motion and Quantum Physics
- CHEM 112 Chemical Principles II

Select 3 credits from the following:

- ECON 14 Principles of Economics
- ECON 102 Introductory Microeconomic Analysis and Policy
- ECON 104 Introductory Macroeconomic Analysis and Policy

Additional Courses: Require a grade of C or better

- CAS 100A Effective Speech
- or CAS 100B Effective Speech
- ENGL 15 Rhetoric and Composition
- or ENGL 30H Honors Rhetoric and Composition

Supporting Courses and Related Areas

Select 3 credits in a 400-level ME Technical Elective course from department list excluding ME 410, ME 435, ME 440W, ME 441W, ME 442W, ME 443W, ME 444, ME 445, ME 450, ME 454, ME 490, ME 494, and ME 496

Select 6 credits in Engineering Technical Elective courses from department list

Select 3 credits in General Technical Elective courses from department list

1 Three rotations of Engr Co-op (ENGR 295, ENGR 395, and ENGR 495) can be used as 3 credits of GTE.

2 Students who complete Basic ROTC may substitute 6 ROTC credits for 3 credits of GTE and 3 credits of GHW.

General Education

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (https://bulletins.psu.edu/undergraduate/general-education/baccalaureate-degree-general-education-program/) section of the Bulletin and consult your academic adviser.
The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

**Foundations** (grade of C or better is required and Inter-Domain courses do not meet this requirement.)
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

**Breadth in the Knowledge Domains** (Inter-Domain courses do not meet this requirement.)
- Arts (GA): 3 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 3 credits
- Social and Behavioral Sciences (GS): 3 credits
- Natural Sciences (GN): 3 credits

**Integrative Studies**
- Inter-Domain Courses (Inter-Domain): 6 credits

**Exploration**
- GN, may be completed with Inter-Domain courses: 3 credits
- GA, GH, GN, GS, Inter-Domain courses. This may include 3 credits of World Language course work beyond the 12th credit level or the requirements for the student's degree program, whichever is higher: 6 credits

**University Degree Requirements**

**First Year Engagement**
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

**Cultures Requirement**
6 credits are required and may satisfy other requirements
- United States Cultures: 3 credits
- International Cultures: 3 credits

**Writing Across the Curriculum**
3 credits required from the college of graduation and likely prescribed as part of major requirements.

**Total Minimum Credits**
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

**Quality of Work**
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

**Limitations on Source and Time for Credit Acquisition**
The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (https://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#83-80)). For more information, check the Suggested Academic Plan for your intended program.