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.

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.)
- Quantification (GQ): 6 credits
- Writing and Speaking (GWS): 9 credits

Knowledge Domains
- Arts (GA): 6 credits
- Health and Wellness (GHW): 3 credits
- Humanities (GH): 6 credits
- Social and Behavioral Sciences (GS): 6 credits
- Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
- Inter-Domain or Approved Linked Courses: 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 (http://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.

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 (http://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>
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<tbody>
<tr>
<td>CMPSC 200</td>
<td>Programming for Engineers with MATLAB</td>
<td>3</td>
</tr>
<tr>
<td>IE 312</td>
<td>Product Design and Manufacturing Processes</td>
<td>3</td>
</tr>
<tr>
<td>MATH 220</td>
<td>Matrices</td>
<td>2-3</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>
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Prescribed Courses: Require a grade of C or better

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<tr>
<td>CHEM 110</td>
<td>Chemical Principles I</td>
<td>3</td>
</tr>
<tr>
<td>EDSGN 100</td>
<td>Cornerstone Engineering Design</td>
<td>3</td>
</tr>
<tr>
<td>EMCH 211</td>
<td>Statics</td>
<td>3</td>
</tr>
</tbody>
</table>
EMCH 212  Dynamics                              3
EMCH 213  Strength of Materials                 3
ENGL 202C  Effective Writing: Technical Writing 3
MATH 140  Calculus With Analytic Geometry I    4
MATH 141  Calculus with Analytic Geometry II   4
MATH 251  Ordinary and Partial Differential Equations 4
ME 300    Engineering Thermodynamics I          3
ME 320    Fluid Flow                            3
ME 330    Computational Tools                   3
ME 340    Mechanical Engineering Design Methodology 3
ME 348    Circuit Analysis, Instrumentation, and Statistics 4
ME 360    Mechanical Design                      3
ME 370    Vibration of Mechanical Systems        3
ME 410    Heat Transfer                          3
ME 450    Modeling of Dynamic Systems            3
ME 454    Mechatronics                           3
PHYS 211  General Physics: Mechanics            4
PHYS 212  General Physics: Electricity and Magnetism 4

Additional Courses
Select 1 credit of First-Year Seminar        1
Select 3 credits from the following:          3
   BIOL 141  Introduction to Human Physiology
   CHEM 111  Experimental Chemistry I
   & PHYS 214 and General Physics: Wave Motion and Quantum Physics
   CHEM 112  Chemical Principles II
Select 3 credits from the following:          3
   ECON 14   Principles of Economics
   ECON 102  Introductory Microeconomic Analysis and Policy
   ECON 104  Introductory Macroeconomic Analysis and Policy
Select 3 credits from the following:          3
   ME 440W   Mechanical Systems Design Project
   ME 441W   Thermal Systems Design Project
   ME 442W   Advanced Vehicle Design I
   & ME 443W and Advanced Vehicle Design II
Select 2 credits from the following:          2
   EMCH 316  Experimental Determination of Mechanical Response of Materials
   ME 315    Heat Transfer Laboratory
   ME 325    Fluids Laboratory
   ME 355    Dynamic Systems Laboratory
   ME 375    Vibrations Laboratory

Additional Courses: Require a grade of C or better
   CAS 100  Effective Speech
   or 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 440W, ME 441W, ME 442W, ME 443W, 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 \(^1,2\)

\(^1\) 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 of the ROTC credits for 3 credits of GTE and 3 credits of GHW.