CHEMICAL ENGINEERING, B.S.

Begin Campus: Any Penn State Campus

End Campus: University Park

Degree Requirements
For the Bachelor of Science degree in Chemical Engineering, a minimum of 133 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>115</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/82-00-083-00-degree-requirements/82-44](https://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-083-00-degree-requirements/82-44)).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BMB 251</td>
<td>Molecular and Cell Biology I</td>
<td>3</td>
</tr>
<tr>
<td>CHE 230</td>
<td>Computational Tools for Chemical Engineering</td>
<td>1</td>
</tr>
<tr>
<td>CHE 300</td>
<td>Professional Development Seminar</td>
<td>1</td>
</tr>
<tr>
<td>CHE 340</td>
<td>Introduction to Biomolecular Engineering</td>
<td>3</td>
</tr>
<tr>
<td>CHE 452</td>
<td>Chemical Process Safety</td>
<td>3</td>
</tr>
<tr>
<td>CHE 470</td>
<td>Design of Chemical Plants</td>
<td>3</td>
</tr>
<tr>
<td>CHE 480W</td>
<td>Chemical Engineering Laboratory</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 111</td>
<td>Experimental Chemistry I</td>
<td>1</td>
</tr>
<tr>
<td>CHEM 112</td>
<td>Chemical Principles II</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 113</td>
<td>Experimental Chemistry II</td>
<td>1</td>
</tr>
<tr>
<td>CHEM 210</td>
<td>Organic Chemistry I</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 212</td>
<td>Organic Chemistry II</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 213</td>
<td>Laboratory in Organic Chemistry</td>
<td>2</td>
</tr>
<tr>
<td>CHEM 457</td>
<td>Experimental Physical Chemistry</td>
<td>2</td>
</tr>
<tr>
<td>MATH 231</td>
<td>Calculus of Several Variables</td>
<td>2</td>
</tr>
<tr>
<td>MATH 251</td>
<td>Ordinary and Partial Differential Equations</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 212</td>
<td>General Physics: Electricity and Magnetism</td>
<td>4</td>
</tr>
</tbody>
</table>

Prescribed Courses: Require a grade of C or better

<table>
<thead>
<tr>
<th>Code</th>
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</tr>
</thead>
<tbody>
<tr>
<td>CHE 210</td>
<td>Introduction to Material Balances</td>
<td>3</td>
</tr>
<tr>
<td>CHE 220</td>
<td>Introduction to Chemical Engineering Thermodynamics</td>
<td>3</td>
</tr>
<tr>
<td>CHE 320</td>
<td>Phase and Chemical Equilibria</td>
<td>3</td>
</tr>
<tr>
<td>CHE 330</td>
<td>Process Fluid Mechanics</td>
<td>3</td>
</tr>
<tr>
<td>CHE 350</td>
<td>Process Heat Transfer</td>
<td>3</td>
</tr>
<tr>
<td>CHE 410</td>
<td>Mass Transfer Operations</td>
<td>3</td>
</tr>
<tr>
<td>CHE 430</td>
<td>Chemical Reaction Engineering</td>
<td>3</td>
</tr>
<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>
</tbody>
</table>

Prescribed Courses: Require a grade of C or better

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<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 202C</td>
<td>Effective Writing: Technical Writing</td>
<td>3</td>
</tr>
<tr>
<td>MATH 140</td>
<td>Calculus With Analytic Geometry I</td>
<td>4</td>
</tr>
<tr>
<td>MATH 141</td>
<td>Calculus With Analytic Geometry II</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 211</td>
<td>General Physics: Mechanics</td>
<td>4</td>
</tr>
</tbody>
</table>

Additional Courses
Select 1 credit of First-Year Seminar
Select one of 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

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<thead>
<tr>
<th>Code</th>
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<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAS 100A</td>
<td>Effective Speech</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 15</td>
<td>Rhetoric and Composition</td>
<td>3</td>
</tr>
</tbody>
</table>

Supporting Courses and Related Areas
Select 3 credits of physical chemistry from departmental list
Select 3 credits of materials elective from departmental list
Select 6 credits in 400-level chemical engineering electives from departmental list
Select 3 credits of approved engineering electives from departmental list
Select 6 credits of professional electives from departmental list

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/](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.

<table>
<thead>
<tr>
<th>Foundation</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quantification (GQ):</td>
<td>6</td>
</tr>
<tr>
<td>Writing and Speaking (GWS):</td>
<td>9</td>
</tr>
<tr>
<td>Arts (GA):</td>
<td>3</td>
</tr>
<tr>
<td>Health and Wellness (GHW):</td>
<td>3</td>
</tr>
<tr>
<td>Humanities (GH):</td>
<td>3</td>
</tr>
<tr>
<td>Social and Behavioral Sciences (GS):</td>
<td>3</td>
</tr>
<tr>
<td>Natural Sciences (GN):</td>
<td>3</td>
</tr>
</tbody>
</table>
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.