CHEMICAL ENGINEERING (BS)

This program was approved for students entering the university in the Summer 2019—Spring 2020 catalog year. For more information about catalog year, go to Catalog Year Information (http://catalog.louisville.edu/undergraduate/university-wide-unit-specific-policies/catalog-year).

Bachelor of Science in Chemical Engineering
Unit: Speed School of Engineering (https://engineering.louisville.edu)
Department: Chemical Engineering (https://engineering.louisville.edu/chemical)
Academic Plan Code(s): CHE_BCH

Program Information
Students specializing in Chemical Engineering will complete a program consisting of two semesters in Engineering Fundamentals and a further period of study in the Department of Chemical Engineering to complete the Bachelor of Science degree, followed by a fifth year in Graduate Studies for the Master of Engineering degree. This curriculum is designed as an integrated five-year program, with a cooperative education component, culminating in the Master of Engineering degree.


Degree Summary

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>General Education Requirements (<a href="http://catalog.louisville.edu/undergraduate/general-education-requirements">http://catalog.louisville.edu/undergraduate/general-education-requirements</a>)</td>
<td>31</td>
</tr>
<tr>
<td></td>
<td>(19-22 hours of General Education requirements may be satisfied through coursework required by the degree program)</td>
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<tr>
<td>Code</td>
<td>Title</td>
<td>Hours</td>
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<td>College/School Requirements</td>
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<td>Program/Major Requirements</td>
<td>77</td>
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<td>Minimum Total Hours</td>
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</table>

Some courses required in this degree program satisfy multiple requirements. To complete the degree in the minimum number of hours listed, some hours from the General Education Requirements must be satisfied by courses defined by the unit and/or program. Using other courses to satisfy General Education requirements will require additional hours to complete the degree requirements. See the Degree Requirements and/or Track tabs for specific coursework.

2 Any one course of PHIL 222, PHIL 225, PHIL 321, PHIL 323, or PHIL 328 satisfies the ChE Department Ethics Elective requirement. However, only PHIL 222 also counts for General Education content requirement in Arts and Humanities (AH).

Specific coursework information can be found on the Degree Requirements tab.

Departmental Admission Requirements
Acceptance into a Department requires that a student have a 2.25 GPA in the prescribed set of courses totaling 32 semester hours in Engineering Fundamentals. In addition, the student must be in good standing (university GPA ≥ 2.25).

General Education Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>General Education Requirements (<a href="http://catalog.louisville.edu/undergraduate/general-education-requirements">http://catalog.louisville.edu/undergraduate/general-education-requirements</a>)</td>
<td>31</td>
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<tr>
<td></td>
<td>The following courses are required by the program and satisfy the respective General Education Requirement(s):</td>
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</tr>
<tr>
<td>CHEM 201</td>
<td>General Chemistry I - S</td>
<td></td>
</tr>
<tr>
<td>CHEM 207</td>
<td>Introduction to Chemical Analysis I - SL</td>
<td></td>
</tr>
<tr>
<td>COMM 111</td>
<td>Introduction to Public Speaking - OC</td>
<td></td>
</tr>
<tr>
<td>or COMM 112</td>
<td>Business and Professional Speaking - OC</td>
<td></td>
</tr>
<tr>
<td>ENGL 101</td>
<td>Introduction to College Writing - WC</td>
<td></td>
</tr>
<tr>
<td>ENGL 102</td>
<td>Intermediate College Writing - WC</td>
<td></td>
</tr>
<tr>
<td>ENGR 101</td>
<td>Engineering Analysis I - QR</td>
<td></td>
</tr>
<tr>
<td>PHIL 222</td>
<td>Contemporary Moral Problems - AH (optional, see note below)</td>
<td></td>
</tr>
<tr>
<td>PHYS 298</td>
<td>Introductory Mechanics, Heat and Sound - S</td>
<td></td>
</tr>
</tbody>
</table>

All degrees require the completion of the University-wide General Education Program (link provided above). To complete the degree in the minimum number of hours listed on the Overview tab, some hours from the General Education Requirements must be satisfied by courses defined by the unit and/or program.

While any one course of PHIL 222, PHIL 225, PHIL 321, PHIL 323, or PHIL 328 satisfies the ChE Department Ethics Elective requirement, only PHIL 222 also counts for the General Education content requirement in Arts and Humanities (AH).

College/School Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 201</td>
<td>General Chemistry I - S</td>
<td>3</td>
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<tr>
<td>CHEM 207</td>
<td>Introduction to Chemical Analysis I - SL</td>
<td>1</td>
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<tr>
<td>COMM 111</td>
<td>Introduction to Public Speaking - OC</td>
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<td>COMM 112</td>
<td>Business and Professional Speaking - OC</td>
<td>3</td>
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<tr>
<td>ENGL 101</td>
<td>Introduction to College Writing - WC</td>
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</tr>
<tr>
<td>ENGR 102</td>
<td>Engineering Analysis I - QR</td>
<td>4</td>
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<tr>
<td>ENGR 110</td>
<td>Engineering Methods, Tools, and Practice I</td>
<td>2</td>
</tr>
<tr>
<td>ENGR 111</td>
<td>Engineering Methods, Tools and Practice II</td>
<td>2</td>
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</tbody>
</table>

1 Some courses required in this degree program satisfy multiple requirements. To complete the degree in the minimum number of hours listed, some hours from the General Education Requirements must be satisfied by courses defined by the unit and/or program. Using other courses to satisfy General Education requirements will require additional hours to complete the degree requirements. See the Degree Requirements and/or Track tabs for specific coursework.
Program/Major Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
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<tbody>
<tr>
<td>CHE 205</td>
<td>Introduction to Chemical Engineering</td>
<td>3</td>
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<tr>
<td>CHE 211</td>
<td>Chemical Engineering Thermodynamics I</td>
<td>3</td>
</tr>
<tr>
<td>CHE 230</td>
<td>Computer Applications in Chemical Engineering</td>
<td>2</td>
</tr>
<tr>
<td>CHE 253</td>
<td>Materials Science</td>
<td>3</td>
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<tr>
<td>CHE 288</td>
<td>Chemical Engineering Cooperative Education Seminar</td>
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<tr>
<td>CHE 289</td>
<td>Chemical Engineering Cooperative Education I</td>
<td>1</td>
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<tr>
<td>CHE 305</td>
<td>Material and Energy Balances</td>
<td>4</td>
</tr>
<tr>
<td>CHE 312</td>
<td>Chemical Engineering Thermodynamics II</td>
<td>3</td>
</tr>
<tr>
<td>CHE 331</td>
<td>Principles of Fluid Dynamics</td>
<td>3</td>
</tr>
<tr>
<td>CHE 389</td>
<td>Chemical Engineering Cooperative Education II</td>
<td>1</td>
</tr>
<tr>
<td>CHE 401</td>
<td>Safety, Health and Environment</td>
<td>1</td>
</tr>
<tr>
<td>CHE 433</td>
<td>Principles of Heat and Mass Transfer</td>
<td>4</td>
</tr>
<tr>
<td>CHE 436</td>
<td>Separation Operations</td>
<td>3</td>
</tr>
<tr>
<td>CHE 441</td>
<td>Kinetics and Chemical Reactions</td>
<td>3</td>
</tr>
<tr>
<td>CHE 461</td>
<td>Elements of Process Control</td>
<td>3</td>
</tr>
<tr>
<td>CHE 471</td>
<td>The Strategy of Design</td>
<td>3</td>
</tr>
<tr>
<td>CHE 485</td>
<td>Unit Operations Laboratory I</td>
<td>2</td>
</tr>
<tr>
<td>CHE 486</td>
<td>Unit Operations Laboratory II</td>
<td>2</td>
</tr>
<tr>
<td>CHE 489</td>
<td>Chemical Engineering Cooperative Education III</td>
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<tr>
<td>CHE 520</td>
<td>Modeling and Transport Phenomena</td>
<td>3</td>
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<tr>
<td>CHE 572</td>
<td>Plant Process and Project Design - CUE</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 202</td>
<td>General Chemistry II - S</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 208</td>
<td>Introduction to Chemical Analysis II - SL</td>
<td>1</td>
</tr>
<tr>
<td>CHEM 209</td>
<td>Introduction to Chemical Analysis III</td>
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</tr>
<tr>
<td>PHYS 295</td>
<td>Introductory Laboratories I - SL</td>
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Supporting Courses

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
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<tbody>
<tr>
<td>CHEM 341</td>
<td>Organic Chemistry I</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 343</td>
<td>Organic Chemistry Laboratory I</td>
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<tr>
<td>IE 360</td>
<td>Probability and Statistics for Engineers</td>
<td>3</td>
</tr>
<tr>
<td>IE 370</td>
<td>Engineering Economic Analysis</td>
<td>3</td>
</tr>
<tr>
<td>Advanced Chemistry or Chemical Engineering Elective (see list below)</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Advanced Science or Chemical Engineering Elective (see list below)</td>
<td>3</td>
<td></td>
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<tr>
<td>Ethics Elective</td>
<td></td>
<td>3</td>
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</table>

Minimum Total Hours 77

Candidates for the Bachelor of Science degree must be in good standing (university GPA ≥ 2.25) and must attain a grade point average of at least 2.25 for all courses used to satisfy degree requirements.

Advanced Chemistry or Chemical Engineering Electives

Select one course from the following list:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
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<tbody>
<tr>
<td>CHEM 342</td>
<td>Organic Chemistry II</td>
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<tr>
<td>CHEM 441</td>
<td>Elements of Physical Chemistry</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 445</td>
<td>Survey of Biochemistry</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 450</td>
<td>Introduction to Computational Chemistry and Molecular Modeling</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 465</td>
<td>Physical Chemistry I</td>
<td>3</td>
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<tr>
<td>CHEM 466</td>
<td>Physical Chemistry II</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 515</td>
<td>Inorganic Chemistry</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 527</td>
<td>Introduction to Separations and Spectroscopy - WR</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 545</td>
<td>Biochemistry I</td>
<td>3</td>
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<tr>
<td>CHEM 550</td>
<td>Group Theory and its Chemical Applications</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 557</td>
<td>Bio-Organic Phenomena</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 572</td>
<td>Plant Process and Project Design - CUE</td>
<td>3</td>
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Advanced Science or Chemical Engineering Elective

Select one course from the following list:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
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<tbody>
<tr>
<td>BIOL 240</td>
<td>Unity of Life - S</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 242</td>
<td>Diversity of Life - S</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 257</td>
<td>Introduction to Microbiology - S</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 329</td>
<td>Cellular and Molecular Biology</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 330</td>
<td>Genetics and Molecular Biology</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 350</td>
<td>Biostatistics</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 342</td>
<td>Organic Chemistry II</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 441</td>
<td>Elements of Physical Chemistry</td>
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<td>CHEM 550</td>
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<td>CHEM 557</td>
<td>Bio-Organic Phenomena</td>
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<td>CHEM 563</td>
<td>Climate Science</td>
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<tr>
<td>GEOS 301</td>
<td>Geology for Scientists and Engineers</td>
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<td>GEOS 360</td>
<td>Global Environmental Change</td>
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<tr>
<td>GEOS 363</td>
<td>Climate Science</td>
<td>3</td>
</tr>
<tr>
<td>GEOS 365</td>
<td>Biogeography</td>
<td>3</td>
</tr>
<tr>
<td>GEOS 564</td>
<td>Hydrology</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 299</td>
<td>Introductory Electricity, Magnetism and Light</td>
<td>4</td>
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</tbody>
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CHEM 5
CHEM 4
CHEM 3
CHEM 2
CHEM 1

Flight Plan

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHE 300</td>
<td>CHEM 300-level or higher non-required CHE course</td>
<td>3</td>
</tr>
</tbody>
</table>

1. This course is a General Education requirement for the program; see louisville.edu/provost/ger/ for the listing, by academic year, of AH/D1/D2/SB/SBH Electives which satisfy the University-wide General Education requirements.

2. Students completing ENGL 105 in lieu of ENGL 101 or ENGL 102 satisfy the General Education and Engineering Fundamentals requirements for Written Communication. However, an additional 3-hr Writing (WR) course or honors Written Communication (WC) course may be needed to satisfy program credit hour requirements.

3. Acceptance into a Department requires that a student have a 2.25 GPA in the prescribed set of courses totaling 32 semester hours in Engineering Fundamentals. In addition, the student must be in good standing (university GPA ≥ 2.25).

4. In order to meet departmental graduation requirements a student may accumulate no more than two D grades in CHE-prefixed courses. Any additional D grades beyond two must be repeated, in accordance with policies on course repetition. If a student accumulates more than one D in any one year of the program, it is strongly recommended that one or more of those courses be repeated to earn a better grade before proceeding to the next course in the sequence.

5. An undergraduate student must receive permission from the department chair in order to enroll in a 600-level course. The course chosen to fulfill this elective requirement cannot be used to satisfy any other program or degree requirements. Note that while some courses are acceptable as either Science or Advanced Chemistry Electives, a single course cannot be used to meet both requirements as the curriculum requires that these two electives constitute a combined total of six (6) credit hours.

6. The course chosen to fulfill this elective requirement cannot be used to satisfy program or degree requirements. Note that while some courses are acceptable as either Science or Advanced Chemistry Electives, a single course cannot be used to meet both requirements as the curriculum requires that these two electives constitute a combined total of six (6) credit hours.

7. Any one course of PHIL 222, PHIL 225, PHIL 321, PHIL 323, or PHIL 328 satisfies the CHE Department Ethics Elective requirement. However, only PHIL 222 also counts for the General Education content requirement in Arts and Humanities (AH).
CHE 471 The Strategy of Design 3
CHE 485 Unit Operations Laboratory I 2
Advanced Science or Chemical Engineering Elective 3
PHIL 222 Contemporary Moral Problems - AH 3

Hours 14

Spring
CHE 461 Elements of Process Control 3
CHE 486 Unit Operations Laboratory II 2
CHE 520 Modeling and Transport Phenomena 3
CHE 572 Plant Process and Project Design - CUE 3
Advanced Chemistry or Chemical Engineering Elective 3

Hours 14

Minimum Total Hours 123

Degree Audit Report
Degree Audit reports illustrate how your completed courses fulfill the requirements of your academic plan. What-if reports allow you to compare the courses you have completed in your current academic plan to the courses required in another academic plan. Should you have questions about either report, please consult with your academic advisor.

To create either report:

1. Log into your ULink account.
2. Click on the Student Services tab.
3. Next, click on "View my Academic Advisement Report" to run a Degree Audit report in the Undergraduate Advising area.
4. To create a What-if report, click on "Create a What-if Advisement Report."

Click here to run a Degree Audit report, or create a What-if report. (https://ulink.louisville.edu)

Flight Planner
Based on your major, the Flight Planner tool may be available for you to create a personalized Flight Plan. The Flight Planner can be found in the ULink Student Center. Consult with your advisor for assistance with the Flight Planner.