CHEMICAL ENGINEERING MAJOR (B.S.)

https://ceps.unh.edu/chemical-engineering/program/bs/chemical-engineering-major

Description

Chemical engineering is concerned with the analysis and design of processes that deal with the transfer and transformation of energy and material. The practice of chemical engineering includes the conception, development, design, and application of physicochemical processes and their products; the development, design, construction, operation, control, and management of plants for these processes; and activities relating to public service, education, and research.

The curriculum prepares students for productive careers in industry or government and provides a foundation for graduate studies. The program emphasizes chemical engineering fundamentals while offering opportunities for focused study in energy, environmental, or bioengineering.

Traditional employment areas in the chemical process industries include industrial chemicals, petroleum and petrochemicals, plastics, pharmaceuticals, metals, textiles, and food. Chemical engineers also are working in increasing numbers in the areas of energy engineering, pollution abatement, and biochemical and biomedical engineering; in addition, they are employed by many government laboratories and agencies as well as private industries and institutions.

Graduates from the program have the ability to apply knowledge of mathematics, science, and engineering to identify, formulate, and solve chemical engineering problems as well as to design and conduct experiments safely and analyze and interpret data. They are prepared to pursue advanced studies in chemical engineering. Program graduates gain a sense of professional and ethical responsibility with the ability to apply environmental, safety, economic, and ethical criteria in the design of engineering processes. They learn to function in individual and group working environments, and learn skills in written and oral communication and the effective use of computers for engineering practice, including information search in the library and on the Internet. They also understand the need for lifelong learning and the significance of societal and global issues relevant to chemical engineering.

A minimum of 129 credits is required for graduation with the degree of bachelor of science in chemical engineering. There are ten electives in the chemical engineering curriculum. Six of these are for the Discovery Program requirements. The remaining four electives should consist of three chemical engineering electives and one additional technical elective.

Students are required to obtain a minimum 2.0 grade-point average in CHE 501 Introduction to Chemical Engineering I-CHE 502 Introduction to Chemical Engineering II and in overall standing at the end of the sophomore year in order to continue in the major. Study abroad (Exchange) chemical engineering students are required to have a cumulative GPA of 3.0 or better in math, physics, chemistry, and CHE courses at the end of the semester prior to their exchange semester.

Degree Plan

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>ENGL 401</td>
<td>First-Year Writing</td>
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<tr>
<td>MATH 425</td>
<td>Calculus I</td>
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<td>CHEM 405</td>
<td>Chemical Principles for Engineers</td>
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<td>CHE 400</td>
<td>Chemical Engineering Lectures</td>
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Spring

<table>
<thead>
<tr>
<th>Course</th>
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<tbody>
<tr>
<td>MATH 426</td>
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Requirements

Required Courses

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<thead>
<tr>
<th>Code</th>
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<tbody>
<tr>
<td>CHE 400</td>
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<td>CHE 501</td>
<td>Introduction to Chemical Engineering I</td>
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<td>CHE 502</td>
<td>Introduction to Chemical Engineering II</td>
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<td>CHE 601</td>
<td>Fluid Mechanics and Unit Operations</td>
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<td>CHE 602</td>
<td>Heat Transfer and Unit Operations</td>
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<td>CHE 603</td>
<td>Applied Mathematics for Chemical Engineers</td>
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<tr>
<td>CHE 604</td>
<td>Chemical Engineering Thermodynamics</td>
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<td>CHE 612</td>
<td>Chemical Engineering Laboratory I</td>
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<tr>
<td>CHE 614</td>
<td>Separation Processes</td>
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<tr>
<td>CHE 703</td>
<td>Mass Transfer and Stagewise Operations</td>
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<td>CHE 707</td>
<td>Chemical Engineering Kinetics</td>
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<tr>
<td>CHE 708</td>
<td>Chemical Engineering Design</td>
<td>4</td>
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<tr>
<td>CHE 713</td>
<td>Chemical Engineering Laboratory II</td>
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<tr>
<td>CHE 752</td>
<td>Process Dynamics and Control</td>
<td>4</td>
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<tr>
<td>CHEM 405</td>
<td>Chemical Principles for Engineers</td>
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<td>Physical Chemistry I</td>
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<td>MATH 527</td>
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<tr>
<td>MATH 644</td>
<td>Statistics for Engineers and Scientists</td>
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<td>PHYS 407</td>
<td>General Physics I</td>
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<tr>
<td>PHYS 408</td>
<td>General Physics II</td>
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Elective Courses

Select three of the following:

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<tr>
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<tbody>
<tr>
<td>CHEM 651</td>
<td>BioTech Experience/Biomanufacturing</td>
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<td>CHEM 705</td>
<td>Fossil Fuels and Renewable Energy Sources</td>
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<td>CHEM 706</td>
<td>Electrochemical Methods for Energy Applications</td>
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<td>Fundamentals of Air Pollution and Its Control</td>
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<td>Introduction to Nuclear Engineering</td>
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<td>CHEM 722</td>
<td>Introduction to Microfluidics</td>
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<td>CHEM 744</td>
<td>Corrosion</td>
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<td>CHEM 762</td>
<td>Biomedical Engineering</td>
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<td>CHEM 766</td>
<td>Biomaterials</td>
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<td>ENGR 755</td>
<td>Computational Molecular Bioengineering</td>
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<td>Second Year</td>
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<td>PHYS 408</td>
<td>General Physics II</td>
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<tr>
<td>CHE 501</td>
<td>Introduction to Chemical Engineering I</td>
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| Credits | 16 |

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<tbody>
<tr>
<td>CHEM 684</td>
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<td>CHEM 686</td>
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<tr>
<td>CHE 502</td>
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<tr>
<td>MATH 740</td>
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<tr>
<td>or MATH 644</td>
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| Credits | 16 |

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<td>CHEM 653</td>
<td>Organic Chemistry Laboratory</td>
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<tr>
<td>CHE 601</td>
<td>Fluid Mechanics and Unit Operations</td>
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<td>CHE 603</td>
<td>Applied Mathematics for Chemical Engineers</td>
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| Credits | 16 |

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<tr>
<td>CHEM 652A</td>
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<td>CHE 602</td>
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<tr>
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<td>CHE 612</td>
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| Credits | 16 |

<table>
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<tr>
<th>Fourth Year</th>
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<tbody>
<tr>
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<td>Mass Transfer and Stagewise Operations</td>
</tr>
<tr>
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<tr>
<td>CHE 713</td>
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</tr>
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<td>Process Dynamics and Control</td>
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<td>CHE Elective</td>
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<table>
<thead>
<tr>
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<tbody>
<tr>
<td>CHE 614</td>
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<tr>
<td>CHE 708</td>
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<tr>
<td>CHE Electives</td>
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<td>Discovery Elective</td>
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</table>

| Credits | 15 |

| Total Credits | 129 |

1. ENGL 401 First-Year Writing satisfies the Discovery Foundation Writing Skills category.
2. MATH 425 Calculus I satisfies the Discovery Foundation Quantitative Reasoning category.
3. PHYS 407 General Physics I or CHEM 405 Chemical Principles for Engineers satisfies the Discovery Physical Science (with lab) category.
4. CHE 502 Introduction to Chemical Engineering II satisfies the Discovery Inquiry requirement.
5. MATH 740 Design of Experiments I or MATH 644 Statistics for Engineers and Scientists is the recommended technical elective.
6. CHE 708 Chemical Engineering Design satisfies the Discovery Capstone Experience/Course.
7. CHE students do not have to take a course in the Discovery ETS category since they satisfy this requirement through a combination of courses in the CHE curriculum.