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.
### Second Year
#### Fall
- **CHEM 683** Physical Chemistry I  
  Credits: 3
- **CHEM 685** Physical Chemistry Laboratory  
  Credits: 2
- **MATH 527** Differential Equations with Linear Algebra  
  Credits: 4
- **PHYS 408** General Physics II  
  Credits: 4
- **CHE 501** Introduction to Chemical Engineering I \(^4\)  
  Credits: 3

#### Spring
- **CHEM 684** Physical Chemistry II  
  Credits: 3
- **CHEM 686** Physical Chemistry Laboratory  
  Credits: 2
- **CHE 502** Introduction to Chemical Engineering II  
  Credits: 3
- **MATH 740** Design of Experiments I \(^5\)  
  or **MATH 644** Statistics for Engineers and Scientists  
  Credits: 4
- **Discovery Program Elective** \(^7\)  
  Credits: 4

### Third Year
#### Fall
- **CHEM 651** Organic Chemistry I  
  Credits: 3
- **CHEM 653** Organic Chemistry Laboratory  
  Credits: 2
- **CHE 601** Fluid Mechanics and Unit Operations  
  Credits: 3
- **CHE 603** Applied Mathematics for Chemical Engineers  
  Credits: 4
- **CHE Elective**  
  Credits: 4

#### Spring
- **CHEM 652A** Organic Chemistry II  
  Credits: 3
- **CHE 602** Heat Transfer and Unit Operations  
  Credits: 3
- **CHE 604** Chemical Engineering Thermodynamics  
  Credits: 3
- **CHE 612** Chemical Engineering Laboratory I  
  Credits: 3
- **Discovery Program Elective** \(^7\)  
  Credits: 4

### Fourth Year
#### Fall
- **CHE 703** Mass Transfer and Stagewise Operations  
  Credits: 3
- **CHE 707** Chemical Engineering Kinetics  
  Credits: 3
- **CHE 713** Chemical Engineering Laboratory II  
  Credits: 3
- **CHE 752** Process Dynamics and Control  
  Credits: 4
- **CHE Elective**  
  Credits: 4

#### Spring
- **CHE 614** Separation Processes  
  Credits: 3
- **CHE 708** Chemical Engineering Design \(^6\)  
  Credits: 4
- **CHE Electives**  
  Credits: 4
- **Discovery Elective** \(^7\)  
  Credits: 4

### 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.

### Student Learning Outcomes
- The ability to apply knowledge of mathematics, science and engineering.
- The ability to design and conduct experiments safely, as well as to analyze and interpret data.
- The ability to identify, formulate and solve chemical engineering problems.
- The ability to design a process that meets desired specifications with consideration of environmental, safety, economic and ethical criteria.
- An appreciation of contemporary issues relevant to chemical engineering.
- Completed the UNH general education/Discovery program and obtained a broad education useful to understand the impact of engineering solutions in a global and societal context.
- The ability to use computers effectively for engineering practice.
- An appreciation of professional and ethical responsibility.
- The ability to communicate effectively.
- Skills to search for information in the library and on the internet. These skills will be used in their pursuit of lifelong learning.
- The capacity of function and work effectively alone and in a team environment.