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 bioengineering, energy or environmental engineering.

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 as individuals or in a team and gain skills in written and oral communication and effectively use computers for engineering practice, including information search in the library and online. They also understand the need for lifelong learning and the significance of societal and global issues relevant to chemical engineering.

The Chemical Engineering program (B Sc in Chemical Engineering) is accredited by the Engineering Accreditation Commission of ABET, https://www.abet.org, under the General Criteria and the Program Criteria for Chemical, Biochemical, Biomolecular and Similarly Named Engineering Programs.

## Requirements

### Degree Requirements

**Minimum Credit Requirement:** 129 credits

**Minimum Residency Requirement:** 32 credits must be taken at UNH

**Minimum GPA:** 2.0 required for conferral*
Chemical Engineering Major (B.S.)

Degree Plan

First Year

Fall
CHBE 400 Chemical and Bioengineering Lectures 1
CHEM 405 Chemical Principles for Engineers 3
ENGL 401 First-Year Writing 1
MATH 425 Calculus I 2
Discovery Program Electives 5

Credits 17

Spring
MATH 426 Calculus II 4
PHYS 407 General Physics I 3
Discovery Program Electives (2) 6

Credits 16

Second Year

Fall
CHBE 501 Material Balances 3
CHEM 683 Physical Chemistry I 3
CHEM 685 Physical Chemistry Laboratory 2
MATH 527 Differential Equations with Linear Algebra 4
PHYS 408 General Physics II 4

Credits 16

Spring
CHBE 502 Energy Balances 4
CHEM 684 Physical Chemistry II 3
CHEM 686 Physical Chemistry Laboratory 2
MATH 740 or MATH 644 Design of Experiments I 5
or Statistics for Engineers and Scientists
Discovery Program Elective 6

Credits 16

Third Year

Fall
CHBE 601 Fluid Mechanics and Unit Operations 3
CHBE 603 Applied Mathematics for Chemical Engineers
CHEM 651 Organic Chemistry I 3
CHEM 653 Organic Chemistry Laboratory 2
Chemical Engineering Elective 4

Credits 16

Spring
CHBE 602 Heat Transfer and Unit Operations 3
CHBE 604 Chemical Engineering Thermodynamics 3
CHBE 612 Chemical Engineering Laboratory I 3
CHEM 652A Organic Chemistry II 3
Discovery Program Elective 6

Credits 16

Fourth Year

Fall
CHBE 703 Mass Transfer and Stagewise Operations 3

Credits 16

CHBE 707 Chemical Engineering Kinetics 3
CHBE 713 Chemical Engineering Laboratory II 3
CHBE 752 Process Dynamics and Control 4
Chemical Engineering Elective 4

Credits 17

Spring
CHBE 614 Separation Processes 3
CHBE 708 Chemical Engineering Design 5

Chemical Engineering Elective 4
Discovery Elective 6

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 CHBE 502 Energy Balances satisfies the Discovery Inquiry requirement.
5 CHBE#708 Chemical Engineering Design satisfies the Discovery Capstone Experience/Course.
6 Chemical Engineering 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 curriculum.

Student Learning Outcomes

By the time of graduation, students will have:

• an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.
• an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.
• an ability to communicate effectively with a range of audiences.
• an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.
• an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.
• an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.
• an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.