

Duluth Campus

Chemical Engineering B.S.Ch.E.

Chemical Engineering

Swenson College of Science and Engineering

- Program Type: Baccalaureate
- Requirements for this program are current for Fall 2012
- Required credits to graduate with this degree: 127
- Required credits within the major: 112
- Degree: Bachelor of Science in Chemical Engineering

The Department of Chemical Engineering strives for nationally recognized excellence in engineering education and research by using modern, hands-on, and active learning experiences to prepare undergraduate students for professional success, and to hold paramount the safety, health, and welfare of the public and protect the environment in performance of their professional duties.

The Department of Chemical Engineering produces engineers with a strong foundation of technical, communication, teamwork, and problem-solving skills required for professional success, consistent with the following objectives:

1. Pursue careers where they apply their engineering and problem-solving skills.
2. Pursue advanced studies or other forms of continuing education.
3. Value their UMD chemical engineering education and endorse the program and its students.

This four-year baccalaureate (B.S.Ch.E.) degree program emphasizes the development of the student's ability to analyze and design chemical processing systems. By the end of the program, the student must demonstrate the ability to solve engineering problems, a sensitivity to the social and environmental impacts of the engineering profession, and the ability to maintain a high level of competency.

Chemical engineering graduates are qualified for employment in diverse industries, ranging from those that manufacture inorganic chemicals, petrochemicals, plastics, synthetic fibers, paper and pulp, and pharmaceuticals to those that process minerals, materials, and hazardous wastes.

Graduates are qualified for assignments that include plant operations, process development, process control, project engineering, or technical sales, and frequently pursue engineering management later in their careers. They are also well qualified to continue with professional or graduate education.

The chemical engineering curriculum is based on fundamental sciences including physics, chemistry, and mathematics; traditional chemical engineering sciences such as material and energy balance, transport phenomena, and thermodynamics; and chemical engineering design courses such as reaction engineering, separations, and unit operations, with a capstone design course during the senior year. Students have an opportunity to become involved in research, through either the Undergraduate Research Opportunities Program or the department honors program.

Honors Requirement: To graduate with department honors, students must have a minimum 3.50 GPA and be nominated by the chemical engineering faculty.

Program Delivery

This program is available:

- via classroom (the majority of instruction is face-to-face)

Admission Requirements

Students may declare a chemical engineering major as freshmen or sophomores.

Students must complete the majority of the program's lower division requirements (freshman and sophomore years), including CHE 2111, CHEM 2541, MATH 3280, and PHYS 2015 and 2016, before applying for admission to upper division (junior and senior years). Successful completion of CHE 2111 (with a grade of C+ or better) is required for admission to upper division. Admission is competitive and applicants are admitted on a space-available basis, with priority determined by the cumulative GPA in engineering, physics, mathematics, and chemistry through CHEM 2541.

For information about University of Minnesota admission requirements, visit the [Office of Admissions website](#).

General Requirements

The Board of Regents, on recommendation of the faculty, grants degrees from the University of Minnesota. Requirements for an

undergraduate degree from University of Minnesota Duluth include the following:

1. Students must meet all course and credit requirements of the departments and colleges or schools in which they are enrolled including an advanced writing course. Students seeking two degrees must fulfill the requirements of both degrees. However, two degrees cannot be awarded for the same major.
2. Students must complete all requirements of the [Liberal Education Program](#).
3. Students must complete a minimum of 120 semester credits.
4. At least 30 of the last 60 degree credits earned immediately before graduation must be awarded by UMD.
5. Students must complete at least half of their courses at the 3xxx-level and higher at UMD. Study-abroad credits earned through courses taught by UM faculty and at institutions with which UMD has international exchange programs may be used to fulfill this requirement.
6. If a minor is required, students must take at least three upper division credits in their minor field from UMD.
7. The minimum cumulative UM GPA required for graduation will be 2.00 and will include only University of Minnesota coursework. A minimum UM GPA of 2.00 is required in each UMD undergraduate major and minor. No academic unit may impose higher grade point standards to graduate.
8. Diploma, transcripts, and certification will be withheld until all financial obligations to the University have been met.

Program Requirements

Requirements for the B.S.Ch.E. include:

* At least 10 credits of science or engineering electives, subject to department approval. Must be 2xxx or higher; only one 2xxx course is allowed; at least one course must be 4xxx or higher; BIOL 1012 may be used in place of a 2xxx course; maximum of 3 credits of COOP and internship credits allowed; may not be used to satisfy advanced chemistry elective requirements.

* At least 8 credits of advanced chemistry electives. Courses must be CHEM 2xxx or higher and may not be satisfied with CHEM 2095, 3097, 3194, 4184, 4185, or 4634.

* A 2.00 minimum GPA in all courses taken in the chemical engineering major, including required courses in related fields. GPA requirements apply to all courses in the major taken at UMD calculated separately and to all courses in the major when transfer credits are included.

Year One (33 cr)

First math course is determined by ACT math score. This schedule presupposes placement into MATH 1296.

CHE 1011 - Introduction to Chemical Engineering. [LE CAT] (3.0 cr)

CS 1121 - Introduction to Programming in Visual BASIC.NET [LE CAT, LOGIC & QR] (3.0 cr)

PHYS 2013 - General Physics I [LE CAT, NAT SCI] (4.0 cr)

PHYS 2014 - General Physics Lab I [NAT SCI] (1.0 cr)

WRIT 1120 - College Writing [LE CAT, WRITING] (3.0 cr)

CHEM 1161 ~~{Inactive}~~ [LE CAT4, NAT SCI] (5.0 cr)

or **CHEM 1153** - General Chemistry I [LE CAT, NAT SCI] (4.0 cr)

CHEM 1154 - General Chemistry Lab I [LE CAT, NAT SCI] (1.0 cr)

CHEM 1162 ~~{Inactive}~~ (5.0 cr)

or **CHEM 1155** - General Chemistry II (4.0 cr)

CHEM 1156 - General Chemistry Lab II (1.0 cr)

MATH 1296 - Calculus I [LE CAT, LOGIC & QR] (5.0 cr)

or **MATH 1596** ~~{Inactive}~~ [LE CAT2, LOGIC & QR] (5.0 cr)

MATH 1297 - Calculus II [LOGIC & QR] (5.0 cr)

or **MATH 1597** ~~{Inactive}~~ [LOGIC & QR] (5.0 cr)

Year Two (28 cr)

CHE 2111 - Material and Energy Balances (3.0 cr)

CHE 2121 - Chemical Engineering Thermodynamics (3.0 cr)

CHE 3031 - Computational Methods in Chemical Engineering (3.0 cr)

CHEM 2541 - Organic Chemistry I (3.0 cr)

CHEM 2543 - Organic Chemistry I Laboratory (1.0 cr)

MATH 3280 - Differential Equations with Linear Algebra (4.0 cr)

PHYS 2015 - General Physics II (4.0 cr)

PHYS 2016 - General Physics Lab II (1.0 cr)

Science/Engr Elective (3-5 cr)

Science or engineering elective: 2xxx or higher course in the Swenson College of Science and Engineering

Advanced Chemistry Elective (1-5 cr)

Courses must be CHEM 2xxx or higher and may not be satisfied with CHEM 2095, 3097, 3194, 4184, 4185 or 4634

CHEM 2xxx
or CHEM 3xxx
or CHEM 4xxx

Year Three (28 cr)

May not be satisfied with CHEM 2095, 3097, 3194, 4184, 4185 or 4634.

[CHE 2011](#) - Design of Engineering Experiments (3.0 cr)

[CHE 3111](#) - Fluid Mechanics (3.0 cr)

[CHE 3112](#) - Heat and Mass Transfer (3.0 cr)

[CHE 3231](#) - Properties of Engineering Materials (3.0 cr)

[CHE 3241](#) - Principles of Particle Technology (3.0 cr)

[CHE 4402](#) - Process Dynamics and Control (3.0 cr)

Advanced Writing Requirement (3 cr)

WRIT 3xxx - or higher advanced writing course

Science/Engr Elective (3-5 cr)

Advanced science or engineering elective: 3xxx or higher course in the Swenson College of Science and Engineering

Advanced Chemistry Elective (1-5 cr)

Courses must be CHEM 2xxx or higher and may not be satisfied with CHEM 2095, 3097, 3194, 4184, 4185 or 4634

CHEM 2xxx

or CHEM 3xxx

or CHEM 4xxx

Year Four (23 cr)

[CHE 3211](#) - Chemical Engineering Laboratory I [COMM & LAN] (3.0 cr)

[CHE 4111](#) - Separations (3.0 cr)

[CHE 4211](#) - Chemical Engineering Laboratory II (3.0 cr)

[CHE 4301](#) - Chemical Reaction Engineering (3.0 cr)

[CHE 4501](#) - Chemical Engineering Design I [SUSTAIN] (3.0 cr)

[CHE 4502](#) - Chemical Engineering Design II (3.0 cr)

Science/Engr Elective (3-5 cr)

Advanced science or engineering elective: 4xxx or higher in the Swenson College of Science and Engineering