Chemical Engineering, MSChE

For program contact information, please visit the College of Engineering website (https://che.northeastern.edu/academics/graduate-studies/ms-chme/).

The Master of Science in Chemical Engineering is normally pursued by students with a Bachelor of Science in Chemical Engineering or closely allied fields. Students wishing to pursue the master's degree but with undergraduate educational backgrounds other than chemical engineering may be required to complete supplementary undergraduate coursework. These courses are in addition to the minimum course requirements. Students enrolled in the program are encouraged to seek guidance from their instructors and advisor regarding additional coursework that may supplement the graduate curriculum.

Students originally admitted to the master's degree program who wish to switch to the PhD program must petition the associate chair for graduate studies. If admission is granted, then the student must satisfy all the requirements of the doctoral degree program, including the requirements for doctoral candidacy.

Course Requirements

A minimum of 32 semester hours of academic work is required to qualify for the Master of Science degree in chemical engineering.

If pursuing the General Principles and Applications concentration, students can select from either the master's project option or master's thesis option. Students completing the master's project will take the 4-semester-hour master's project course and 4 semester hours of a core course. Students in the thesis track will complete the 4-semester-hour master's project course followed by the 4-semester-hour thesis course. In addition, each full-time student pursuing a thesis option must enroll in Professional Development and Communication Essentials (CHME 6390) in their first two semesters followed by Seminar (CHME 7390) for each semester they continue to work toward their degree. The faculty advisor and the student establish the sequence of courses that students take to pursue the Master of Science in Chemical Engineering.

If pursuing the Biosystems or Sustainability concentrations, students must complete a minimum of 32 semester hours of coursework. In addition, during their first two semesters of enrollment, they must complete Professional Development and Communication Essentials (CHME 6390).

Thesis Requirements

Students pursuing a Master of Science in Chemical Engineering with concentration in General Principles and Applications thesis option must submit to the Graduate School of Engineering a written thesis that is approved by the thesis committee and department chair. For details, see the graduate school requirements and electronic submittal instructions (https://coe.northeastern.edu/academics-experiential-learning/graduate-school-of-engineering/graduate-student-services/dissertation-thesis-instructions/). MS with thesis students must also complete an oral master's thesis defense in order to successfully complete the program. The student will be expected to form a master's thesis committee, composed of a minimum of three members—one who is the research advisor, one other faculty member from the chemical engineering department, and one member from outside the department. The oral presentation will be open to the public, including students, faculty, and the candidate's committee.

Part-time Students

Part-time students may progress according to their plans and time constraints but within the seven-year time limit. A minimum of 32 semester hours of academic coursework is required for part-time students.

Master of Science students wishing to change their status from part-time to full-time must notify the chemical engineering department and make a formal petition to the Graduate School of Engineering. Refer to the regulations of the Graduate School of Engineering for further information on academic administrative policies.

Departure Prior to Thesis Completion

Occasionally, students must leave the chemical engineering department prior to completion of all degree requirements. In such instances, long time intervals have often elapsed before thesis or manuscript submission. Accordingly, the department has adopted the guideline that a student cannot submit a thesis for credit beyond three years after the student stops actively pursuing the research. Exceptions may be granted upon petition to the departmental graduate committee. Petitions must demonstrate extenuating circumstances and prove that the research is still of value to the profession.

Graduate Certificate Options

Students enrolled in a master's degree have the opportunity to also pursue one of the many engineering graduate certificate options in addition to or in combination with the MS degree. Students should consult their faculty advisor regarding these options (https://catalog.northeastern.edu/graduate/engineering/graduate-certificate-programs/).

GORDON INSTITUTE OF ENGINEERING LEADERSHIP

Master's Degree in Chemical Engineering with Graduate Certificate in Engineering Leadership

Students may complete a Master of Science in Chemical Engineering in addition to earning a Graduate Certificate in Engineering Leadership (https://catalog.northeastern.edu/graduate/engineering/multidisciplinary/engineering-leadership-graduate-certificate/). Students must apply and be admitted to the Gordon Engineering Leadership Program in order to pursue this option. The program requires fulfillment of the 16-semester-hour curriculum

required to earn the Graduate Certificate in Engineering Leadership, which includes an industry-based challenge project with multiple mentors, in addition to the semester hours required for the chemical engineering concentration selected.

ENGINEERING BUSINESS

Master's Degree in Chemical Engineering with Graduate Certificate in Engineering Business

Students may complete a Master of Science in Chemical Engineering in addition to earning a Graduate Certificate in Engineering Business. Students must apply and be admitted to the Galante Engineering Business Program in order to pursue this option. The program requires the applicant to have earned or be in a program to earn a Bachelor of Science in Engineering from Northeastern University. Students may use some of their breadth electives credits toward both the MS degree and the certificate. The certificate coursework, along with participation in cocurricular professional development elements, earn the Graduate Certificate in Engineering Business. (https://catalog.northeastern.edu/graduate/engineering/mechanical-industrial/engineering-business-graduate-certificate/)

Program Requirements

- Concentrations and course offerings may vary by campus and/or by program modality. Please consult with your advisor or admissions coach for the course availability each term at your campus or within your program modality.
- Certain options within the program may be *required* at certain campuses or for certain program modalities. Please consult with your advisor or admissions coach for requirements at your campus or for your program modality.

All students must complete the following core requirements unless otherwise indicated. Courses cannot double count in two different categories.

Core Requirements

Code	Title	Hours
CHME 6310	Python for Chemical Engineers	2
CHME 6320	Numerical and Statistical Methods for Chemical Engineering	4
CHME 6390	Professional Development and Communication Essentials [1]	0

Concentrations

Complete one of the following concentrations:

- Biosystems (p. 2)
- General Principles and Applications (p. 3)
- Sustainability (p. 4)

Program Credit/GPA Requirements

32 total semester hours required
Minimum 3.000 GPA required

BIOSYSTEMS CONCENTRATION

Code	Title	Hours
CHME 5160	Drug Delivery: Engineering Analysis	4
or CHME 5630	Biochemical Engineering	
CHME 6430	Chemical Engineering for Biosystems and Biomaterials	2
Biosystems Depth Electives		
Complete 8 semester hours from the following (courses cannot count in multiple categories):		8
CHME 5160	Drug Delivery: Engineering Analysis	
CHME 5185	Design of Experiments and Ethical Research (DOEER)	
CHME 5515	Process Safety Engineering for Biotechnology and Pharmaceutical Industries	
CHME 5630	Biochemical Engineering	
CHME 5631	Biomaterials Principles and Applications	
CHME 5632	Advanced Topics in Biomaterials	
CHME 5683	Introduction to Polymer Science	
Biosystems Breadth Electives		
Complete 12 semester hours from the following (courses cannot count in multiple categories):		12
BIOE 5410	Molecular Bioengineering	

CHEM 5620	Protein Chemistry
CHEM 5625	Chemistry and Design of Protein Pharmaceuticals
CHEM 5638	Molecular Modeling
CHME 5105	Materials Characterization Techniques
CHME 5137	Computational Modeling in Chemical Engineering
CHME 5160	Drug Delivery: Engineering Analysis
CHME 5179	Complex Fluids and Everyday Materials
CHME 5185	Design of Experiments and Ethical Research (DOEER)
CHME 5510	Fundamentals in Process Safety Engineering
CHME 5515	Process Safety Engineering for Biotechnology and Pharmaceutical Industries
CHME 5621	Electrochemical Engineering
CHME 5630	Biochemical Engineering
CHME 5631	Biomaterials Principles and Applications
CHME 5632	Advanced Topics in Biomaterials
CHME 5642	Photochemistry Fundamentals and Applications
CHME 5649	Numerical Strategies and Data Analytics for Chemical Sciences
CHME 5683	Introduction to Polymer Science
CHME 5699	Special Topics in Chemical Engineering
CHME 7330	Chemical Engineering Thermodynamics
CHME 7340	Chemical Engineering Kinetics
CHME 7350	Transport Phenomena
CHME 7600	Pharmaceutical Engineering I
CHME 7601	Pharmaceutical Engineering II
CHME 7973	Special Topics in Chemical Engineering
CIVE 7251	Environmental Biological Processes
EMGT 5220	Engineering Project Management
EMGT 6225	Economic Decision Making
EMGT 6305	Financial Management for Engineers
IE 6200	Engineering Probability and Statistics
IE 7280	Statistical Methods in Engineering
IE 7285	Statistical Quality Control
ME 5620	Fundamentals of Advanced Materials
NNMD 5270	Foundations in Nanomedicine: Therapeutics
NNMD 5370	Nanomedicine Research Techniques
NNMD 5470	Nano/Biomedical Commercialization: Concept to Market
PHSC 6214	Experimental Design and Biostatistics

GENERAL PRINCIPLES AND APPLICATIONS CONCENTRATION

Code	Title	Hours
CHME 6410	Chemical Engineering Research Methods	2
CHME 7330	Chemical Engineering Thermodynamics	4
or CHME 7350	Transport Phenomena	
Thesis or Project Options		
Complete one of the following options (courses cannot count in multiple categories):		8
Thesis Option		
In addition to completing the thesis course, students must successfully complete the thesis submission process, including securing committee and Graduate School of Engineering signatures and submission of an electronic copy of their MS thesis to ProQuest:		
CHME 7390	Seminar [2]	
CHME 7945	Master's Project [3]	
CHME 7990	Thesis	
Project Option		
CHME 7330	Chemical Engineering Thermodynamics	
or CHME 7340	Chemical Engineering Kinetics	

or CHME 7350	Transport Phenomena	
CHME 7945	Master's Project	
Electives Course List		
Complete 12 semester hours from the following (courses cannot count in multiple categories):		12
BIOE 5410	Molecular Bioengineering	
CHEM 5620	Protein Chemistry	
CHEM 5625	Chemistry and Design of Protein Pharmaceuticals	
CHEM 5638	Molecular Modeling	
CHEM 5651	Materials Chemistry of Renewable Energy	
CHEM 5653	Electrochemistry of Renewable Energy Devices	
CHME 5105	Materials Characterization Techniques	
CHME 5137	Computational Modeling in Chemical Engineering	
CHME 5160	Drug Delivery: Engineering Analysis	
CHME 5179	Complex Fluids and Everyday Materials	
CHME 5185	Design of Experiments and Ethical Research (DOEER)	
CHME 5510	Fundamentals in Process Safety Engineering	
CHME 5515	Process Safety Engineering for Biotechnology and Pharmaceutical Industries	
CHME 5621	Electrochemical Engineering	
CHME 5630	Biochemical Engineering	
CHME 5631	Biomaterials Principles and Applications	
CHME 5632	Advanced Topics in Biomaterials	
CHME 5642	Photochemistry Fundamentals and Applications	
CHME 5649	Numerical Strategies and Data Analytics for Chemical Sciences	
CHME 5683	Introduction to Polymer Science	
CHME 7330	Chemical Engineering Thermodynamics	
CHME 7340	Chemical Engineering Kinetics	
CHME 7350	Transport Phenomena	
CHME 7600	Pharmaceutical Engineering I	
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EMGT 5220	Engineering Project Management	
EMGT 6225	Economic Decision Making	
EMGT 6305	Financial Management for Engineers	
IE 6200	Engineering Probability and Statistics	
IE 7280	Statistical Methods in Engineering	
IE 7285	Statistical Quality Control	
ME 5620	Fundamentals of Advanced Materials	
NNMD 5270	Foundations in Nanomedicine: Therapeutics	
NNMD 5370	Nanomedicine Research Techniques	
NNMD 5470	Nano/Biomedical Commercialization: Concept to Market	
PHSC 6214	Experimental Design and Biostatistics	

SUSTAINABILITY CONCENTRATION

Code	Title	Hours
CHME 5621	Electrochemical Engineering	4
or CHME 5683	Introduction to Polymer Science	
CHME 6420	Engineering for Chemical Sustainability	2
Sustainability Depth Electives		
Complete two of the following (courses cannot count in multiple categories):		8
CHME 5105	Materials Characterization Techniques	
CHME 5137	Computational Modeling in Chemical Engineering	
CHME 5179	Complex Fluids and Everyday Materials	
CHME 5621	Electrochemical Engineering	
CHME 5683	Introduction to Polymer Science	

Sustainability Breadth Electives		
Complete 12 semester hours from the following (courses cannot count in multiple categories):		12
BIOE 5410	Molecular Bioengineering	
CHEM 5638	Molecular Modeling	
CHEM 5651	Materials Chemistry of Renewable Energy	
CHEM 5653	Electrochemistry of Renewable Energy Devices	
CHME 5105	Materials Characterization Techniques	
CHME 5137	Computational Modeling in Chemical Engineering	
CHME 5160	Drug Delivery: Engineering Analysis	
CHME 5179	Complex Fluids and Everyday Materials	
CHME 5185	Design of Experiments and Ethical Research (DOEER)	
CHME 5510	Fundamentals in Process Safety Engineering	
CHME 5515	Process Safety Engineering for Biotechnology and Pharmaceutical Industries	
CHME 5621	Electrochemical Engineering	
CHME 5630	Biochemical Engineering	
CHME 5631	Biomaterials Principles and Applications	
CHME 5632	Advanced Topics in Biomaterials	
CHME 5642	Photochemistry Fundamentals and Applications	
CHME 5649	Numerical Strategies and Data Analytics for Chemical Sciences	
CHME 5683	Introduction to Polymer Science	
CHME 5699	Special Topics in Chemical Engineering	
CHME 7330	Chemical Engineering Thermodynamics	
CHME 7340	Chemical Engineering Kinetics	
CHME 7350	Transport Phenomena	
CHME 7600	Pharmaceutical Engineering I	
CHME 7601	Pharmaceutical Engineering II	
CHME 7973	Special Topics in Chemical Engineering	
CIVE 5250	Organic Pollutants in the Environment	
CIVE 5260	Environmental Fluid Mechanics	
CIVE 5365	Climate Technologies for Decarbonization, Mitigation, and Adaptation	
CIVE 7251	Environmental Biological Processes	
EMGT 5220	Engineering Project Management	
EMGT 6225	Economic Decision Making	
EMGT 6305	Financial Management for Engineers	
IE 6200	Engineering Probability and Statistics	
IE 7280	Statistical Methods in Engineering	
IE 7285	Statistical Quality Control	
ME 5620	Fundamentals of Advanced Materials	

1 To be completed in the first two semesters in the program.
2 To be taken simultaneously with Thesis (CHME 7990).
3 To be taken prior to Thesis (CHME 7990).