

Master of Science in Chemistry

This program provides graduate education for students planning careers in industry, business, teaching or planning additional graduate work or professional studies. Four options in the program are available, the Separation Science Emphasis, the Business-Oriented Separation Science Emphasis, the General Program Emphasis, and the Chemical Education Emphasis. Students in the program can follow the Separation Science Emphasis in order to be prepared for careers in pharmaceutical, cosmetics, nutrients, and food industries. The Business-Oriented Separation Science Emphasis enhance the educational experience of the Separation Science chemists beyond what could be achieved if the Separation Science and the Business Administration were pursued independently. It serves those who would like to advance into management positions. The General Program Emphasis prepares students to enter professional schools or to continue further graduate work in chemistry. The Chemical Education Emphasis serves in-service middle and high school teachers who attained a bachelor's degree in chemistry and hold a teaching certification/license to become highly qualified teachers trained in advanced chemistry and pedagogical content knowledge of teaching science in secondary schools. They will also be well prepared to conduct research in the area of Chemical Education or teach at 2-year colleges.

Requirements for Admission to the Program:

Students must fulfill the requirements for admission to the College of Graduate Studies and Research.

Full admission to the program requires at least a 3.0 (B) average in the following prerequisite undergraduate courses:

1. two semesters of general chemistry, two semesters of organic chemistry, two semesters of physical chemistry, and one semester of analytical chemistry (all of these must include laboratory);
2. two semesters (normally eight credit hours) of physics including laboratory; and
3. two semesters (normally eight credit hours) of calculus.

Conditional admission to the program may be granted when a student has a marginal undergraduate record or a deficiency in prerequisite undergraduate courses. All conditions must be fulfilled for candidacy (see below).

If the admission file/evaluation is not completed by the time of registration, the student may choose to register as a graduate student-at-large provided the appropriate application has been filed with the Office of Admission and Records in accordance with their established deadlines.

Requirements for the Degree:

- **Course Work:** (30 credit hours) A total of 30 credit hours must be earned. The majority of students take approximately ten formal courses. Options are available to earn credit hours for research, independent study, and thesis work as outlined below. For students admitted to Master's programs for the Fall 1997 semester and thereafter, graduate coursework is at the 400-level. However, two of the following courses may be taken as part of the master's program if they have not been previously taken as part of an undergraduate program. No other 300 level courses can apply. Consult with your program advisor or the Graduate College for details

Code	Title	Hours
CHEM-316	Inorganic Chemistry	4
CHEM-330 or CHEM-331	Instrumental Analysis: Spectroscopy Instrumental Analysis: Quantitative Methods	4
Total Hours		8

Core Courses

All students with the exception of the Business-Oriented Separation Science Emphasis must take at least one course in each of the four areas of the Core Courses.

Code	Title	Hours
Analytical Chemistry		
CHEM-450	Gas Chromatography	3
Inorganic Chemistry		
CHEM-402	Organometallic Chemistry	3
CHEM-406	Coordination Chemistry	3
CHEM-413	Modern Inorganic Chemistry	3
Organic Chemistry		
CHEM-403	Physical Methods Of Organic Chemistry	3
CHEM-411	Organic Reaction Mechanisms	3
Physical Chemistry		

CHEM-404	Chemical Thermodynamics	3
CHEM-405	Quantum Chemistry	3
CHEM-412	Reaction Kinetics	3

Separation Science Emphasis

Required Coursework:

Students in the Separation Science Emphasis program must take 21 hours from the CORE and 9 hours of the following Required Coursework in the Separation Science:

Code	Title	Hours
CHEM-451	Liquid Chromatography	3
CHEM-455	Method Development And Validation In Liquid Chromatography	3
CHEM-456	Advanced Chromatographic Methods	3
Total Hours		9

Students writing a thesis take 12 hours from the CORE, the 9 hours of Required Coursework in the Separation Science Emphasis, and 9 hours of Independent Study (CHEM-408, 3 cr.) and Thesis hours: Chemistry, 1 - 3 cr. in the area of Separation Science. These Thesis credit hours are added over multiple semesters to make 6 credits total. Non-thesis students take 18 hours from the CORE, the 9 hours of Required Coursework in the Separation Science, and 3 hours of Independent Study in the area of Separation Science.

BUSINESS-ORIENTED SEPARATION SCIENCE EMPHASIS

REQUIRED COURSEWORK:

Students in the Business-Oriented Separation Science Emphasis program must take 3 hours Gas- Chromatography (CHEM 450) from the CORE, 9 hours of the required course work in the Separation science, 3 hours Independent Study in the area of Separation Science, and 15 hours of the following Required Business Competencies Coursework:

Code	Title	Hours
Required Courses:		
COBM-401	Accounting For Managers	3
COBM-402	Business Economics And Finance For Managers	3
COBM-403	Topics In Management And Marketing	3
COBM-404	Business Statistics And Operations Decisions For Managers	3
Select one elective from the following Managerial Competencies courses or approved by the department:		
MNGT-474	Human Resources Policy And Decision Making	3
MNGT-480	Entrepreneurship	3
MNGT-489	Management Of Organizational Change	3
MNGT-490	Innovation And Creativity	3
MNGT-491	Strategic Technology & Innovation Management	3

General Program Emphasis

Students in the General Program Emphasis must take 30 credit hours from the CORE and/or Separation Science Emphasis and are also encouraged to do research and/or thesis work. Students writing a thesis take 21 hours from the CORE and/or Separation Science Emphasis and 9 hours of the Independent Study (CHEM-408 3 cr.) and Thesis hours: Chemistry 1-3 cr. in the area of Chemistry. These Thesis credit hours are added over multiple semesters to make 6 credits total. Non-thesis students take 27 hours from the Core and/or Separation Science Emphasis and 3 hours of Independent Study in the area of Chemistry.

Chemical Education Emphasis

Required coursework:

Students in the Chemical Education Emphasis program must take 21 hours from the CORE and/or Separation Science Emphasis and 9 hours of Required Coursework in Education listed below or other 400 level courses from the College of Education approved by the Chemistry Department.

Code	Title	Hours
EDFN-410	Education As A Social Institution	3
LTCY-502	Literacy Instruction In Content Areas In Secondary Grades	3
LTCY-506	Writing Instruction In Middle & High School	3

EDFN-442	Media Technology For Educators ¹	3
Total Hours		12

¹ EDFN-442 Highly Recommended

Students writing a thesis take 12 hours from the CORE and/or Separation Science Emphasis, the 9 credit hours from the Required Coursework in Education and/or other 400 level courses from the College of Education approved by the Chemistry Department, and 9 hours of Independent Study (CHEM-408) and Thesis hours: Chemistry 1-3 cr. in the area of Chemical Education. These Thesis credit hours are added over multiple semesters to make 6 credits total. Non-thesis students must take 18 hours from the Core and/or Separation Science, the 9 hours of Required Coursework in Education and/or other 400 level courses from the College of Education approved by the Chemistry Department, and 3 hours of Independent Study in the area of Chemical Education.

- **Research and Thesis Work:** Students are encouraged to do laboratory or library research and/or more formally, write a thesis, and may do so under the following condition:
 - acceptance by research or thesis advisor.
Academic credit for research and thesis work is normally earned through Independent Study (CHEM-408) and Thesis hours: Chemistry (CHEM-5901, 1 cr., CHEM-5902, 2 cr., and CHEM-5903, 3 cr.) Individual arrangements are made between the student and the research advisor.
- **Final Examination:** Students writing master's theses are required to make a public oral defense of their work. Non-thesis students must make a public oral presentation of their research work, or take a comprehensive written departmental examination. Consult the graduate advisor for details.
- **Students with Foreign Credentials:** Students with foreign credentials should check with the Graduate College regarding transcript evaluation and English language testing. Since this is often a lengthy process, it is advisable for the international student with residency status to begin taking graduate courses in chemistry as a student-at-large while waiting for official word on admission. Consult the graduate advisor.
- **Merit Tuition Scholarships and Assistantships:** The Chemistry program is regularly allotted Tuition Scholarships to defray the cost of tuition for graduate students. Check with the graduate advisor for eligibility requirements well in advance of registration.

Beginning in the Fall 2023 term, incoming graduate students may complete up to 12 credit hours of their graduate study remotely and/or online during their first year. Class meetings will be held on Zoom during the evenings in order to accommodate students' busy schedules.

Students wishing to pursue their graduate degree on a full-time basis may do so with partial support from the University in the form of an Graduate Assistantship. In order to qualify, the student must be willing to do work and/or take in-person courses at NEIU. Please contact the Chair or Program Coordinator for more information and for an application.