

CHEMISTRY AND CHEMICAL BIOLOGYwww.chem.neu.edu/web

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The Department of Chemistry and Chemical Biology provides education in basic chemistry and modern chemistry-related disciplines. The department offers an American Chemical Society–certified program leading to a Bachelor of Science in Chemistry, and also offers a Bachelor of Science in Biochemistry jointly with the Department of Biology. The overall objective of the Bachelor of Science in Chemistry major program is to provide the fundamental scientific background and practical training for students as they prepare for chemically related careers or advanced study in fields including the traditional chemical specialties, as well as biochemistry, materials science, forensic science, medicine, education, law, and other endeavors that may draw upon an understanding of the chemical basis of the world around us.

Key general objectives are the development of qualitative and quantitative problem-solving skills and effective communication skills. Specific learning objectives for the chemistry major include to develop conceptual understanding and problem-solving abilities in the fundamental chemical subfields of analytical chemistry, biochemistry, inorganic chemistry, organic chemistry, and physical chemistry; gain a foundation of physics and mathematics and integrate these areas with chemical principles; perform quantitative measurements; synthesize and characterize compounds; learn proper laboratory practices including safety; develop proficiency with modern instruments and computers for data acquisition and analysis; and learn the relevance of chemistry to biology, pharmacology, medicine, manufactured and natural materials, and the environment.

Most of our chemistry majors participate in the cooperative education program and thereby gain invaluable professional experience to augment their classroom and laboratory work. Not only does that experience add immensely to the overall education received, it also has the potential to provide contacts and references for later employment or graduate school admissions. Chemistry majors also undertake a research project for at least one semester under the supervision of a faculty member. Sufficient electives are available in the program either to take more advanced courses or research within the department, or to add courses in an area of special interest, such as criminal justice in the case of an

interest in forensic science. Qualified students may also participate in a five-year combined BS/MS program.

Transferring to the Major

A GPA of 2.500 is required in all chemistry, physics, and math courses taken. Acceptance into the major will be based on students' meeting the department's criteria for admission and availability of space in the program.

Academic Progression Standards

Students who began as freshman chemistry majors must, after four semesters, have completed 64 semester hours and the following courses with grades of C or better:

CHM U217	General Chemistry 1 for Chemical Science Majors	4 SH
	with CHM U218 Lab for CHM U217	2 SH
CHM U220	General Chemistry 2 for Chemical Science Majors	4 SH
	with CHM U221 Lab for CHM U220	2 SH
CHM U315	Organic Chemistry 1 for Chemistry Majors	4 SH
	with CHM U316 Lab for CHM U315	2 SH
CHM U317	Organic Chemistry 2 for Chemistry Majors	4 SH
	with CHM U318 Lab for CHM U317	2 SH
CHM U321	Analytical Chemistry	4 SH
	with CHM U322 Lab for CHM U321	1 SH

Students who transferred into the major must, after two semesters in the major, have completed 64 semester hours and the following courses with grades of C or better:

CHM U211	General Chemistry 1	4 SH
	with CHM U212 Lab for CHM U211	1 SH
CHM U214	General Chemistry 2	4 SH
	with CHM U215 Lab for CHM U214	1 SH

or equivalent courses.

BS in Chemistry**NU CORE REQUIREMENTS**

See page 42 for requirement list.

CHEMISTRY MAJOR TECHNICAL REQUIREMENTS**Mathematics**

Complete the following two courses:

MTH U151	Calculus and Differential Equations for Biology 1	4 SH
or MTH U241	Calculus 1 for Science and Engineering	4 SH
MTH U152	Calculus and Differential Equations for Biology 2	4 SH
or MTH U242	Calculus 2 for Science and Engineering	4 SH

Biochemistry

Complete one of the following courses with corresponding lab:

BIO U323	Biochemistry	4 SH
with BIO U324	Lab for BIO U323	1 SH
CHM U621	Principles of Chemical Biology for Chemists	3 SH
with CHM U622	Lab for CHM U621	1 SH

Physics

Complete the following two courses with corresponding labs:

PHY U145	Physics for Life Sciences 1	4 SH
with PHY U146	Lab for PHY U145	1 SH
or PHY U161	Physics 1	4 SH
with PHY U162	Lab for PHY U161	1 SH
PHY U147	Physics for Life Sciences 2	4 SH
with PHY U148	Lab for PHY U147	1 SH
or PHY U165	Physics 2	4 SH
with PHY U166	Lab for PHY U165	1 SH

CHEMISTRY MAJOR REQUIREMENTS**General Chemistry 1**

Complete the following course with corresponding lab:

CHM U217	General Chemistry 1 for Chemical Science Majors	4 SH
with CHM U218	Lab for CHM U217	2 SH

General Chemistry 2

Complete the following course with corresponding lab:

CHM U220	General Chemistry 2 for Chemical Science Majors	4 SH
with CHM U221	Lab for CHM U220	2 SH

Intermediate-Level Chemistry—Organic Chemistry 1

Complete the following course with corresponding lab:

CHM U315	Organic Chemistry 1 for Chemistry Majors	4 SH
with CHM U316	Lab for CHM U315	2 SH

Intermediate-Level Chemistry—Organic Chemistry 2

Complete the following course with corresponding lab:

CHM U317	Organic Chemistry 2 for Chemistry Majors	4 SH
with CHM U318	Lab for CHM U317	2 SH

Intermediate-Level Chemistry 1

Complete the following two courses with corresponding labs:

BIOANALYTICAL CHEMISTRY		
CHM U331	Bioanalytical Chemistry	4 SH
with CHM U332	Lab for CHM U331	1 SH

PHYSICAL CHEMISTRY

CHM U401	Physical Chemistry 1	4 SH
with CHM U402	Lab for CHM U401	1 SH

Intermediate-Level Chemistry 2

Complete one of the following courses with corresponding lab:

CHM U421	Biophysical Chemistry	4 SH
or CHM U403	Physical Chemistry 2	4 SH
or CHM U637	Foundations of Spectroscopy	3 SH
CHM U404	Lab for CHM U403	1 SH

Advanced-Level Chemistry

Complete the following four courses with corresponding labs:

CHM U501	Inorganic Chemistry	4 SH
or CHM U696	Organometallic Chemistry	3 SH
CHM U521	Instrumental Methods of Analysis	1 SH
with CHM U522	Instrumental Methods of Analysis Lab	4 SH
CHM U531	Chemical Synthesis Characterization	1 SH
with CHM U532	Chemical Synthesis Characterization Lab	4 SH
CHM U628	Spectroscopy of Organic Compounds	3 SH
with CHM U629	Identification of Organic Compounds	2 SH

Senior Research/Capstone

Complete the following course:

CHM U750	Senior Research	4 SH
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CHEMISTRY MAJOR CREDIT REQUIREMENT

Complete 85 semester hours for the major.

GENERAL ELECTIVES

Additional courses taken beyond college and major course requirements to satisfy graduation credit requirements.

COOPERATIVE EDUCATION

If elected

UNIVERSITY-WIDE REQUIREMENTS

136 total semester hours required

Minimum 2.000 GPA required

BS in Environmental Geology and Chemistry

For degree requirements, please visit the myNEU Web Portal (www.myneu.neu.edu), click on the “Self-Service” tab, then on “My Degree Audit.”

BS in Geology and Chemistry

For degree requirements, please visit the myNEU Web Portal (www.myneu.neu.edu), click on the “Self-Service” tab, then on “My Degree Audit.”

BS/MS in Chemistry**NU CORE REQUIREMENTS**

See page 42 for requirement list.

CHEMISTRY MAJOR TECHNICAL REQUIREMENTS**Mathematics**

Complete the following two courses:

MTH U151	Calculus and Differential Equations for Biology 1	4 SH
or MTH U241	Calculus 1 for Science and Engineering	4 SH
MTH U152	Calculus and Differential Equations for Biology 2	4 SH
or MTH U242	Calculus 2 for Science and Engineering	4 SH

Biochemistry

Complete one of the following courses with corresponding lab:

BIO U323	Biochemistry	4 SH
with BIO U324	Lab for BIO U323	1 SH
CHM U621	Principles of Chemical Biology for Chemists	3 SH
with CHM U622	Lab for CHM U621	1 SH

Physics

Complete the following two courses with corresponding labs:

PHY U145	Physics for Life Sciences 1	4 SH
with PHY U146	Lab for PHY U145	1 SH
or PHY U161	Physics 1	4 SH
with PHY U162	Lab for PHY U161	1 SH
PHY U147	Physics for Life Sciences 2	4 SH
with PHY U148	Lab for PHY U147	1 SH
or PHY U165	Physics 2	4 SH
with PHY U166	Lab for PHY U165	1 SH

CHEMISTRY MAJOR REQUIREMENTS**General Chemistry 1**

Complete the following course with corresponding lab:

CHM U217	General Chemistry 1 for Chemical Science Majors	4 SH
with CHM U218	Lab for CHM U217	2 SH

General Chemistry 2

Complete the following course with corresponding lab:

CHM U220	General Chemistry 2 for Chemical Science Majors	4 SH
with CHM U221	Lab for CHM U220	2 SH

Intermediate-Level Chemistry—Organic Chemistry 1

Complete the following course with corresponding lab:

CHM U315	Organic Chemistry 1 for Chemistry Majors	4 SH
with CHM U316	Lab for CHM U315	2 SH

Intermediate-Level Chemistry —Organic Chemistry 2

Complete the following course with corresponding lab:

CHM U317	Organic Chemistry 2 for Chemistry Majors	4 SH
with CHM U318	Lab for CHM U317	2 SH

Intermediate-Level Chemistry 1

Complete the following two courses with corresponding labs:

BIOANALYTICAL CHEMISTRY		
CHM U331	Bioanalytical Chemistry	4 SH
with CHM U332	Lab for CHM U331	1 SH

PHYSICAL CHEMISTRY

CHM U401	Physical Chemistry 1	4 SH
with CHM U402	Lab for CHM U401	1 SH

Intermediate-Level Chemistry 2

Complete the following course with corresponding lab:

CHM U421	Biophysical Chemistry	4 SH
with CHM U404	Lab for CHM U403	1 SH

Advanced-Level Chemistry

Complete the following four courses with corresponding labs, where indicated:

CHM G246	Synthesis and Reactivity of Inorganic Compounds	3 SH
or CHM G346	Organometallic Chemistry	3 SH
CHM U521	Instrumental Methods of Analysis	1 SH
with CHM U522	Instrumental Methods of Analysis Lab	4 SH
CHM U531	Chemical Synthesis Characterization	1 SH
with CHM U532	Chemical Synthesis Characterization Lab	4 SH
CHM G268	Spectroscopy of Organic Compounds	3 SH

Senior Research/Capstone

Complete the following course:

CHM U750	Senior Research	4 SH
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GRADUATE REQUIREMENTS**Graduate Seminars**

Complete the following (repeatable) course three times:

CHM G504	Graduate Seminar	1 SH
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Graduate Electives

Complete five graduate electives.

Master's Research and Thesis

Complete 10 semester hours of master's thesis research:

CHM G661	Master's Research	1 SH
CHM G662	Master's Research	2 SH
CHM G663	Master's Research	3 SH
CHM G664	Master's Research	4 SH
CHM G665	Master's Research	5 SH
CHM G666	Master's Research	6 SH

CHEMISTRY BS/MS MAJOR CREDIT REQUIREMENT

Complete 113 semester hours in the major.

GENERAL ELECTIVES

Additional courses taken beyond college and major course requirements to satisfy graduation credit requirements.

COOPERATIVE EDUCATION

If elected

UNIVERSITY-WIDE REQUIREMENTS

160 total semester hours required

Minimum 2.000 GPA required for undergraduate courses

Minimum 3.000 GPA required for graduate courses

Minor in Chemistry**REQUIRED COURSES**

Complete the following six courses with corresponding labs.

Engineering students may take CHM U151 in place of CHM U211 and two other chemistry courses in place of CHM U214 and CHM U401:

General Chemistry 1

CHM U211	General Chemistry 1	4 SH
with CHM U212	Lab for CHM U211	1 SH

General Chemistry 2

CHM U214	General Chemistry 2	4 SH
with CHM U215 Lab for CHM U214		1 SH

Organic Chemistry 1

CHM U311	Organic Chemistry 1	4 SH
with CHM U312 Lab for CHM U311		1 SH

Organic Chemistry 2

CHM U313	Organic Chemistry 2	4 SH
with CHM U314 Lab for CHM U313		1 SH

Physical Chemistry 1

CHM U401	Physical Chemistry 1	4 SH
with CHM U402 Lab for CHM U401		1 SH

Physical Chemistry 2

CHM U403	Physical Chemistry 2	4 SH
with CHM U404 Lab for CHM U403		1 SH
or CHM U637	Foundations of Spectroscopy	3 SH
or CHM U421	Biophysical Chemistry	4 SH

GPA REQUIREMENT

2.000 GPA required in the minor