

# CHEMISTRY, B.S.

## Contact

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## Mission

Chemistry and physics are both fundamental sciences that touch every aspect of our lives and the world around us. Chemistry is the study of matter: its chemical and physical properties, the chemical and physical changes it undergoes, and the energy changes that accompany those processes.

Chemistry often is referred to as the central science. It rests upon the foundation of mathematics and physics and in turn is the essential basis for the life sciences such as biology and medicine. Chemistry is largely an experimental science and has applications in such diverse areas of research as the development of new drugs, the search for solutions to problems of environmental pollution, and the derivation of alternative energy sources. Much cutting-edge research in biology and medicine is being carried out at the level of atoms and molecules, the particles of matter upon which the study of chemistry is based.

Physics, too, is the study of matter and energy, viewed from a different perspective. Understanding living systems and the universe in which we live requires an understanding of the chemical and physical principles that operate within them.

In addition to offering majors in Chemistry, Biochemistry, and Laboratory Science, and minors in Chemistry, Biochemistry, and Biophysics, the School of Molecular and Physical Sciences fills a significant role for students in other programs through its introductory courses in chemistry and physics. Because of the fundamental roles of chemistry and physics in the biological, environmental, and health sciences, students in these programs benefit from the conceptual, quantitative, problem-solving, and communication skills stressed in the introductory courses, which form the foundation for later courses in the students' majors.

## Major Description

The Bachelor of Science degree with a major in Chemistry stresses the fundamental aspects of chemistry as a discipline, including analytical chemistry, biochemistry, organic chemistry, inorganic chemistry, and physical chemistry.

Coursework in the core areas of chemistry is complemented with laboratory experiments designed to illustrate important chemical principles, theories, and applications through discovery with the integration of practical instrumental techniques that are essential in the field. While the chemistry core courses provide both depth and breadth in the basic areas of chemistry, students also have the opportunity to intensely study selected modern applications in advanced elective courses and in undergraduate research.

The School of Molecular and Physical Sciences' faculty members are highly committed to excellence in undergraduate education and offer many opportunities for students to engage in collaborative, mentored undergraduate research. Additionally, the department is well equipped with modern laboratory instrumentation, available to students in laboratory courses and in undergraduate research projects.

The curriculum is designed to meet the requirements of the American Chemical Society Committee on Professional Training. Since the School of Molecular and Physical Sciences courses stress the integration of theory and experiment, the development of critical thinking and problem-solving skills, and the cultivation of oral and written communication skills, students are well-prepared for direct entry into the workforce, or into competitive graduate programs in the physical sciences and other related technology fields. Chemistry graduates are also well prepared for entry into professional programs such as medical, dental, pharmacy, or veterinary schools.

## Honors Program

We offer qualified students the option of graduating with Honors. This includes significant research, scholarship or creative activity under the direction of a faculty member. Interested students should consult with their major advisor.

## Transfer Credit

See Undergraduate Admissions (<https://catalog.une.edu/undergraduate/admissions/>) for more information.

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## Financial Information

Tuition and fees for subsequent years may vary. Other expenses include books and housing. For more tuition and fee information, please consult this catalog's Financial Information (<https://catalog.une.edu/undergraduate/financial-information-undergraduate-programs/>) section.

## Curricular Requirements

Code	Title	Hours
<b>Nor'easter Core Requirements</b>		
Nor'easter Core Requirements ( <a href="https://catalog.une.edu/undergraduate/core-curriculum/">https://catalog.une.edu/undergraduate/core-curriculum/</a> )		40
<b>Program Required Courses</b>		
CHE 150 & 150L	University General Chemistry I and University General Chemistry I Lab <sup>1</sup>	4
CHE 151 & 151L	University General Chemistry II and University General Chemistry II Lab <sup>1</sup>	4
CHE 250 & 250L & 250S	University Organic Chemistry I and University Organic Chemistry I Lab and University Organic Chemistry I Lab Lecture <sup>1</sup>	5
CHE 251 & 251L & 251S	University Organic Chemistry II and University Organic Chemistry II Lab and University Organic Chemistry II Lab Lecture <sup>1</sup>	5
CHE 280 & 280L	Intermediate Inorganic Chemistry and Intermediate Inorganic Chemistry Lab	3
CHE 307 & 307L	Quantitative Analysis and Quantitative Analysis Lab	5
CHE 350 & 350L	Biochemistry I: Proteins and Biochemistry I Proteins Lab	5
CHE 370 & 370L	Physical Chemistry I and Physical Chemistry I Lab	4
CHE 371	(Physical Chemistry II)	3
CHE 375	Advanced Laboratory	2

CHE 401	Seminar	1
CHE 417 & 417L	Instrumental Methods of Analysis and Instrumental Methods Lab	4
MAT 190	Calculus I	4
MAT 195	Calculus II	4
MAT 200	Calculus III	4
PHY 210	University Physics I <sup>1</sup>	4
PHY 211	University Physics II <sup>1</sup>	4
Program Specific Elective(s)		3
Open Elective Courses (Students complete open elective credits as necessary to meet the University's 120-credit minimum for graduation. The total number of elective credits required will depend on the student's completed program, core, and other degree requirements.)		12
<b>Total Hours</b>		<b>120</b>

<sup>1</sup> Matriculated majors are expected to enroll in the University course sequences for general chemistry, organic chemistry, and physics. The following substitutions may be made with program permission: CHE 110 General Chemistry I for CHE 150 University General Chemistry I; CHE 111 General Chemistry II for CHE 151 University General Chemistry II; CHE 201 Organic Chemistry I for CHE 250 University Organic Chemistry I; CHE 202 Organic Chemistry II for CHE 251 University Organic Chemistry II; PHY 110 General Physics I w/Lab for PHY 210 University Physics I; and/or PHY 111 General Physics II w/Lab for PHY 211 University Physics II.

Please note: While some courses can fulfill both core and program requirements, the credits earned do not count twice towards the minimum total required credits for the degree.

Students wishing to pursue teacher certification in Physical Science can complete a double major with Chemistry and Middle and Secondary Education, or a major in Middle and Secondary Education and a concentration in Chemistry. For more information, see the Middle and Secondary Education catalog page.

### Program-Specific Electives

Code	Title	Hours
Select one of the following:		3
CHE 320	(Mechanistic Organic Chemistry)	
CHE 380	Inorganic Chemistry	
CHE 405	Medicinal Chemistry	
CHE 410	Research I	
CHE 411	Research II	
CHE 420	(Spectroscopic Methods of Structural Analysis)	
CHE 450	Advanced Biochemistry Lab	
CHE 495	Advanced Chemistry Internship	3

### Academic and Technical Standards

A minimum grade of C- must be achieved in all required science and mathematics courses used toward graduation in chemistry/secondary education, and a 2.00 cumulative grade-point average in the sciences is a requirement for graduation.

### Learning Outcomes

- Students will be able to describe and apply advanced chemical information and concepts.
- Students will be able to demonstrate proficiency in safe laboratory practices and use of instrumentation standard to the discipline.
- Students will be able to clearly communicate chemical information in both oral and written forms.
- Students will be able to work collaboratively in various team settings.
- Students will be able to compete successfully for placement in graduate programs or employment relevant to the field of study.