
CHEMISTRY (CH)

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The science of chemistry is a central component of modern science education. A major in chemistry with sound selective courses will prepare the student in a variety of fields, such as molecular biology and biotechnology, chemistry, environmental science, medicine, pharmacy, and physiology.

The goal of this department is to educate students to be competent in their chosen careers. Our mission is to provide educational opportunities that are challenging and reflect the current state of knowledge in the field. In the past, our graduates have been successful in graduate schools and in professional schools, and have found jobs in industrial laboratories and in the teaching field.

Students must attain at least a 2.00 grade point average in the major in order to graduate.

Requirements for a Major in Chemistry:

In addition to the general education requirements, the following courses are required:

	Semester Hours
CH 101, 102, General Chemistry I, II	8
CH 201, 202, Quantitative Analysis and Lab	4
CH 260, Inorganic Chemistry	4
CH 301, 302, Organic Chemistry I, II	6
CH 303, 304, Organic Chemistry Lab I, II	2
CH 350, 352, Physical Chemistry I, II	6
CH 351, 353, Physical Chemistry Lab I, II	2
CH 401, Biochemistry	4
CH 460, Senior Seminar	2
CH Elective (Choose from CH 310, CH 320, CH 340, or CH 360)	4
MTH 201, 202, Calculus I, II	6
PSC 201, 202, General College Physics I, II	8
	Total 56

Sample Four-Year Course Sequence: Chemistry

Freshman Year:

CH 101, 102, General Chemistry I, II
MTH 201, 202, Calculus I, II

Sophomore Year:

CH 201, 202, Quantitative Analysis and Lab
CH 260, Inorganic Chemistry
CH 301, 303, Organic Chemistry I and Lab
CH 302, 304, Organic Chemistry II and Lab

Junior Year:

PSC 201, 202, General College Physics I, II
CH 350, 351, Physical Chemistry I and Lab
CH 352, 353, Physical Chemistry II and Lab

Senior Year:

CH 401, Biochemistry
CH Elective
CH 460, Senior Seminar

Requirements for a Major in Chemistry with a

Teaching License:

	Semester Hours
CH 101, 102, General Chemistry I, II	8
CH 201, 202, Quantitative Analysis and Lab.....	4
CH 260, Inorganic Chemistry	4
CH 301, 302, Organic Chemistry I, II.....	6
CH 303, 304, Organic Chemistry Lab I, II.....	2
CH 350, 352, Physical Chemistry I, II	6
CH 351, 353, Physical Chemistry Lab I, II.....	2
CH 460, Senior Seminar.....	2
MTH 201, 202, Calculus I, II.....	6
PSC 201, 202, General College Physics I, II.....	8
BIO 101, Introduction to Biology	4
	Total 52

The other **General Education** and **Professional Education** requirements which must be met to be recommended for a teaching license in Chemistry are explained in detail on page 124.

Sample Four-Year Course Sequence: Chemistry with a Teaching

License

Freshman Year:

BIO 101, Introduction to Biology
CH 101, 102, General Chemistry I, II
MTH 201, 202, Calculus I, II
TH 103, Introduction to Human Communications
CSS 113, Microcomputers and Application Software

Sophomore Year:

CH 201, 202, Quantitative Analysis and Lab
CH 260, Inorganic Chemistry
CH 301, 303, Organic Chemistry I and Lab
CH 302, 304, Organic Chemistry II and Lab
ED 290, Foundations of Education
HIS 201 or 202, American History I or II
PSY 205, Developmental Psychology

Junior Year:

PSC 201, 202, General College Physics I, II
CH 350, 351, Physical Chemistry I and Lab
CH 352, 353, Physical Chemistry II and Lab
ED 322, Educational Psychology
ED 334, Content Reading and Language Development
ED 474, Secondary/PK-12 Curriculum
ED 478, Teaching Assistant: Secondary Education
PHL 150 or 210, Introduction to Philosophy or Ethics
HTH 110, Contemporary Health Problems

Senior Year:

- CH 460, Seminar
- ED 406, Instruction in Secondary/PK-12 Education
- ED 489, Directed Teaching/Seminar in Secondary Education/PK-12
- PE Fitness Course

Minor

Students electing a minor in Chemistry must complete CH 101, 102, 201, 202, and 7 or 8 semester hours from the following: CH 260, and 300-level Chemistry courses for a total of 19 to 20 semester hours.

Students must maintain a grade point average of at least 2.00 in the minor.

Biology/Chemistry

The Biology/Chemistry major adds the biology component to the chemistry component and is recommended for students in pre-med and for those considering graduate study in the health sciences.

The student who wishes to major in Biology/Chemistry must complete the General Education requirements of the University and the following 56 semester hours in Biology and Chemistry.

Requirements for a Major in Biology/Chemistry:

BIO 101, Introduction to Biology	4
BIO 103, General Zoology.....	4
Biology Electives (select from 204, 205, 301, 302, 330)	12
CH 101, 102, General Chemistry I, II	8
CH 201, 202, Quantitative analysis and Lab	4
CH 301, 302, Organic Chemistry I, II.....	6
CH 303, 304, Organic Chemistry Lab I, II.....	2
CH 350, Physical Chemistry I.....	3
CH 351, Physical Chemistry I Lab.....	1
CH 401, Biochemistry.....	4
PSC 201, 202, General College Physics I, II.....	8
	Total 56

Sample Four-Year Course Sequence:

Biology/Chemistry

Freshman Year:

- CH 101, 102, General Chemistry I, II
- BIO 102, General Botany
- BIO 103, General Zoology

Sophomore Year:

- CH 201, 202, Quantitative Analysis and Lab
- BIO Elective
- PSC 201, 202, General College Physics I, II

- 304 Organic Chemistry II Laboratory (1)
An emphasis of the organic synthesis of various kinds of organic compounds (alcohols, ketones, azo, dyes, etc.). The compounds synthesized will be routinely analyzed by gas chromatography and infrared spectroscopy. Prerequisites: CH 101, 102, 301, 303. Corequisite: CH 302.
- 310 Polymer Chemistry and Lab (4)
A brief introduction to the chemistry of polymers including lab experiences: basic concepts, classification, structure, and properties. Topics include kinetics and mechanism of polymerization reactions, stereochemistry, crystallinity, cross linking, polymer solutions, molar mass, thermal and mechanical properties and the applications of polymer chemistry. Prerequisites: CH 101, 102, 301, 302.
- 320 Instrumental Analysis and Lab (4)
A study of instrumentation principles and laboratory methods, including chromatographic methods of gas phase, liquid phase, thin layer and/or column method. Spectroscopic methods of NMR, UV, visible, and IR. Electrometric methods of titration and polarography, etc. Prerequisites: CH 201, 202. Alternate years.
- 340 Forensic Chemistry and Lab (4)
A review of the historical development of forensic science philosophies and practices. Students study a wide range of forensic techniques, describe the developing state of the art, and reflect on the changing role of forensic science in the administration of justice. Laboratory experiences based on these topics will be conducted. Prerequisites: CH 101, 102.
- 350 Physical Chemistry I (3)
A study of the theoretical aspects of physical phenomena in chemistry. Topics include properties of gas, thermo-dynamics equilibria, kinetics, and electrochemistry. Prerequisites: CH 101, 102. Corequisite: CH 351. Alternate years.
- 351 Physical Chemistry I Laboratory (1)
A laboratory study of experimental work on viscosity, density, conductance, kinetics, etc. The writing of formal laboratory reports is emphasized. Corequisite: CH 350. Alternate years.
- 352 Physical Chemistry II (3)
A study of topics including quantum chemistry, atomic, molecular structure and chemical bondings, spectra of atoms and molecules, statistical thermodynamics, surface and nuclear chemistry. Prerequisite: CH 350. Corequisite: CH 353. Alternate years.
- 353 Physical Chemistry II Laboratory (1)
A laboratory analysis of experiments to illustrate and supplement CH 352. Corequisite: CH 352. Alternate years.
- 360 Computational Chemistry and Lab (4)
A very brief and nonmathematical introduction to molecular mechanics and semi-empirical and *ab initio* molecular orbital methods. Students use graphics-based software to calculate equilibrium, transition-state geometries, reaction thermo-chemistry, and kinetics. Molecular modeling is used to elucidate molecular structures and chemical reactivity and selectivity. Prerequisites: CH 101, 102, 350, 352.

401 Biochemistry and Lab

(4)

A study of the relationship between biology and organic chemistry. Topics include biomolecules (synthesis, structure, and function), intermediary metabolism, and the function of cell components. Laboratory work will accompany lectures. Prerequisites: CH 101, 102, 301, 302, BIO 102, 103.

417 Water Quality Assessment and Lab (Same as ENS 417)

(4)

A course that introduces water quality testing and assessment. Commonly used testing methods and instrumentation provide a range of skills that may be used in the classroom and in the field. Topics include EPA-approved sampling and data collection techniques, instrument calibration and operation, environmental public policy issues, and the use of spreadsheets for data compilation. Aquatic environments will be monitored on a regular basis. No prerequisites.

460 Seminar

(2)

A study of selected topics on recent advances in the field or on research done by the student. Each student will prepare and present one or more reports. Open discussion by all students will follow. Prerequisite: Junior or senior status. Alternate years.