

Biological Chemistry

Department Website: <http://chemistry.uchicago.edu/kb>

Program of Study

The Department of Chemistry, in conjunction with the Department of Biochemistry and Molecular Biology (BCMB) in the Division of the Biological Sciences, offers a BS degree in Biological Chemistry. The program is designed to prepare students to enter a variety of interdisciplinary fields in biochemical and biophysical sciences. Undergraduate research is strongly encouraged. By combining resources of both departments, students in this program are given the opportunity to study chemistry and physics of macromolecules, mechanisms of actions of enzymes and hormones, molecular and cellular biology, biotechnology, and other related fields.

Summary of Requirements

GENERAL EDUCATION

CHEM 11100-11200	Comprehensive General Chemistry I-II ^{†*‡}	200
One of the following sequences:		200
MATH 15100-15200	Calculus I-II	
MATH 16100-16200	Honors Calculus I-II [†]	
MATH 13100-13200	Elementary Functions and Calculus I-II (requires grade of A- or higher)	
BIOS 20186	Fundamentals of Cell and Molecular Biology ^{**}	100
BIOS 20187	Fundamentals of Genetics (or AP credit, if an AP 5 Fundamentals Sequence is completed) ^{+**}	100
Total Units		600

MAJOR

One of the following: ^{†*}		100
CHEM 11300	Comprehensive General Chemistry III	
CHEM 12300	Honors General Chemistry III	
One of the following:		100
MATH 15300	Calculus III	
MATH 16300	Honors Calculus III	
MATH 19620	Linear Algebra [†]	
MATH 13300	Elementary Functions and Calculus III (requires grade of A- or higher)	
MATH 20000-20100	Mathematical Methods for Physical Sciences I-II	200
CHEM 20100	Inorganic Chemistry I	100
PHYS 12100-12200-12300	General Physics I-II-III (or higher)	300
One of the following sequences:		300
CHEM 22000-22100-22200	Organic Chemistry I-II-III	
CHEM 23000-23100-23200	Honors Organic Chemistry I-II-III	
CHEM 26100 & CHEM 26200	Quantum Mechanics and Thermodynamics	200
CHEM 26700	Experimental Physical Chemistry	100
One of the following:		100
CHEM 20200	Inorganic Chemistry II	
CHEM 23300	Intermediate Organic Chemistry	
CHEM 26300	Chemical Kinetics and Dynamics	
One appropriate 20000-level course in Biology (under the category Advanced-Level Courses) [§]		100
BIOS 20200	Introduction to Biochemistry	100
BIOS 21317	Topics in Biological Chemistry	100
One approved 30000-level biochemistry or chemistry course [§]		100
Total Units		1900

[†] Credit may be granted by examination.

[‡] CHEM 10100-10200 Introductory General Chemistry I-II and CHEM 12100-12200 Honors General Chemistry I-II also satisfy this requirement. Enrollment into a particular sequence is based on chemistry placement or AP score.

- * See Advanced Placement and Accreditation Examinations sections of this catalog. **Note that no credit is given for IB chemistry.**
- ** Chemistry and Biological Chemistry majors can take these courses without the Biological Sciences prerequisites (BIOS 20150-20151) unless they pursue a double major in the Biological Sciences. They are expected to show competency in mathematical modelling of biological phenomena covered in BIOS 20151.
- + Students with a score of 5 on the AP biology test receive one credit. They are eligible to register for a three-quarter AP 5 Fundamental Sequence. Upon completion of the sequence, students receive an additional AP credit, for a total of two, to meet the general education requirement. Students majoring in Biological Chemistry will count the AP 5 Fundamentals Sequence as three electives.
- § These courses must be chosen in consultation with the departmental counselor; their approval must be conveyed to the student's College adviser for proper documentation.

NOTE: The three-quarter sequence MATH 20300-20400-20500 Analysis in Rn I-II-III may be substituted for MATH 20000 Mathematical Methods for Physical Sciences I; please note that MATH 20250 Abstract Linear Algebra or STAT 24300 Numerical Linear Algebra is a prerequisite for MATH 20400. MATH 27300 Basic Theory of Ordinary Differential Equations may be substituted for MATH 20100 Mathematical Methods for Physical Sciences II. MATH 19620 Linear Algebra is recommended for Biological Chemistry majors who plan to pursue advanced study in physical chemistry.

Advanced Placement

Students who earn a score of 5 on the AP test in chemistry are given credit for CHEM 11100 Comprehensive General Chemistry I. Students with CHEM 11100 Comprehensive General Chemistry I credit may join CHEM 11200 Comprehensive General Chemistry II in the Winter Quarter. A score of 5 on the AP exam also permits students to take CHEM 12100-12200-12300 Honors General Chemistry I-II-III; students may opt to begin with CHEM 12100 Honors General Chemistry I in the Autumn Quarter or CHEM 12200 Honors General Chemistry II in the Winter Quarter. Students who complete the first quarter of Comprehensive General Chemistry or Honors General Chemistry forgo the AP credit. Note that no credit is given for IB chemistry.

Accreditation

The Department of Chemistry also administers accreditation examinations for CHEM 11100-11200-11300 Comprehensive General Chemistry I-II-III to entering College students. Only incoming first-year and transfer students are eligible to take these examinations, which are offered at the beginning of Autumn Quarter. Students may receive credit on the basis of their performance on accreditation examinations.

Grading

Students majoring in biochemistry must earn 1) a major GPA of 2.0 or higher and 2) a C- or higher in all courses required by the Biochemistry major, including those courses counting toward general education requirements in the mathematical, biological, and physical sciences. Nonmajors may take chemistry courses on a P/F basis; only grades of C- or higher constitute passing work.

Honors and Undergraduate Research

By their third year, students majoring in Biological Chemistry are strongly encouraged to participate in research with a faculty member. For more information on research opportunities and honors in Biological Chemistry, visit chemistry.uchicago.edu/undergraduate-chemistry-major-and-research.

Excellent students who pursue a substantive research project with a faculty member in the Department of Chemistry or the Department of Biochemistry and Molecular Biology should plan to submit an honors thesis based on their work. Students usually begin this research program during their third year, and they continue their research activities through the following summer and their fourth year. To be considered for honors, students are expected to complete their arrangements with the departmental counselor before the end of their third year and to register for one quarter of CHEM 29900 Advanced Research in Chemistry or one year of CHEM 29600 Research in Chemistry during their third or fourth years.

A BS with honors in Biological Chemistry requires students to write a creditable honors paper describing their research. The paper must be approved by the program advisers in the Department of Chemistry and the Department of Biochemistry and Molecular Biology, and it must be submitted before the deadline established by the department. In addition, an oral presentation of the research is required.

To earn a BS degree with honors in Biological Chemistry, students must also have an overall GPA of 3.0 or higher.

Joint Degree Program

A four-year joint degree program leading to a concurrent award of the BS in Biological Chemistry and the MS in Chemistry is available for a select group of students who have achieved advanced standing through their performance on placement or on accreditation examinations. Special programs are developed for such students. For more information, consult Ka Yee Lee at kayeelee@uchicago.edu and Vera Dragisich at vdragisi@uchicago.edu in the Chemistry Department.



Font Notice

This document should contain certain fonts with restrictive licenses. For this draft, substitutions were made using less legally restrictive fonts. Specifically:

Times was used instead of Trajan.

Times was used instead of Palatino.

The editor may contact Leepfrog for a draft with the correct fonts in place.