BIOCHEMISTRY

Bachelor of Science — Joint Major, Biology and Chemistry Departments

Andrew Smith, *Professor and Steering Committee Chairperson*

The biochemistry major provides a strong background for graduate study in biochemical science, preparation for medical school or a career in the pharmaceutical, agricultural, environmental, and biotechnology industries. The curriculum combines a strong background in relevant areas of chemistry and biology with focused study in biochemistry, including extensive laboratory courses that cover major experimental techniques in biochemistry. Students may participate in a diverse array of research programs with faculty from the biology or chemistry departments. The capstone course integrates coursework and biochemical experimental techniques through study of current research results in biochemistry through exposure to the primary literature.

Requirements for Honors in Biochemistry

Students may apply for honors to the biochemistry steering committee no later than three days before the add/drop deadline in the fall semester of their senior year. They must have completed at least 3 credits of research at level 3 or above to qualify and must have a minimum overall GPA of 3.00 with a 3.30 average in all chemistry and biology courses.

If the application is approved, students conduct an honors project designed in consultation with an adviser from either the biology or chemistry faculty. An honors committee of no fewer than three faculty members, including the adviser, is selected from both biology and chemistry faculties, with at least one member from each department. The committee reviews the project periodically to monitor the student's progress.

An honors thesis is to be submitted by the student no later than three weeks before the date of graduation. The honors thesis is evaluated by the honors committee. An oral defense of the thesis, open to faculty and students of both departments, is made before the honors committee. Final approval from consultation of the honors committee and the chairs of biology and chemistry.

Majors

- Biochemistry Major — B.S. (https://catalog.ithaca.edu/undergrad/schools/school-humanities-sciences/biochemistry/biochemistry-major-bs/)

BIOC 19100-19200 Research: Biochemistry (LA)
After consultation with a faculty member doing biochemical research, the student undertakes a research problem under the guidance of that faculty member. Prerequisites: Permission of the faculty member.
Attributes: NS
1-3 Credits

BIOC 24000 Experimental Biochemistry (LA)
Immersion in a project-based research environment, focusing on current methodologies in biochemistry, molecular biology, genomics, and bioinformatics. In a highly collaborative atmosphere, students will form an interactive research team that engages in rigorous scientific problem solving through the sharing of ideas and progress reports. Prerequisites: BIOL 12100 or BIOL 11900; CHEM 22100. (Y)
Attributes: ENRE, NS
2 Credits

BIOC 29100 Research: Biochemistry (LA)
After consultation with a faculty member doing biochemical research, the student undertakes a research problem under the guidance of that faculty member. Prerequisites: Permission of the faculty member.
Attributes: NS
1-3 Credits

BIOC 29200 Research: Biochemistry (LA)
After consultation with a faculty member doing biochemical research, the student undertakes a research problem under the guidance of that faculty member. Prerequisites: Permission of the faculty member.
Attributes: NS
1-3 Credits

BIOC 33300 Biochemistry and Molecular Biology (LA)
A one-semester survey course covering the main concepts of biochemistry and molecular biology. Covers protein structure, enzymology, core metabolism, nucleic acid structure, DNA replication, transcription and translation from a molecular perspective. Lecture/discussion: Three hours. Not open to students who have completed BIOC 35300 or BIOC 35400. Prerequisites: BIOL 11900 or BIOL 12100; CHEM 22200. (S,Y)
Attributes: BIEL
3 Credits

BIOC 35300 Biochemistry: Protein Structure & Function (LA)
Introduction to biochemistry, including consideration of protein, enzyme, carbohydrate, and lipid structure and function, and metabolism of sugars, fatty acids, and amino acids. Mechanisms of reactions and control of pathways are stressed. Three hours of lecture per week. Prerequisites: CHEM 22200 and 23200. (F,Y)
Attributes: BIEL, QL
3 Credits

BIOC 35400 Biochemistry: Molecular Biology of the Gene (LA)
The structure of nucleic acids and chromosomes, replication of DNA, mutation and repair, DNA recombination, transcription, RNA processing, translation, gene regulation in prokaryotes and eukaryotes, genes and development, and molecular medicine will be covered. Three hours of lecture and one hour of discussion per week. Prerequisites: CHEM 22200 and BIOL 22700. (S,Y)
Attributes: BIEL
4 Credits

BIOC 39000 Independent Research in Biochemistry (LA)
In consultation with a faculty member, student will plan and execute a research project in biochemistry or related area. The project will culminate in a research paper describing the findings as well as an oral presentation delivered to the department of the faculty advisor. Prerequisites: BIOL 22700; CHEM 23200; permission of instructor. (F-S, Y)

3 Credits

BIOC 39100-39200 Research: Biochemistry (LA)
After consultation with a faculty member doing biochemical research, the student undertakes a research problem under the guidance of that faculty member. Prerequisites: Permission of the faculty member.
Attributes: NS
1-3 Credits

BIOC 41000 Experimental Biochemistry (LA)
Immersion in a project-based research environment, focusing on current methodologies in biochemistry, molecular biology, genomics, and bioinformatics. In a highly collaborative atmosphere, students will form an interactive research team that engages in rigorous scientific problem solving through the sharing of ideas and progress reports. Prerequisites: BIOL 12100 or BIOL 11900; CHEM 22100. (Y)
Attributes: ENRE, NS
2 Credits

BIOC 48100 Current Topics in Biochemistry (LA)
Discussion of major research areas of current interest. Topics change from year to year, but may include genetic engineering and cloning techniques, mechanisms of carcinogenesis, toxicology, immunology, and gerontology. Prerequisites: WRTG 10600 or ICSM 10800-10899 or ICSM 11800-11899; BIOC 35300 and BIOC 35400. (S,Y)
Attributes: BIEL, CP, WI
3 Credits

BIOC 49100-49200 Research: Biochemistry (LA)
After consultation with a faculty member doing biochemical research, the student undertakes a research problem under the guidance of that faculty member. Prerequisites: Permission of the faculty member.
Attributes: NS
1-3 Credits

BIOC 49700-49800 Honors Research: Biochemistry (LA)
After consultation with a selected honors committee from biology and chemistry faculty, the student undertakes a research project under the guidance of a faculty member. An honors thesis and an oral defense of the thesis are required. Prerequisites: Admission to honors program; three credits of research at level 3 or above.
Attributes: NS
3-4 Credits