BIOCHEMISTRY IN THE COLLEGE OF ARTS AND SCIENCES

https://www.uvm.edu/biochemistry

The interdisciplinary Biochemistry program is administered by the College of Agriculture and Life Sciences (CALS) and the College of Arts and Sciences (CAS) in conjunction with the Larner College of Medicine (LCOM). The Bachelor of Science in Biochemistry can be pursued through the College of Agriculture and Life Sciences or through the College of Arts and Sciences.

COLLEGE OF ARTS AND SCIENCES BIOCHEMISTRY MAJOR

Biochemistry is the basic science that explores the chemical and physical properties of living organisms and the chemical changes that occur in these organisms. It is integral to the study of a variety of scientific disciplines, including biology, chemistry, microbiology, genetics, anatomy, physiology, and pharmacology. The Bachelor of Science degree in Biochemistry is an interdisciplinary undergraduate degree program offered through the College of Arts and Sciences (CAS), the College of Agriculture and Life Sciences (CALS) and the Larner College of Medicine (LCOM). It draws upon a broad set of University resources from all three colleges to provide students with a modern science-based education, emphasizing fundamental knowledge of chemistry and biology along with advanced courses specializing in biochemistry and biomedical sciences.

The Biochemistry curriculum is challenging, offering students with strong academic abilities in science an opportunity to explore upper-level courses in areas of modern biochemistry. Many students pursue undergraduate research projects with research advisors from the Biochemistry, Chemistry, or Microbiology & Molecular Genetics departments. These students gain invaluable research experience that will prepare them for future pursuits in industry or academia. Thus, the Biochemistry degree is designed to meet the needs of students wishing to compete in the job market at the B.S. degree level as well as students planning to continue with advanced studies in a graduate or professional degree program.

MAJORS

BIOCHEMISTRY MAJOR

Biochemistry B.S.

MINORS

BIOCHEMISTRY MINOR

Biochemistry

GRADUATE

Biochemistry AMP

Biochemistry M.S.

Cellular, Molecular and Biomedical Sciences M.S.

Cellular, Molecular and Biomedical Sciences Ph.D.

See the online Graduate Catalogue for more information

Courses

BIOC 1010. Biochem: Modern Perspect I. 1 Credit.
This is Part I of a sequence to help students develop an understanding of what the field of biochemistry is, its core principles, and what biochemists do. Prerequisites: Biochemistry major, First-year standing.

BIOC 1011. Biochem: Modern Perspect II. 1 Credit.
This is Part 2 of a sequence to help students develop an understanding of what the field of biochemistry is, its core principles, and what biochemists do. Prerequisites: Biochemistry major, First-year standing.

BIOC 1990. Special Topics. 1-18 Credits.
See Schedule of Courses for specific titles.

BIOC 1991. Internship. 1-3 Credits.
On-site supervised work experience combined with a structured academic learning plan directed by a faculty member or a faculty-staff team in which a faculty member is the instructor of record, for which academic credit is awarded. Offered at department discretion.

BIOC 1993. Independent Study. 1-18 Credits.
A course which is tailored to fit the interests of a specific student, which occurs outside the traditional classroom/laboratory setting under the supervision of a faculty member, for which credit is awarded. Offered at department discretion.

BIOC 2990. Special Topics. 1-18 Credits.
See Schedule of Courses for specific titles.

BIOC 2991. Internship. 1-18 Credits.
On-site supervised work experience combined with a structured academic learning plan directed by a faculty member or a faculty-staff team in which a faculty member is the instructor of record, for which academic credit is awarded. Offered at department discretion.

BIOC 2993. Independent Study. 1-18 Credits.
A course which is tailored to fit the interests of a specific student, which occurs outside the traditional classroom/laboratory setting under the supervision of a faculty member, for which credit is awarded. Offered at department discretion.

BIOC 2994. Teaching Assistantship. 1-3 Credits.
Undergraduate student service as a teaching assistant, usually in an introductory-level course in the discipline, for which credit is awarded. Offered at department discretion.

BIOC 2995. Undergraduate Research. 1-18 Credits.
Undergraduate student work on individual or small team research projects under the supervision of a faculty member, for which credit is awarded. Written report due at end of each semester. Prerequisite: Instructor permission.

BIOC 3001. Fundamentals of Biochemistry. 3 Credits.
Provides a broad introduction to the field of biochemistry. Students will explore the molecular basis and chemical principles of biochemistry pertinent to living systems. This course is taught by LCOM faculty and emphasizes the relevance of biochemistry to health, disease, physiology and medicine. Prerequisites: CHEM 1150, CHEM 1580, CHEM 1550, CHEM 2585, or equivalent; BIOL 1450, BCOR 1450, BCOR 2500, or equivalent.

BIOC 3003. Fundamentals of Biochem Lab. 1 Credit.
A companion laboratory course for BIOC 3001 Fundamentals of Biochemistry. Designed to provide students with hands-on biochemical experience that will be useful for a future career in science; focuses on some of the most commonly used techniques in today's biomedical research laboratories. Pre/Co-requisite: BIOC 3001.

BIOC 3005. Biochemistry I. 3 Credits.
Introduction to chemistry and structure of biological macromolecules; examination of mechanisms of chemical processes in biological systems including enzyme catalysis, biosynthesis, regulation, and information transfer. Prerequisite: CHEM 1550 or CHEM 2585.

BIOC 3006. Biochemistry II. 3 Credits.
Continuation of Biochemistry I. Biochemistry of nucleic acids; nucleic acid based processes, such as replication and transcription; cellular information transfer, genomics, and proteomics. Prerequisite: BIOC 3005.

BIOC 3007. Biochemistry Lab. 3 Credits.
Introduction to biochemical tools, including spectrometry, chromatography, and electrophoresis; natural and recombinant enzyme isolation; assays of DNA-modifying enzymes; computer-based structure/function exercises. Prerequisite: BIOC 3005.

BIOC 3030. Adv Biochem Lab: Protein CURE. 4 Credits.
Course-based undergraduate research experience (CURE) designed to develop students' critical thinking and use of the scientific method. Students will read the literature to identify a biological question linked to a specific protein, develop a hypothesis, and test it at the bench. Findings will be presented to their classmates. Prerequisites: BIOC 3005, BIOC 3006, BIOC 3007. Pre/Co-requisites: BIOC 3005, BIOC 3006, BIOC 3007.

BIOC 3063. Nutritional Biochemistry. 3 Credits.
Comprehensive study of the metabolism of the macro-nutrients by humans with emphasis on hormonal control of biochemical pathways, nutritional and metabolic interrelationships and dietary disorders. The biochemistry of the micronutrients and vitamins will also be studied. Prerequisite: BIOC 3001, BIOC 3005, or NFS 2183.

BIOC 3075. Adv Biochem of Human Disease. 3 Credits.
The course takes a deep dive into five distinct areas of biochemistry related to a disease or group of diseases primarily through group learning. Key biochemical principles are reviewed and extended. Additionally students will read and discuss a primary literature article with each area. Prerequisites: NFS 2183, BIOC 3001, or BIOC 3005.

BIOC 3990. Special Topics. 1-18 Credits.
See Schedule of Courses for specific titles.

BIOC 3991. Internship. 1-18 Credits.
On-site supervised work experience combined with a structured academic learning plan directed by a faculty member or a faculty-staff team in which a faculty member is the instructor of record, for which academic credit is awarded. Offered at department discretion.

BIOC 3993. Independent Study. 1-18 Credits.
A course which is tailored to fit the interests of a specific student, which occurs outside the traditional classroom/laboratory setting under the supervision of a faculty member, for which credit is awarded. Offered at department discretion.

BIOC 3994. Teaching Assistantship. 1-3 Credits.
Undergraduate student service as a teaching assistant, usually in an introductory-level course in the discipline, for which credit is awarded. Offered at department discretion.

BIOC 3995. Undergraduate Research. 1-18 Credits.
Undergraduate student work on individual or small team research projects under the supervision of a faculty member, for which credit is awarded. Offered at department discretion.

BIOC 4084. Biochemistry Senior Seminar. 1 Credit.
Oral and written presentation of a subject of current biochemical interest. Prerequisite: Senior standing.

BIOC 4996. Honors. 1-6 Credits.
College honors thesis or other department/program honors, under the supervision of a faculty member. Offered at department discretion.