

BIOCHEMISTRY

OVERVIEW

The goal of the Biochemistry Graduate Program at the University of Vermont is to prepare students for careers in science as both researchers and educators. This is accomplished by expanding knowledge of both chemistry and biochemistry, while cultivating the ability for critical analysis, creativity and independent study.

DEGREES

- Biochemistry AMP
- Biochemistry M.S.

FACULTY

Berger, Christopher; Associate Professor, Department of Molecular Physiology & Biophysics; PHD, University of Minnesota

Bouchard, Beth Ann; Assistant Professor, Department of Biochemistry; PHD, University of Vermont

Brummel-Ziedins, Kathleen E.; Associate Professor, Department of Biochemistry; PHD, University of Maryland College Park

Butenas, Saulius; Associate Professor, Department of Biochemistry; PHD, Institute of Polytech at Kansas

Everse, Stephen Jay; Associate Professor, Department of Biochemistry; PHD, University of California San Diego

Francklyn, Christopher Steward; Professor, Department of Biochemistry; PHD, University of California Santa Barbara

Gordon, Jonathan; Assistant Professor, Department of Biochemistry; PHD, University of Western Ontario, Canada

Heath, Jessica; Assistant Professor, Department of Pediatrics; Department of Biochemistry; MD, SUNY Stony Brook

Hondal, Robert J.; Associate Professor, Department of Biochemistry; PHD, Ohio State University

Kelm, Robert; Associate Professor, Department of Medicine; PHD, University of Vermont

Lian, Jane; Professor, Department of Biochemistry; PHD, Boston University School of Medicine

Morrison, Scott Walker; Professor, Department of Biochemistry; PHD, University of Wisconsin Madison

Silveira, Jay R.; Assistant Professor, Department of Biochemistry; PHD, University of Vermont

Stein, Gary; Professor, Department of Biochemistry; PHD, University of Vermont

Stein, Janet; Professor, Department of Biochemistry; PHD, Princeton University

Tracy, Paula Babiarz; Professor, Department of Biochemistry; PHD, Syracuse University

Zaidi, Sayyed Kaleem; Associate Professor, Department of Biochemistry; PHD, University of Punjab

Courses

BIOC 205. 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 142 or CHEM 144. Cross-listed with: CHEM 205 and MMG 205.

BIOC 206. 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 205, CHEM 205, or MMG 205. Cross-listed with: CHEM 206, MMG 206.

BIOC 207. Biochemistry Lab. 2 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 205, CHEM 205, or MMG 205. Cross-listed with: CHEM 207, MMG 207.

BIOC 212. Biochemistry of Human Disease. 3 Credits.

Molecular approach to genetic, metabolic, and infectious diseases; recombinant DNA technology and medicine; molecular biology of cancer. Prerequisite: CHEM 042, CHEM 044, or CHEM 141.

BIOC 240. Macromol Struct Prot&Nucl Acid. 3 Credits.

Introduction to structural biology and macromolecular structure with an emphasis on protein-protein and protein-nucleic acids interactions. Prerequisites: BIOL 002 or BCOR 012, and CHEM 142; Junior standing. Cross-listed with: MMG 240. Alternate years.

BIOC 301. General Biochemistry. 0 or 3 Credits.

Survey for science majors. Chemistry, structure, metabolism, and function of proteins, carbohydrates, lipids; enzymes, bioenergetics and respiratory processes. Prerequisite: CHEM 142 or CHEM 144, or Instructor permission.

BIOC 302. General Biochemistry. 3 Credits.

Survey for science majors. Amino acids, nucleic acids, protein synthesis, cellular and physiological control mechanisms. Prerequisite: CHEM 142 or CHEM 144, or Instructor permission.

BIOC 305. Medical Biochemistry. 3 Credits.

A survey course in human biochemistry, with particular emphasis on medical applications.

BIOC 306. Medical Biochemistry. 3 Credits.

A survey course in human biochemistry, with particular emphasis on medical applications.

BIOC 307. Special Topics in Biochemistry. 1-3 Credits.

Areas of biochemistry not treated in concurrent advanced course offerings.

BIOC 308. Special Topics in Biochemistry. 1-3 Credits.

Areas of biochemistry not treated in current advanced course offerings.

BIOC 309. Laboratory Research Rotations. 3 Credits.

Two sequential research projects in Departmental faculty laboratories, composed of experimental work, an oral presentation, and a written report. First semester.

BIOC 310. Laboratory Research Rotations. 3 Credits.

Two sequential research projects in Departmental faculty laboratories, composed of experimental work, an oral presentation and a written report. Second semester.

BIOC 325. Data Analysis&Presentation I. 2 Credits.

Develop graduate level skills in data analysis, reading, writing, teaching and presenting your own work and that of others (Part 1 of 2). Prerequisites: Graduate standing; Enrollment in BIOC 301 and CLBI 301. Cross-listed with: MPBP 325.

BIOC 326. Data Analysis&Presentation II. 2 Credits.

Develop graduate level skills in data analysis, reading, writing, teaching and presenting your own work and that of others (Part 2 of 2). Prerequisites: BIOC 301, CLBI 301; Graduate standing. Cross-listed with MPBP 326.

BIOC 351. Proteins I: Structure&Function. 3 Credits.

Special Topics: Introduction to concepts in protein structure and chemistry as well as exploration of ideas in a "hands on" fashion using computational resources. Prerequisite: BIOC 301, or Department permission. Alternate years.

BIOC 352. Protein: Nucleic Acid Interact. 3 Credits.

Structure of DNA and RNA, and the structure and assembly of nucleoprotein complexes will be described using examples from prokaryotes, yeast, viruses, and mammalian cells in culture. Prerequisites: MMG 211 or equivalent, and BIOC 302 or equivalent. Cross-listed with: MMG 352. Alternate years.

BIOC 353. Proteins II: Enzymology. 3 Credits.

General consideration of enzyme nomenclature, purification, assay, kinetics, mechanisms, cofactors, active sites, subunit structure, allosteric and regulatory properties, and control of multienzyme systems. Prerequisite: BIOC 301, or Department permission. Alternate years.

BIOC 354. Nucleic Acids II. 3 Credits.

The study of structure, composition, organization, function, synthesis, and metabolism of nucleic acids and nucleoprotein particles and matrices in eukaryotic organisms. Prerequisite: BIOC 302.

BIOC 370. Physical Biochemistry. 3 Credits.

Protein interaction, solubility and fractionation, electrophoresis, sedimentation, phase rule study, diffusion, viscosity, spectrophotometry, and related topics. Prerequisites: BIOL 302 and CHEM 162, or Department permission.

BIOC 372. Cancer Biology. 3 Credits.

Overview of cancer biology for health science students. Foundation for cancer research. Lecture format; interdisciplinary viewpoint; outside lectures. Prerequisite: BIOC 302, or Department permission.

BIOC 381. Seminar. 1 Credit.

A review of recent developments and current literature in the various fields of biochemistry. Prerequisite: Graduate standing.

BIOC 391. Master's Thesis Research. 1-12 Credits.

Credit as arranged.

BIOC 392. Independent Literature Rsch. 1-12 Credits.

Reading and literature research culminating in a paper on a topic of current interest in biochemistry.

BIOC 395. Special Topics. 1-12 Credits.**BIOC 396. Special Topics. 1-12 Credits.****BIOC 491. Doctoral Dissertation Research. 1-12 Credits.**

Credit as arranged.