

BIOMOLECULAR SCIENCE

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Biomolecular science explores the interface between the traditional disciplines of biology and chemistry. Students who meet the requirements of the concentration have the opportunity to have their degree accredited by the American Society for Biochemistry and Molecular Biology.

Overview of the Concentration

The concentration in biomolecular science will appeal to any student who is seeking an understanding of the core sciences of biology and chemistry but wishes to pursue an integrated selection of upper-level courses or to apply the study of biology and chemistry to a different major. An experiential learning component takes biomolecular science out of the traditional classroom and enables students to explore its applications in the laboratory.

Intended Learning Outcomes for the Concentration

Requirements

Requirements for the Concentration

Code	Title	Credits
The following core courses must be completed:		
BIO 150	Evolutionary Foundations of Biodiversity	1.00
BIO 227	Cell Biology	1.00
BIO 233	Intermediate Genetics	1.00
CHEM 122 or CHEM 125	Introductory Chemistry Structural Chemistry and Equilibrium	1.00
CHEM 126	Energies and Rates of Chemical Reactions	1.00
CHEM 247 & CHEM 253	Organic Chemistry I and Synthesis Laboratory I (0.25)	1.25
CHEM 248 & CHEM 254	Organic Chemistry II and Synthesis Laboratory II (0.25)	1.25
CHEM 379 & CHEM 373	Biochemistry I and Laboratory Research in Biochemistry (0.25)	1.25

Experiential Learning Component

Participation in an experiential learning component (see below)

Electives

Select at least two level III electives from the following: 2.00

BIO 315	Principles of Bioinformatics
BIO 324	Evolutionary Genetics
BIO 364	Molecular Biology
BIO 372	Developmental Biology

BIO 382	Immunology
BIO 383	Evolutionary Biology
BIO 391	Selected Topics (when appropriate, by petition)
CHEM 384	Bioanalytical Chemistry
CHEM 385	Biochemistry II
CHEM 391	Selected Topics in Chemistry (when taught as Biophysical Chemistry)

Students are encouraged to consult with their advisor and the program director about the appropriate physics and mathematical sequences for their interests as well as appropriate complementary courses.

Experiential Learning Component

Participation in an experimentally based research experience or employment that takes biomolecular sciences beyond the traditional classroom is required of each concentrator. This can occur either on- or off-campus. This activity must be approved by the Biomolecular Science Director and presented to the biomolecular science community.

Courses

BMOLS 111: Molecular Discovery II

In this second course of the Molecular Discovery Learning Community, students build on the content and research skills introduced in the first course (FYS120: Molecular Discovery I) while engaging in a laboratory-based research project. This course emphasizes experimental design, molecular techniques, and data analysis. Offered annually during January term.

Prerequisite: FYS 120, section entitled Molecular Discovery I.

BMOLS 201: Explorations in Biomolecular Science (0.25)

A quarter-credit course devoted to a broad study of the field of biomolecular science through the reading and discussion of primary and secondary literature across the field. While required of all biomolecular science concentrators, this course is open to all interested students. P/N only. Offered annually in the spring semester.

Prerequisite: BIO 150; CHEM 121 and CHEM 123, or CHEM 122, or CHEM 125, or CH/BI 125, or the equivalent.

BMOLS 294: Academic Internship

BMOLS 298: Independent Study

BMOLS 394: Academic Internship

BMOLS 396: Directed Undergraduate Research

This course provides a comprehensive research opportunity, including an introduction to relevant background material, technical instruction, identification of a meaningful project, and data collection. The topic is determined by the faculty member in charge of the course and may relate to his/her research interests. Offered based on department decision. May be offered as a 1.00 credit course or .50 credit course.

Prerequisite: determined by individual instructor.

BMOLS 398: Independent Research

Faculty

Program Director, 2025-2026

Kim A. Kandl

Paul and Mildred Hardy Distinguished Professor of Biology
cell biology; molecular biology; genetics

Douglas J. Beussman

Professor of Chemistry
analytical area - mass spectrometry; chemical instrumentation;
proteomics; forensic science; bioanalytical

Lisa M. Bowers

Associate Professor of Biology
microbiology; genetics; molecular biology; synthetic biology

Eric Cole

Professor of Biology
developmental biology; invertebrate zoology; cell biology

Jay A. Demas

Associate Professor of Physics and Biology
neuronal biophysics; sensory circuits; retinal neurophysiology

Steven A. Freedberg

Professor of Biology
evolutionary biology; computer simulation modeling; bioinformatics

Sara E. Fruehling

Associate Professor of Practice in Biology
microbiology; virology; genetics

Cassandra Joiner

Assistant Professor of Chemistry
chemical biology and protein biochemistry

Laura L. Listenberger

Professor of Biology and Chemistry
lipid biochemistry; cell and molecular biology

William (Will) Matchett

Visiting Assistant Professor of Biology

Greg W. Muth

Associate Professor of Chemistry
biochemistry

Jean C. Porterfield

Associate Professor of Biology
evolutionary biology; molecular ecology; gene expression analysis

Jeff J. Schweinfus

Professor of Chemistry; Edolph A. Larson and Truman E. Anderson, Sr.
Chair of Chemistry
physical and biophysical chemistry