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. The quarter-credit course, BMOLS 201 Explorations in Biomolecular Science (0.25), introduces concentrators and other interested students to the breadth of this scientific area. 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

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>BIO 150</td>
<td>Evolutionary Foundations of Biodiversity</td>
<td>1.00</td>
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<tr>
<td>BIO 227</td>
<td>Cell Biology</td>
<td>1.00</td>
</tr>
<tr>
<td>BIO 233</td>
<td>Intermediate Genetics</td>
<td>1.00</td>
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<tr>
<td>BMOLS 201</td>
<td>Explorations in Biomolecular Science (0.25)</td>
<td>0.25</td>
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<tr>
<td>CHEM 125</td>
<td>Structural Chemistry and Equilibrium</td>
<td>1.00</td>
</tr>
<tr>
<td>CHEM 126</td>
<td>Energies and Rates of Chemical Reactions</td>
<td>1.00</td>
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<tr>
<td>CHEM 247 &amp; CHEM 253</td>
<td>Organic Chemistry I and Synthesis Laboratory I (0.25)</td>
<td>1.25</td>
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<tr>
<td>CHEM 248 &amp; CHEM 254</td>
<td>Organic Chemistry II and Synthesis Laboratory II (0.25)</td>
<td>1.25</td>
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<tr>
<td>CHEM 379 &amp; CHEM 373</td>
<td>Biochemistry I and Experimental Biochemistry (0.25)</td>
<td>1.25</td>
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Experiential Learning Component

Participation in an experientially 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 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. Through exploration of the breadth of the field, biomolecular science concentrators plan their own level III course structure. 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.

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<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>BIO 324</td>
<td>Evolutionary Genetics</td>
<td></td>
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<tr>
<td>BIO 347</td>
<td>Surviving/Thriving in Extreme Environments: Biochemistry of Adaptation</td>
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<td>BIO 364</td>
<td>Molecular Biology</td>
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<td>BIO 372</td>
<td>Developmental Biology</td>
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<tr>
<td>BIO 382</td>
<td>Immunology</td>
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<tr>
<td>BIO 383</td>
<td>Evolutionary Biology</td>
<td></td>
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<tr>
<td>BIO 391</td>
<td>Selected Topics (when appropriate, by petition)</td>
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<tr>
<td>CHEM 360</td>
<td>Medicinal Chemistry</td>
<td></td>
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<td>CHEM 384</td>
<td>Bioanalytical Chemistry</td>
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<td>CHEM 385</td>
<td>Biochemistry II</td>
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<tr>
<td>CHEM 391</td>
<td>Selected Topics in Chemistry</td>
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<td></td>
<td>(when taught as Biophysical Chemistry)</td>
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<tr>
<td>CSCI 315</td>
<td>Bioinformatics</td>
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1 CH/BI 125, CH/BI 126 and CH/BI 227 can substitute for CHEM 125, CHEM 126, and BIO 227.

2 CHEM 121 and CHEM 123, or CHEM 122 can substitute for CHEM 125.

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.
BMOLS 398: Independent Research

Faculty

Director, 2019-2020
Laura L. Listenberger
Associate Professor of Biology and Chemistry
lipid biochemistry; cell and molecular biology

Beth R.J. Abdella
Associate Professor of Chemistry
bio-organic chemistry

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

James A. Demas
Associate Professor of Biology and Physics
neuronal biophysics; sensory circuits; retinal neurophysiology

Steven A. Freedberg (on leave)
Associate Professor of Biology
evolutionary biology; computer simulation modeling; bioinformatics

Kim A. Kandl
Associate Professor of Biology
cell biology; molecular biology; genetics

Gregory W. Muth
Associate Professor of Chemistry
biochemistry

Jeffrey J. Schwinefus
Professor of Chemistry
physical and biophysical chemistry

Anne Walter
Professor of Biology
comparative animal and cell physiology; membrane physiology and biophysics; comparative enzymology; applying biology in international settings