Biochemistry and Molecular Biology

Director: Deborah E. Lycan
Administrative Assistant: Amy Timmins

The molecular logic of living organisms is the focus of this major. Biochemists and molecular biologists study how the collection of molecules within the cell interact to maintain and perpetuate life. The biochemistry/molecular biology major at Lewis & Clark provides students with an opportunity to pursue an interdisciplinary course of study that follows the guidelines of the American Society for Biochemistry and Molecular Biology. Students majoring in biochemistry/molecular biology devote their first years of study to mastering the basic tenets of calculus, physics, genetics, and chemistry. Upper-division coursework exposes students to current research in biochemistry and cellular and molecular biology.

The distinctive character of our program derives from the curricular goals that shape it. Faculty associated with the biochemistry/molecular biology program are proponents of a lab-rich, investigative education for undergraduates in the sciences. Opportunities for scientific inquiry are woven into the laboratory curriculum and prepare the student ultimately to undertake collaborative research projects with the faculty. To foster the ability of our students to engage independently in the scientific process, we devote class time to critically reading the primary literature. In our laboratory courses, students participate in selecting and designing their experiments. The curriculum is constructed to engage students in the scientific process and thereby facilitate the development of reflective judgment and problem-solving skills.

Students majoring in biochemistry/molecular biology are guided by sponsoring faculty from both the biology and chemistry departments. The major prepares students for careers in biomedical research, biotechnology, and genetic engineering. It is especially suitable for students seeking admission to medical or dental schools, or to graduate programs in biochemistry, cell or molecular biology, or genetics. Students majoring in biochemistry/molecular biology may not minor in biology or chemistry.

Major Requirements

A minimum of 54 semester credits in biology and chemistry (11 semester credits of which are granted for associated laboratory work), plus courses in mathematics and physics, distributed as follows:

- BIO 151 Investigations in Genetics and Evolutionary Biology
- BIO 311 Molecular Biology
- BIO 312 Molecular Biology Lab
- BIO 361 Cell Biology
- One elective selected from the following:
  - BIO 200 Investigations in Cell and Molecular Biology
  - BIO 320 Human Genes and Disease
  - BIO 408 Phylogenetic Biology and Molecular Evolution
  - BIO 412 Developmental Biology
  - BIO 422 Neurobiology
  - BIO 462 Immunology
  - CHEM 110 General Chemistry I
  - CHEM 120 General Chemistry II
  - CHEM 210 Organic Chemistry I
  - CHEM 220 Organic Chemistry II
  - CHEM 310 Physical Chemistry: Thermodynamics and Kinetics
  - CHEM 330 Structural Biochemistry
  - CHEM 335 Metabolic Biochemistry
  - CHEM 336 Biochemistry Laboratory
  - MATH 131 Calculus I
  - MATH 132 Calculus II
  - PHYS 141 Introductory General Physics I
  - PHYS 142 Introductory General Physics II
  - Honors students must complete BCMB 410 Biochemistry/Molecular Biology Seminar.

Honors

Biochemistry/molecular biology majors who have distinguished themselves academically by earning a GPA of 3.500 or higher in the major and overall, have completed either BIO 312 or CHEM 336, and have some prior research experience are invited in the spring of their junior year to participate in the senior thesis program. Students who accept the invitation work with a faculty advisor to develop a research project, which must be approved by faculty overseeing the biochemistry/molecular biology major. Following the experimental work, students prepare a written thesis and orally defend it during the spring semester of the senior year. Honors are awarded to those students whose thesis is judged to be meritorious.

Faculty


Tuajuanda C. Jordan. Dean of the College of Arts and Sciences, professor of chemistry. Biochemistry, genomics, protein biochemistry. Ph.D. 1989 Purdue University.

B.S. 1982 Fisk University.


Courses

BCMB 410 Biochemistry/Molecular Biology Seminar
Faculty: Biochemistry and Molecular Biology Faculty. 
Content: Select topics in biochemistry and molecular biology. Students attend seminars of invited outside researchers and prepare an oral seminar on their own research or on a critical analysis of a relevant research publication.
Prerequisites: BIO 311. CHEM 330. CHEM 335 (may be taken concurrently).
Restrictions: Sophomore standing required.
Usually offered: Annually.
Semester credits: 1.

BCMB 496 Biochemistry/Molecular Biology Senior Research
Faculty: Biochemistry and Molecular Biology Faculty.
Content: In-depth laboratory inquiry into a question relevant to biochemistry/ molecular biology. Students develop a thesis proposal in association with a faculty mentor, conduct extensive experimental work to address their hypothesis, and present their analysis of their findings in a written thesis. 4 credits each semester of the senior year.
Prerequisites: None.
Restrictions: By invitation only. Senior standing required.
Usually offered: Annually, fall and spring semester.
Semester credits: 4.

BCMB 499 Independent Study
Faculty: Biochemistry and Molecular Biology Faculty.
Content: Participation in a faculty-supervised research project at Lewis Clark or another research institution. Further information available from biochemistry program faculty members. May be repeated for credit.
Prerequisites: None.
Restrictions: Approval of project proposal by program and supervising faculty member and sophomore standing required.
Usually offered: Annually, fall and spring semester.
Semester credits: 2-4.