

Biochemistry and Molecular Biology, B.S.

Few areas of Biological Sciences remain that are not impacted by studies at the chemical and molecular level. The major in Biochemistry and Molecular Biology is designed to provide a comprehensive background in this modern, conceptual understanding of biology. Students who wish to begin in-depth study of the molecular basis in any of a variety of fields, including development, gene expression, immunology, pathogenesis, disease, virology, and evolution, can do so through this major. This program will be especially attractive to those students who intend to pursue an advanced degree in biological or medical sciences.

The Biochemistry and Molecular Biology major is based upon required courses in Advanced Biochemistry and Advanced Molecular Biology (BIO SCI M114 and BIO SCI M116). These courses, together with a wide variety of elective course offerings, provide majors the choice to either explore the breadth of the field or follow a more in-depth study of any of its subdisciplines. For students interested in the interface between biology and chemistry, this program articulates well with a second major in Chemistry.

The program of study emphasizes laboratory experience and its integration with basic theory. This is accomplished in three ways: first, through coordination between the advanced courses in Biochemistry (BIO SCI M114) and Molecular Biology (BIO SCI M116), and laboratory courses in Biochemistry (BIO SCI M114L) and Molecular Biology (BIO SCI M116L) which provide students with the basic laboratory skills and an appreciation for the experimental foundations of the field; second, through advanced laboratories in Immunology (BIO SCI M121L) and Virology which provide students with the opportunity to develop cutting edge research skills; and third, by emphasizing independent research sponsored by a participating faculty member. The program encourages the research interests of students in subdisciplines other than immunology or virology by offering the opportunity to substitute one year of independent research for the advanced laboratory.

The major in Biochemistry and Molecular Biology is designed to provide students with the appropriate tools and training to successfully pursue graduate degrees that emphasize basic scientific research, including Ph.D. and M.S. training as well as combined M.D./Ph.D. programs. In addition, and particularly with the explosive growth in biotechnology and its significant influence in everyday life, graduates could use their backgrounds very effectively to pursue careers in business, education, law, and public affairs.

The major in Biochemistry and Molecular Biology is open to junior- and senior-level students only. Applications to declare the major are due in the spring (typically of the second year). Review of applications submitted at that time and selection to the major by the Biochemistry and Molecular Biology Faculty Board is completed during the summer. Information can also be found at the UCI Change of Major Criteria website (<http://www.changeofmajor.uci.edu/>). Double majors within the School of Biological Sciences or with Public Health Sciences, Biomedical Engineering: Premedical, Nursing Science, or Pharmaceutical Sciences are not permitted.

All students must meet the University Requirements (<http://catalogue.uci.edu/informationforadmittedstudents/requirementsforabachelorsdegree/>).

All students must meet the School Requirements (<http://catalogue.uci.edu/charliedunlopschoolofbiologicalsciences/#schoolrequirementstext>).

Major Requirements

A. Required Major Courses:	
BIO SCI M114	Advanced Biochemistry
BIO SCI M116	Advanced Molecular Biology
B. Upper-Division Laboratories:	
BIO SCI M114L	Biochemistry Laboratory
BIO SCI M116L	Molecular Biology Laboratory
Select one of the following:	
BIO SCI M118L	Experimental Microbiology Laboratory
BIO SCI M121L	Advanced Immunology Laboratory
BIO SCI 199 Study in Biological Science Research (Approved by the Biochemistry and Molecular Biology Faculty Board.)	
C. Upper-Division Biology Electives:	
Select three of the following:	
BIO SCI M119–M189	
Select one of the following:	
BIO SCI D137	Eukaryotic and Human Genetics
BIO SCI D145	Genomics, Development, and Medicine
BIO SCI M119–M190	
CHEM 128	Introduction to Chemical Biology
CHEM 132A	Chemical Thermodynamics, Kinetics, and Dynamics

CHEM 132B	Quantum Principles, Spectroscopy, and Bonding
CHEM 132C	Molecular Structure and Elementary Statistical Mechanics
PHRMSCI 170A	Molecular Pharmacology I
PHRMSCI 171	Physical Biochemistry
Select two four-unit courses from the following:	
BIO SCI D103–D189, E106–E189, M119–M190, N110–N189	
CHEM 128	Introduction to Chemical Biology
CHEM 132A	Chemical Thermodynamics, Kinetics, and Dynamics
CHEM 132B	Quantum Principles, Spectroscopy, and Bonding
CHEM 132C	Molecular Structure and Elementary Statistical Mechanics
PHRMSCI 170A	Molecular Pharmacology I
PHRMSCI 171	Physical Biochemistry
No course may be used to satisfy more than one requirement.	

Application Process to Declare the Major: The major in Biochemistry and Molecular Biology is open to junior- and senior-level students only. Applications to declare the major can be made at any time, but typically in the spring of the sophomore year. Review of applications submitted at that time and selection to the major by the Biochemistry and Molecular Biology Faculty Board is completed during the summer. Information can also be found at the UCI Change of Major Criteria website (<http://www.changeofmajor.uci.edu/>). Double majors within the School of Biological Sciences or with Public Health Sciences, Biomedical Engineering: Premedical, Nursing Science, or Pharmaceutical Sciences are not permitted.

Freshman		
Fall	Winter	Spring
BIO SCI 93	BIO SCI 94	CHEM 1C- 1LC
BIO SCI 93L	BIO SCI 94L	STATS 7 or 8 (or Math 5A or General Education)
CHEM 1A	CHEM 1B	Lower-Division Writing ¹
BIO SCI 2A	Lower-Division Writing ¹	
Sophomore		
Fall	Winter	Spring
BIO SCI 97	BIO SCI 98	BIO SCI 99
CHEM 51A	CHEM 51B- 51LB	CHEM 51C- 51LC
CHEM 1LD	MATH 5B (or General Education)	
MATH 5A or 5B		
Junior		
Fall	Winter	Spring
Biochem./Mol. elective	BIO SCI M114	BIO SCI M116
Research/Elective	Biochem./Mol. elective	BIO SCI M116L
BIO SCI 100	BIO SCI M114L	PHYSICS 3C- 3LC
PHYSICS 3A	PHYSICS 3B- 3LB	
Senior		
Fall	Winter	Spring
Biochem./Mol. elective	Bio. Sci. elective or lab	Bio. Sci. elective or lab
Biochem./Mol. elective	Research/Elective	Research/Elective
Research/Elective	General Education/Elective	General Education/Elective
General Education/Elective		

¹ Students have the option of taking HUMAN 1AS, HUMAN 1BS, HUMAN 1CS or WRITING 40, WRITING 50, WRITING 60 in order to fulfill the lower-division writing requirement.

- Microbiology and Immunology, B.S.