BIOCHEMISTRY & MOLECULAR BIOLOGY, BACHELOR OF SCIENCE

College of Biological Sciences

The Biochemistry & Molecular Biology Major Program

The Biochemistry & Molecular Biology major introduces students to the chemistry of living organisms and the experimental techniques that are used to probe the structures and functions of biologically important molecules. Students who enjoy both chemistry and biology and who are comfortable with quantitative approaches to problem solving will find this major a rewarding field of study.

The Program

The upper division curriculum in the Biochemistry & Molecular Biology program begins with the three-course, upper-division common curriculum that introduces the principles of biochemistry and genetics. Majors then take a comprehensive and rigorous laboratory course to familiarize them with the most important aspects of biochemical research. Additional upper-division courses in biochemistry and molecular biology examine detailed aspects of these subjects. Students are also required to take courses in other biological sciences and a full year of physical chemistry.

Career Alternatives

The Biochemistry & Molecular Biology program provides a solid scientific background for students seeking a research, teaching, or service career in the life sciences. Positions are open to biochemists in bio-medical, biotechnological, pharmaceutical, agricultural research, and some chemical industries. Also, university-affiliated research laboratories, hospital laboratories, and government-sponsored research facilities provide employment opportunities. The major provides excellent preparation for advanced study in graduate or professional schools.

Graduate Study

See Biochemistry, Molecular, Cellular, & Developmental Biology (Graduate Group) (https://catalog.ucdavis.edu/departments-programs-degrees/biochemistry-molecular-cellular-developmental-biology/).

Faculty Advisor

David Wilson (dkwilson@UCDAVIS.EDU), Ph.D.

Advising

Biology Academic Success Center (BASC), CBS Dean's Office Advising in 1023 Katherine Esau Science Hall (formerly Sciences Laboratory Building); 530-752-0410; cbsundergrads@ucdavis.edu.

Code	Title	Units
Preparatory Subject Matter		
Biological Science		*18*
BIS 002A & BIS 002B & BIS 002C & BIS 002D	Introduction to Biology: Essentials of Life on Earth and Introduction to Biology: Principles of Ecology & Evolution and Introduction to Biology: Biodiversity & the Tree of Life and Introduction to Biology: Principles of Cell Biology & Physiology	
Chemistry		
Choose 002 or 004 series: [1]		15
CHE 002A & CHE 002B & CHE 002C	General Chemistry and General Chemistry and General Chemistry	
or		
CHE 004A & CHE 004B & CHE 004C	General Chemistry for the Physical Sciences & Engineering and General Chemistry for the Physical Sciences & Engineering and General Chemistry for the Physical Sciences & Engineering	
Mathematics		
Choose the 017 or 021 series: [2]		8-12
MAT 017A & MAT 017B & MAT 017C	Calculus for Biology & Medicine and Calculus for Biology & Medicine and Calculus for Biology & Medicine	
or		
MAT 021A & MAT 021B & MAT 021C	Calculus and Calculus and Calculus (Recommended)	
Physics		
Choose the 007 or 009 series: [3]		12-15
PHY 007A & PHY 007B & PHY 007C	General Physics and General Physics and General Physics	
or		
PHY 009A & PHY 009B & PHY 009C	Classical Physics and Classical Physics and Classical Physics	
Preparatory Subject Matter Subtotal		53-60
Depth Subject Matter		
Biological Science		
BIS 101	Genes & Gene Expression	4
BIS 102	Structure & Function of Biomolecules	3
BIS 103	Bioenergetics & Metabolism	3
Chemistry		
Choose the 118 series or CHE 128 series & 129 A-B: [4]		12-13
CHE 118A & CHE 118B & CHE 118C	Organic Chemistry for Health & Life Sciences and Organic Chemistry for Health & Life Sciences and Organic Chemistry for Health & Life Sciences	
or		
CHE 128A & CHE 128B & CHE 128C	Organic Chemistry and Organic Chemistry and Organic Chemistry	

CHE 129A & CHE 129B	Organic Chemistry Laboratory and Organic Chemistry Laboratory	
Choose the 107 or 110 series:		6-12
CHE 107A & CHE 107B	Physical Chemistry for the Life Sciences and Physical Chemistry for the Life Sciences	
or		
CHE 110A & CHE 110B & CHE 110C	Physical Chemistry: Introduction to Quantum Mechanics and Physical Chemistry: Properties of Atoms & Molecules and Physical Chemistry: Thermodynamics, Equilibria & Kinetics	
Molecular & Cellular Biology		
MCB 120	Molecular Biology & Biochemistry Laboratory Associated Lecture	3
MCB 120L	Molecular Biology & Biochemistry Laboratory	3
MCB 121	Advanced Molecular Biology	3
MCB 123	Behavior & Analysis of Enzyme & Receptor Systems	3
MCB 124	Macromolecular Structure & Function	3-4
or MCB 143	Cell & Molecular Biophysics	
Statistics		
Choose STA 100 or 130A & 130B:		4-8
STA 100	Applied Statistics for Biological Sciences	
or STA 130A & STA 130B	Mathematical Statistics: Brief Course and Mathematical Statistics: Brief Course	
Restricted Electives		
Choose at least 6 additional units (p. 2)		6
Depth Subject Matter Subtotal		53-65
Total Units		**106-125**

[1] With BASC advisor approval, these combinations also satisfy the Chemistry requirement: CHE 004A-CHE 002A (3 units with no lab)-CHE 002B-CHE 002C; CHE 004A-CHE 004B-CHE 002C.

[2] With BASC advisor approval, these combinations also satisfy the Mathematics requirement: MAT 021A-MAT 017B-MAT 017C; MAT 017A-MAT 021B.

[3] With BASC advisor approval, these combinations also satisfy the Physics requirement: PHY 007A-PHY 009A-PHY 049*-PHY 007C; PHY 009A-PHY 009B-PHY 049*-PHY 007C. *PHY 049 requires approval from the PHY Department to enroll.

[4] With BASC advisor approval, these combinations also satisfy the Organic Chemistry requirement: CHE 128A-CHE 118B-CHE 118C; CHE 128A-CHE 128B-CHE 129A-CHE 118C; CHE 118A-CHE 128B-CHE 128C-CHE 129A-CHE 129B; CHE 118A-CHE 118B-CHE 128C-CHE 129B.

Restricted Electives

Code	Title	Units
ANS 137	Techniques & Practices of Avian Culture	3
ANT 151	Primate Evolution	4
ANT 152	Human Evolution	5
ANT 158	The Evolution of Sex: A Biological Perspective	4
BIS, any upper division 100-199, except 101, 101D, 102, 103, 105 (https://catalog.ucdavis.edu/courses-subject-code/bis/)		1-5
BIM 162	Introduction to the Biophysics of Molecules & Cells	4
BIT, any upper division 100-199, except tutoring 197T (https://catalog.ucdavis.edu/courses-subject-code/bit/)		1-5
CHE any upper division 100-199, except 107AB, 108, 110ABC, 197T (https://catalog.ucdavis.edu/courses-subject-code/che/)		3-4
EXB 106/CHA 101	Human Gross Anatomy	4
EXB 106L/CHA 101L	Human Gross Anatomy Laboratory	3
ECH 140	Mathematical Methods in Biochemical & Chemical Engineering	4
ECH 142	Heat Transfer for Biochemical & Chemical Engineers	4
ECH 143	Mass Transfer for Biochemical & Chemical Engineers	4
ECH 152A	Chemical Engineering Thermodynamics	3
ECH 152B	Chemical Engineering Thermodynamics	4
ENT 100	General Entomology	4
ENT 102	Insect Physiology	4
ENT 153	Medical Entomology	3
ENT 158	Forensic Entomology	3
EXB 101	Exercise Physiology	4
EXB 117	Exercise & Aging in Health & Disease	3
EXB 124	Physiology of Maximal Human Performance	4
ETX 101	Principles of Environmental Toxicology	4
ETX/NUT 104	Environmental & Nutritional Factors in Cellular Regulation & Nutritional Toxicants	4
ETX 110	Toxic Tragedies & Their Impact on Society	2
ETX 120	Perspectives in Aquatic Toxicology	4
ETX/FST 128	Food Toxicology	3
ETX 130	Role & Applications of Toxicology in Modern Industry	3
EVE, any upper division 100-199, except tutoring 197T (https://catalog.ucdavis.edu/courses-subject-code/eve/)		1-5
FST 100A	Food Chemistry	4
FST 100B	Food Properties	4
FST 102A	Malting & Brewing Science	4
FST 102B	Practical Malting & Brewing	4
FST 104	Food Microbiology	3
FST 123	Introduction to Enzymology	3
FST/ETX 128	Food Toxicology	3
GDB 101	Epidemiology	4
GDB 103	Microbiome of People, Animals, & Plants	3
GEL 107	Earth History: Paleobiology	3
IDI 141	Infectious Diseases of Humans	1
MCB/PLB 126	Plant Biochemistry	3
MCB 140	Cell Biology Laboratory Associated Lecture	3
MCB 140L	Cell Biology Laboratory	5
MCB 142	Advanced Cell Biology: Contractile & Motile Systems	4

MCB 143	Cell & Molecular Biophysics	3
MCB 144	Mechanisms of Cell Division	3
MCB 145	Assembly & Function of Cell Signaling Machinery	3
MCB 160	Genetics Laboratory Associated Lecture	3
MCB 160L	Principles of Genetics Laboratory	5
MCB 162	Human Genetics & Genomics	3
MCB 163	Developmental Genetics	3
MCB 164	Advanced Eukaryotic Genetics	3
MCB 182	Principles of Genomics	3
MIC, any upper division 100-199, except tutoring 197T (https://catalog.ucdavis.edu/courses-subject-code/mic/)		1-5
MMI 188A	Human Immunology	3-4
or MMI 188B	Human Immunology	
NPB, any upper division 100-199, except 102 & tutoring 197T (https://catalog.ucdavis.edu/courses-subject-code/npb/)		1-5
NUT/ETX 104	Environmental & Nutritional Factors in Cellular Regulation & Nutritional Toxicants	4
NUT 105	Nutrition through the Life Cycle	3
NUT 111AY	Introduction to Nutrition & Metabolism	3
NUT 112	Nutritional Assessment	4
PHY 140B	Introduction to Solid State Physics	4
PLB, any upper division 100-199, except tutoring 197T (https://catalog.ucdavis.edu/courses-subject-code/plb/)		1-5
PLS 147	California Plant Communities	3
PMI, any upper division 100-199, except tutoring 197T (https://catalog.ucdavis.edu/courses-subject-code/pmi/)		1-5
PSC 101	Introduction to Biological Psychology	4
STA 101	Advanced Applied Statistics for the Biological Sciences	4
STA 103	Applied Statistics for Business & Economics	4
STA 104	Applied Statistical Methods: Nonparametric Statistics	4
STA 106	Applied Statistical Methods: Analysis of Variance	4
STA 108	Applied Statistical Methods: Regression Analysis	4
VMB 101V	Principles of Pharmacology & Toxicology	3
VMB 101Y	Principles of Pharmacology & Toxicology (Up to 3 units of Research 192, 193, 199, 189, 190C, etc.)	3
Up to 3 units of Research 192, 193, 199, 189, 190C, etc.		3
A small selection of other courses may work upon consultation with BMB master or BASC advisor.		1-3