

MOLECULAR & MEDICAL MICROBIOLOGY, BACHELOR OF ARTS

College of Biological Sciences

The department of Microbiology & Molecular Genetics offers the major in Molecular & Medical Microbiology.

Microbiology is the branch of biology that deals with bacteria, yeasts and other fungi, algae, protozoa, and viruses. These microorganisms are ubiquitous in nature and play a crucial role in areas such as agriculture, biotechnology, ecology, medicine, and veterinary science. The field of microbiology contributes to areas of fundamental inquiry such as biochemistry, cell biology, evolution, genetics, molecular biology, pathogenesis, and physiology. The ease and power of simultaneous genetic and biochemical analysis of microbes led to the emergence of the new disciplines of molecular biology & molecular genetics, and spawned the new industry of biotechnology.

The Program

The Molecular & Medical Microbiology Undergraduate Program offers Bachelor of Science and Bachelor of Arts degrees in the College of Biological Sciences. Both degrees are designed to provide students with quantitative skills and knowledge across the breadth of Biological Sciences, while maintaining a focus on the biology of microorganisms. The B.S. degree offers more training in mathematics, biochemistry and laboratory methodology; the A.B. degree incorporates more exposure to the liberal arts. The choice of a major program and its suitability for particular career options should be discussed with a Biology Academic Success Center (BASC) advisor.

Career Alternatives

A bachelor's degree in Molecular & Medical Microbiology serves as the foundation for advanced study in microbiology, entry into the professional schools of all health sciences, or immediate employment in biotechnology, health care and food science industries.

Related Courses

The offerings of the Department of Microbiology & Molecular Genetics are augmented by courses in Food Science & Technology (FST) (<https://catalog.ucdavis.edu/courses-subject-code/fst/>); Medical Microbiology (MMI) (<https://catalog.ucdavis.edu/courses-subject-code/mmi/>); Molecular & Cellular Biology (MCB) (<https://catalog.ucdavis.edu/courses-subject-code/mcb/>); Pathology, Microbiology, & Immunology (PMI) (<https://catalog.ucdavis.edu/courses-subject-code/pmi/>); Plant Pathology (PLP) (<https://catalog.ucdavis.edu/courses-subject-code/plp/>); and Soil Science (SSC) (<https://catalog.ucdavis.edu/courses-subject-code/ssc/>).

Please note, MIC courses are in the process of transitioning to MMG courses.

Faculty of the Department of Microbiology & Molecular Genetics also teach or participate in the following courses: BIS 002A, BIS 101 or BIS 101V, BIS 104, and BIS 181.

Faculty Advisor

Miriam Markum, Ph.D., Kenjiro W. Quides, Ph.D.

Honors & Honors Program

Miriam Markum, Ph.D., Kenjiro W. Quides, Ph.D.

Teaching Credential Subject Representative

Miriam Markum, Ph.D.; see the Teaching Credential/M.A. Program (<https://education.ucdavis.edu/teaching-credentialma>).

Advising

Biology Academic Success Center (BASC) (<https://basc.biology.ucdavis.edu/>) in 1023 Katherine Esau Hall; 530-752-0410.

Graduate Study

The Graduate Group in Microbiology offers programs of study and research leading to M.S. and Ph.D. degrees.

Strong preference is given to doctoral applicants. The group offers study in general microbiology, microbial physiology, microbial genetics, molecular mechanisms of microbial regulation, molecular mechanisms of microbial pathogenesis, immunology, virology, and recombinant DNA technology. For information on the graduate study and undergraduate preparation for the program contact a graduate advisor or the Chairperson of the Group.

The major requirements below are in addition to meeting University Degree Requirements (<https://catalog.ucdavis.edu/undergraduate-education/university-degree-requirements/>) & College Degree Requirements (<https://catalog.ucdavis.edu/undergraduate-education/college-degree-requirements/>); unless otherwise noted. The minimum number of units required for the Molecular & Medical Microbiology Bachelor of Arts is 77.

Code	Title	Units
Preparatory Subject Matter		
<i>Biological Science</i> ¹		13-15
BIO 001 & 001L	Introductory Biology: Ecology & Evolution and Introductory Biology Lab: Ecology & Evolution	
or BIS 002B	Introduction to Biology: Principles of Ecology & Evolution	
BIO 002 & 002L	Introductory Biology: Molecules to Cells and Introductory Biology Lab: Molecules to Cells	
or BIS 002A	Introduction to Biology: Essentials of Life on Earth and one of:	
BIO 003	Introductory Biology: Cells Through Organisms	
or BIS 002C	Introduction to Biology: Biodiversity & the Tree of Life	
or BIS 002D	Introduction to Biology: Principles of Cell Biology & Physiology	
<i>Chemistry</i>		
Choose the 002 series or 004 series:		10
CHE 002A & CHE 002B	General Chemistry and General Chemistry	
OR		

CHE 004A & CHE 004B	General Chemistry for the Physical Sciences & Engineering and General Chemistry for the Physical Sciences & Engineering	
Choose the 008 series or 118 series: ²		6-12
CHE 008A & CHE 008B	Organic Chemistry: Brief Course and Organic Chemistry: Brief Course (Or)	
OR		
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	
<i>Mathematics</i>		
Choose a series: ³		8
MAT 017A & MAT 017B	Calculus for Biology & Medicine and Calculus for Biology & Medicine	
OR		
MAT 021A & MAT 021B	Calculus and Calculus	
<i>Physics</i>		
Choose the 001 series or 007 series: ⁴		6-12
PHY 001A & PHY 001B	Principles of Physics and Principles of Physics	
OR		
PHY 007A & PHY 007B & PHY 007C	General Physics and General Physics and General Physics	
Preparatory Subject Matter Subtotal		43-57
Depth Subject Matter		
<i>Biological Science</i>		7-10
BIS 101 or BIS 101V	Genes & Gene Expression Genes & Gene Expression	
BIS 105 or (BIS 102 OR B & BIS 103	Biomolecules & Metabolism and Bioenergetics & Metabolism	
<i>Microbiology</i>		15-17
MMG 102 or MIC 102 DISC	Introductory Microbiology	
MMG 107L or MIC 104L DISCONTINUED FOR FALL 2026 **	General Microbiology Laboratory	
MMG 111 or MIC 111 DISC	Human Microbiology	
MMG 180 or MIC 105 DISCONTINUED FOR FALL 2026 **	Microbial Diversity	
MMG 181L or MIC 105L DISC	Microbial Diversity Laboratory	
<i>Areas of Study</i>		
Choose at least one course from each of the areas of study below:		
1. Microbial Genetics		3
MIC 150	(Discontinued for winter 2025) **	
MMG 115	Recombinant DNA Cloning & Analysis	

or MIC 115 DISCONTINUED FOR WINTER 2025 **		
MMG 170 or MIC 170 DISC	Yeast Molecular Genetics	
2. Virology or Immunology		3-4
MMG 162 or MIC 162 DISC	General Virology	
MMI 188A	Human Immunology	
MMI 188B	Human Immunology	
PMI 126	Fundamentals of Immunology	
PMI 128	Biology of Animal Viruses	
Choose at least 6 additional units from the list below:		
Upper division Microbiology courses not used in satisfaction of any other requirement.		
BIS 104	Cell Biology	
BIS 181	Comparative Genomics	
BIS 183	Functional Genomics	
FST 102A	Malting & Brewing Science	
FST 104	Food Microbiology	
FST 104L	Food Microbiology Laboratory	
FST 114	Fermented Foods	
GDB 101	Epidemiology	
GDB 103	Microbiome of People, Animals, & Plants	
MCB 121	Advanced Molecular Biology	
MCB 182	Principles of Genomics	
MMG 172 or MIC 172 DISC	Host-Parasite Interactions	
MMG 175 or MIC 175 DISCONTINUED FOR FALL 2025 **	Cancer Biology	
MMI 130	Medical Mycology	
MMI 177	Human Virology	
NPB 134	General Immunology for Physiologists	
PLP 100	Biology of Plant Pathogens	
PLP 120	Introduction to Plant Pathology	
PLB 123	Plant-Virus-Vector Interaction	
PLP 130	Fungal Biology & Disease	
PLB 148	Introductory Mycology	
PLS 174	Microbiology & Safety of Fresh Fruits & Vegetables	
PMI 126	Fundamentals of Immunology	
PMI 126L	Immunology Laboratory	
PMI 127	Medical Bacteria & Fungi	
SSC 111	Soil Microbiology	
VEN 114	Fermented Foods	
No more than 3 units of variable-unit courses (numbered 192, 198, or 199) may be used for credit in this category.		
Note: Although a course may be listed in more than one category, that course may satisfy only one requirement in the entire major.		
Depth Subject Matter Subtotal		34-40
Total Units		77-97

¹ The BIS 2ABCD series has been discontinued. Students who have started the BIS 2ABCD series should consult with a BASC advisor to

determine which course(s) will complete the lower-division biology requirement.

- ² With BASC advisor approval, this combination also satisfies the Organic Chemistry requirement: CHE 118A-CHE 008B.
 - ³ With BASC advisor approval, this combination also satisfies the Mathematics requirement: MAT 021A-MAT 017B; MAT 017A-MAT 021B.
 - ⁴ With BASC advisor approval, these combinations also satisfy the Physics requirement: PHY 009A (<https://catalog.ucdavis.edu/search/?P=PHY%20009A>)-PHY 009B (<https://catalog.ucdavis.edu/search/?P=PHY%20009B>)-PHY 007B-PHY 007C (<https://catalog.ucdavis.edu/search/?P=PHY%20007C>); PHY 009A (<https://catalog.ucdavis.edu/search/?P=PHY%20007C>); PHY 009A (<https://catalog.ucdavis.edu/search/?P=PHY%20009A>)-PHY 009C-PHY 007A (<https://catalog.ucdavis.edu/search/?P=PHY%20007A>)-PHY 007C (<https://catalog.ucdavis.edu/search/?P=PHY%20007C>).
- ** Course(s) discontinued; see your advisor for course options.