

# MOLECULAR & MEDICAL MICROBIOLOGY, BACHELOR OF SCIENCE

## 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/>); Medical Microbiology (MMI) (<https://catalog.ucdavis.edu/courses-subject-code/>); Molecular & Cellular Biology (MCB) (<https://catalog.ucdavis.edu/courses-subject-code/>); Pathology, Microbiology, & Immunology (PMI) (<https://catalog.ucdavis.edu/courses-subject-code/>); Plant Pathology (PLP) (<https://catalog.ucdavis.edu/courses-subject-code/>); and Soil Science (SSC) (<https://catalog.ucdavis.edu/courses-subject-code/>).

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, BIS 104 and BIS 181.

## Faculty Advisor

Miriam Markum, Ph.D.

## Honors & Honors Program

Miriam Markum, 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 Science Hall (formerly Sciences Laboratory Building); 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 Science is 105.

Code	Title	Units
<b>Preparatory Subject Matter</b>		
<i>Biological Science</i>		<b>18</b>
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	
<i>Chemistry</i>		<b>21-27</b>
Choose the 002 series or 004 series: <sup>1</sup>		
CHE 002A & CHE 002B & CHE 002C	General Chemistry and General Chemistry and General Chemistry	
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	
Choose the 008 series or 118 series: <sup>2</sup>		
CHE 008A & CHE 008B	Organic Chemistry: Brief Course and Organic Chemistry: Brief Course	

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	
<b>Mathematics</b>		8-12
Choose the 017 series or 021 series: <sup>3</sup>		
MAT 017A & MAT 017B & MAT 017C	Calculus for Biology & Medicine and Calculus for Biology & Medicine and Calculus for Biology & Medicine	
<b>OR</b>		
MAT 021A & MAT 021B & MAT 021C	Calculus and Calculus and Calculus (Recommended)	
<b>Physics</b>		12
PHY 007A & PHY 007B & PHY 007C	General Physics and General Physics and General Physics	
<b>Microbiology</b>		7
MIC 091 or MIC 191	Introduction to Research Introduction to Research for Advanced Undergraduates	
Subtotal		60-70
<b>Depth Subject Matter</b>		
<b>Biological Science</b>		
BIS 101	Genes & Gene Expression	4
BIS 105 or BIS 102 & BIS 103	Biomolecules & Metabolism Structure & Function of Biomolecules and Bioenergetics & Metabolism	3-6
<b>Statistics</b>		
STA 100	Applied Statistics for Biological Sciences	4
<b>Microbiology</b>		
MIC 102	Introductory Microbiology	3
MIC 104L	General Microbiology Laboratory	3
MIC 105	Microbial Diversity	3
MIC 105L	Microbial Diversity Laboratory	3
MIC 111	Human Microbiology	3
<b>Areas of Study</b>		
Choose at least one course from each of the areas of study below:		9-10
<b>1. Molecular Microbiology</b>		
MIC 115	Recombinant DNA Cloning & Analysis (Discontinued)	
MIC 150	Genomes of Pathogenic Bacteria	
MIC 170	Yeast Molecular Genetics	
<b>2. Virology</b>		
MIC 162	General Virology (Discontinued)	
PMI 128	Biology of Animal Viruses	
<b>3. Immunology</b>		
MMI 188A or MMI 188B	Human Immunology Human Immunology	
PMI 126	Fundamentals of Immunology	

Choose additional course work from the list below, to achieve a total of 45 or more units. Upper division Microbiology courses not used in satisfaction of any other requirement:

BIS 181	Comparative Genomics
BIS 183	Functional Genomics
FST 104	Food Microbiology
MCB 121	Advanced Molecular Biology
MCB 182	Principles of Genomics
MIC 117	(Discontinued)
MIC 120	Microbial Ecology
MIC 172	Host-Parasite Interactions
MIC 175	Cancer Biology
PLP 130	Fungal Biology & Disease
SSC 111	Soil Microbiology

Or upper division courses in related fields, relevant to the student's interest and chosen in consultation with the advisor.

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	45
Total Units	105-115

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With BASC advisor approval, these combination also satisfies the General Chemistry requirement: CHE 004A-CHE 002A (3 units w/no lab)-CHE 002B-CHE 002C or CHE 004A-CHE 004B-CHE 002C.

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 017C; MAT 017A-MAT 021B.