MOLECULAR & MEDICAL MICROBIOLOGY, BACHELOR OF SCIENCE

College of Biological Sciences

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

Molecular & Medical Microbiology B.S.

The Major Program

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.

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.

Related 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
Rebecca Parales, Ph.D.

Honors & Honors Program

Teaching Credential Subject Representative
Rebecca Parales, 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.

Please Note: MIC courses are in the process of transitioning to MMG courses within the year.

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<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Units</th>
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<tbody>
<tr>
<td>Biological Science</td>
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<tr>
<td>BIS 002A</td>
<td>Introduction to Biology: Essentials of Life on Earth</td>
<td>18</td>
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<tr>
<td>&amp; BIS 002B</td>
<td>and Introduction to Biology: Principles of Ecology &amp; Evolution</td>
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<td>&amp; BIS 002C</td>
<td>and Introduction to Biology: Biodiversity &amp; the Tree of Life</td>
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<tr>
<td>&amp; BIS 002D</td>
<td>and Introduction to Biology: Principles of Cell Biology &amp; Physiology</td>
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<tr>
<td>Chemistry</td>
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<td>21-27</td>
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Choose the 002 series or 004 series: | 1 |

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<tbody>
<tr>
<td>CHE 002A</td>
<td>General Chemistry</td>
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<td>&amp; CHE 002B</td>
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<td>&amp; CHE 002C</td>
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<tr>
<td>CHE 004A</td>
<td>General Chemistry for the Physical Sciences &amp; Engineering</td>
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Choose the 008 series or 118 series: | 2 |

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<tr>
<td>CHE 008A</td>
<td>Organic Chemistry: Brief Course</td>
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<td>&amp; CHE 008B</td>
<td>and Organic Chemistry: Brief Course</td>
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<tr>
<td>CHE 118A</td>
<td>Organic Chemistry for Health &amp; Life Sciences</td>
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<td>&amp; CHE 118B</td>
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<tr>
<td>&amp; CHE 118C</td>
<td>and Organic Chemistry for Health &amp; Life Sciences</td>
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Mathematics | 8-12 |

Choose the 017 series or 021 series: | 3 |

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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 12
PHY 007A & PHY 007B & PHY 007C
General Physics and General Physics and General Physics

Microbiology 1
MIC 091 or MIC 191
Introduction to Research or Introduction to Research for Advanced Undergraduates

Subtotal 60-70

Depth Subject Matter

Biological Science
BIS 101 Genes & Gene Expression 4
BIS 105 Biomolecules & Metabolism 3-6
or BIS 102 Structure & Function of Biomolecules and Bioenergetics & Metabolism

Statistics
STA 100 Applied Statistics for Biological Sciences 4

Microbiology
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

Areas of Study
Choose at least one course from each of the areas of study below: 9-10

1. Molecular Microbiology
   MIC 115 Recombinant DNA Cloning & Analysis
   MIC 150 Genomes of Pathogenic Bacteria
   MIC 170 Yeast Molecular Genetics

2. Virology
   MIC 162 General Virology
   PMI 128 Biology of Animal Viruses

3. Immunology
   MMI 188A Human Immunology
   or MMI 188B 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; or:
   BIS 181 Comparative Genomics
   BIS 183 Functional Genomics
   FST 104 Food Microbiology
   MCB 121 Advanced Molecular Biology
   MCB 182 Principles of Genomics
   MIC 117 Analysis of Molecular Genetic Circuits
   MIC 120 Microbial Ecology
   MIC 172 Host-Parasite Interactions
   MIC 175 Cancer Biology
   PLP 130 Fungal Biology & Disease
   SSC 111 Soil Microbiology

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

1 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.