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

Rebecca Parales, Ph.D.

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 Sciences Laboratory Building; 530-752-0410.

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

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Units</th>
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</thead>
<tbody>
<tr>
<td></td>
<td><strong>Preparatory Subject Matter</strong></td>
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<tr>
<td><strong>Biological Science</strong></td>
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<tr>
<td>BIS 002A</td>
<td>Introduction to Biology: Essentials of Life</td>
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<tr>
<td>&amp; BIS 002B</td>
<td>on Earth</td>
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<td>&amp; BIS 002C</td>
<td>and Introduction to Biology: Principles of</td>
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<td>&amp; BIS 002D</td>
<td>Ecology &amp; Evolution</td>
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<td>and Introduction to Biology: Biodiversity &amp;</td>
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<td>the Tree of Life</td>
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<td>and Introduction to Biology: Principles of</td>
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<td></td>
<td>Cell Biology &amp; Physiology</td>
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<td><strong>Chemistry</strong></td>
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<td>Choose the 002 series or 004 series:</td>
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<tr>
<td>CHE 002A</td>
<td>General Chemistry</td>
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<tr>
<td>&amp; CHE 002B</td>
<td>and General Chemistry</td>
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<tr>
<td>&amp; CHE 002C</td>
<td>and General Chemistry</td>
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<tr>
<td>CHE 004A</td>
<td>General Chemistry for the Physical Sciences &amp;</td>
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<tr>
<td>&amp; CHE 004B</td>
<td>Engineering</td>
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<td>&amp; CHE 004C</td>
<td>and General Chemistry for the Physical Sciences &amp; Engineering</td>
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<td>and General Chemistry for the Physical Sciences &amp; Engineering</td>
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<td>Choose the 008 series or 118 series:</td>
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<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>
<tr>
<td>CHE 118A</td>
<td>Organic Chemistry for Health &amp; Life Sciences</td>
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<tr>
<td>&amp; CHE 118B</td>
<td>and Organic Chemistry for Health &amp; Life Sciences</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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<tr>
<td><strong>Mathematics</strong></td>
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<td>8-12</td>
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<td>Choose the 017 series or 021 series:</td>
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<tr>
<td>Course Code</td>
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<tr>
<td>MAT 017A &amp; MAT 017B &amp; MAT 017C</td>
<td>Calculus for Biology &amp; Medicine and Calculus for Biology &amp; Medicine and Calculus for Biology &amp; Medicine</td>
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<td>OR</td>
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<tr>
<td>MAT 021A &amp; MAT 021B &amp; MAT 021C</td>
<td>Calculus and Calculus and Calculus (Recommended)</td>
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<tr>
<td><strong>Physics</strong></td>
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<tr>
<td>PHY 007A &amp; PHY 007B &amp; PHY 007C</td>
<td>General Physics and General Physics and General Physics</td>
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<tr>
<td><strong>Microbiology</strong></td>
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<tr>
<td>MIC 091 or MIC 191</td>
<td>Introduction to Research or Introduction to Research for Advanced Undergraduates</td>
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**Subtotal** 60-70

**Depth Subject Matter**

**Biological Science**

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<tr>
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<tbody>
<tr>
<td>BIS 101</td>
<td>Genes &amp; Gene Expression</td>
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<tr>
<td>BIS 105</td>
<td>Biomolecules &amp; Metabolism</td>
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<tr>
<td>or BIS 102 &amp; BIS 103</td>
<td>Structure &amp; Function of Biomolecules and Bioenergetics &amp; Metabolism</td>
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</table>

**Statistics**

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<th>Course Code</th>
<th>Course Title</th>
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<tr>
<td>STA 100</td>
<td>Applied Statistics for Biological Sciences</td>
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**Biology**

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<tr>
<th>Course Code</th>
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<tr>
<td>MIC 102</td>
<td>Introductory Microbiology</td>
</tr>
<tr>
<td>MIC 104L</td>
<td>General Microbiology Laboratory</td>
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<tr>
<td>MIC 105</td>
<td>Microbial Diversity</td>
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<tr>
<td>MIC 105L</td>
<td>Microbial Diversity Laboratory</td>
</tr>
<tr>
<td>MIC 111</td>
<td>Human Microbiology</td>
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</table>

**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:

<table>
<thead>
<tr>
<th>Course Code</th>
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<tbody>
<tr>
<td>BIS 181</td>
<td>Comparative Genomics</td>
</tr>
<tr>
<td>BIS 183</td>
<td>Functional Genomics</td>
</tr>
<tr>
<td>FST 104</td>
<td>Food Microbiology</td>
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<tr>
<td>MCB 121</td>
<td>Advanced Molecular Biology</td>
</tr>
<tr>
<td>MCB 182</td>
<td>Principles of Genomics</td>
</tr>
<tr>
<td>MIC 117</td>
<td>Analysis of Molecular Genetic Circuits</td>
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<tr>
<td>MIC 120</td>
<td>Microbial Ecology</td>
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</table>

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<tr>
<th>Course Code</th>
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<tr>
<td>MIC 172</td>
<td>Host-Parasite Interactions</td>
</tr>
<tr>
<td>MIC 175</td>
<td>Cancer Biology</td>
</tr>
<tr>
<td>PLP 130</td>
<td>Fungal Biology &amp; Disease</td>
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<tr>
<td>SSC 111</td>
<td>Soil Microbiology</td>
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</table>

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.