MOLECULAR AND CELL BIOLOGY - BS

Students who select Molecular and Cell Biology as their major will receive a strong background in the cellular and molecular aspects of biology with particular emphasis on eukaryotes. The major provides an excellent foundation for a career in biotechnology, genetic engineering, MD/PhD programs or basic biological research.

Program Requirements

First Year

**Fall**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 111</td>
<td>Introductory Biology I</td>
<td>4</td>
</tr>
<tr>
<td>CHEM 101 &amp; CHEM 111</td>
<td>Fundamentals of Chemistry I and Fundamentals of Chemistry Laboratory I</td>
<td>4</td>
</tr>
<tr>
<td>MATH 147</td>
<td>Calculus I for Biological Sciences</td>
<td>4</td>
</tr>
<tr>
<td>Communication elective</td>
<td><a href="http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/#communication">http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/#communication</a></td>
<td>3</td>
</tr>
<tr>
<td><strong>Semester Credit Hours</strong></td>
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<td>15</td>
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**Spring**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credit Hours</th>
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<tbody>
<tr>
<td>BIOL 112</td>
<td>Introductory Biology II</td>
<td>4</td>
</tr>
<tr>
<td>CHEM 102 &amp; CHEM 112</td>
<td>Fundamentals of Chemistry II and Fundamentals of Chemistry Laboratory II</td>
<td>4</td>
</tr>
<tr>
<td>MATH 148</td>
<td>Calculus II for Biological Sciences</td>
<td>4</td>
</tr>
<tr>
<td>Communication elective</td>
<td><a href="http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/#communication">http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/#communication</a></td>
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<tr>
<td><strong>Semester Credit Hours</strong></td>
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**Second Year**

**Fall**

<table>
<thead>
<tr>
<th>Course</th>
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<th>Credit Hours</th>
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<tbody>
<tr>
<td>BIOL 213</td>
<td>Molecular Cell Biology</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 227 &amp; CHEM 237</td>
<td>Organic Chemistry I and Organic Chemistry Laboratory</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 201</td>
<td>College Physics</td>
<td>4</td>
</tr>
<tr>
<td>American history elective</td>
<td><a href="http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/#american-history">http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/#american-history</a></td>
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</tr>
<tr>
<td><strong>Semester Credit Hours</strong></td>
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**Spring**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 214</td>
<td>Genes, Ecology and Evolution</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 228 &amp; CHEM 238</td>
<td>Organic Chemistry II and Organic Chemistry Laboratory</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 202</td>
<td>College Physics</td>
<td>4</td>
</tr>
<tr>
<td>American history elective</td>
<td><a href="http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/#american-history">http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/#american-history</a></td>
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</tr>
<tr>
<td><strong>Semester Credit Hours</strong></td>
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**Total Semester Credit Hours** | 58 |

**Third Year**

**Fall**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credit Hours</th>
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</thead>
<tbody>
<tr>
<td>BICH 410</td>
<td>Comprehensive Biochemistry I</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 351</td>
<td>Fundamentals of Microbiology</td>
<td>4</td>
</tr>
<tr>
<td>GENE 302 &amp; GENE 312</td>
<td>Principles of Genetics and Comprehensive Genetics Laboratory</td>
<td>4</td>
</tr>
<tr>
<td>STAT 302</td>
<td>Statistical Methods</td>
<td>3</td>
</tr>
<tr>
<td><strong>Semester Credit Hours</strong></td>
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**Spring**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>BICH 411</td>
<td>Comprehensive Biochemistry II</td>
<td>3</td>
</tr>
<tr>
<td>BICH 414</td>
<td>Biochemical Techniques I</td>
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</tr>
<tr>
<td>BICH 431 &amp; GENE 431</td>
<td>Molecular Genetics</td>
<td>3</td>
</tr>
<tr>
<td>Elective</td>
<td></td>
<td>5</td>
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**Fourth Year**

**Fall**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credit Hours</th>
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</thead>
<tbody>
<tr>
<td>BIOL 413</td>
<td>Cell Biology</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 414</td>
<td>Developmental Biology</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 423</td>
<td>Cell Biology Laboratory</td>
<td>2</td>
</tr>
<tr>
<td>POLS 206</td>
<td>American National Government</td>
<td>3</td>
</tr>
<tr>
<td>Language, philosophy and culture</td>
<td><a href="http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/#language-philosophy-culture">http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/#language-philosophy-culture</a></td>
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<tr>
<td>Elective</td>
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<td><strong>Semester Credit Hours</strong></td>
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**Spring**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credit Hours</th>
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</thead>
<tbody>
<tr>
<td>POLS 207</td>
<td>State and Local Government</td>
<td>3</td>
</tr>
<tr>
<td>Select directed electives from the list below</td>
<td></td>
<td>6</td>
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<tr>
<td>Creative arts</td>
<td><a href="http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/#creative-arts">http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/#creative-arts</a></td>
<td>3</td>
</tr>
<tr>
<td>Elective</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td><strong>Semester Credit Hours</strong></td>
<td></td>
<td>15</td>
</tr>
</tbody>
</table>

**Total Semester Credit Hours** | 62 |

1. Students seeking teacher certification must take HIST 105 and HIST 106. Other students may choose HIST 105 and HIST 106 or any 6 hours of American history courses (3 hours may be in Texas history).
2. Students successfully completing the required four semesters of upper-level ROTC courses may substitute these courses for 3 hours of American history and 3 hours of government/political science.

The following are CBK courses and must be completed prior to the start of 5th full semester: BIOL 111, BIOL 112, BIOL 213, BIOL 214, CHEM 101 & CHEM 111, CHEM 102 & CHEM 112, CHEM 227 & CHEM 237, CHEM 228 & CHEM 238, MATH 147, MATH 148.

3. Two courses in the major must be designated as writing intensive.
Select from any 100-499 course not used elsewhere. (Except AGLS 101, BIMS 101; BIOL 101, BIOL 107, BIOL 113, BIOL 206; BUSN 100; CHEM 106, CHEM 116, HORT 101; MATH 102; STLC 100-499 (http://catalog.tamu.edu/undergraduate/course-descriptions/stlc); WFSC 101.) Only one KINE 199 may be used as a general elective.

Can be replaced by BIOL 435 or BIOL 455.

Students successfully completing the required four semesters of upper-level ROTC courses may substitute these courses for 3 hours of American history and 3 hours of government/political science.

### Directed Electives

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Any 300-400 level BIOL course</td>
<td>Biological Oceanography</td>
<td>3</td>
</tr>
<tr>
<td>OCNG 420</td>
<td>Biological Oceanography</td>
<td>3</td>
</tr>
<tr>
<td>Select remaining courses from the following:</td>
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### Cell Biology

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
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</thead>
<tbody>
<tr>
<td>BIOL 430</td>
<td>Biological Imaging</td>
<td>4</td>
</tr>
<tr>
<td>VIBS 343</td>
<td>Histology</td>
<td>4</td>
</tr>
<tr>
<td>VIBS 443</td>
<td>Biology of Mammalian Cells and Tissues</td>
<td>4</td>
</tr>
</tbody>
</table>

### Organismal Biology

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 344</td>
<td>Embryology</td>
<td>4</td>
</tr>
<tr>
<td>BIOL 388</td>
<td>Principles of Animal Physiology</td>
<td>4</td>
</tr>
<tr>
<td>BIOL 434/</td>
<td>Regulatory and Behavioral</td>
<td>3</td>
</tr>
<tr>
<td>NRSC 434</td>
<td>Neuroscience</td>
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<tr>
<td>BIOL 435</td>
<td>Laboratory for Regulatory and Behavioral</td>
<td>1</td>
</tr>
<tr>
<td>BIOL 466</td>
<td>Principles of Evolution</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 467</td>
<td>Integrative Animal Behavior</td>
<td>3</td>
</tr>
<tr>
<td>MEPS 313</td>
<td>Introduction to Plant Physiology</td>
<td>3</td>
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</tbody>
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### Molecular and Computational Biology

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
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</thead>
<tbody>
<tr>
<td>BIOL 450/</td>
<td>Genomics</td>
<td>4</td>
</tr>
<tr>
<td>BICH 450</td>
<td></td>
<td></td>
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<tr>
<td>BIOL 451</td>
<td>Bioinformatics</td>
<td>3</td>
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<tr>
<td>BICH 432/</td>
<td>Laboratory in Molecular Genetics</td>
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<tr>
<td>GENE 432</td>
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</tr>
<tr>
<td>CHEM 327</td>
<td>Physical Chemistry I</td>
<td>3</td>
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</tbody>
</table>

### Microbiology

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Semester Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 406/</td>
<td>Bacterial Genetics</td>
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</tr>
<tr>
<td>GENE 406</td>
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<td></td>
</tr>
<tr>
<td>BIOL 438</td>
<td>Bacterial Physiology</td>
<td>4</td>
</tr>
<tr>
<td>BIOL 445</td>
<td>Biology of Viruses</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 454</td>
<td>Immunology</td>
<td>3</td>
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<tr>
<td>BIOL 455</td>
<td>Laboratory in Immunology</td>
<td>2</td>
</tr>
<tr>
<td>BIOL 456</td>
<td>Medical Microbiology</td>
<td>4</td>
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</tbody>
</table>

**Total Program Hours 120**