### University Core and Graduation Requirements

#### University Core Requirements:

<table>
<thead>
<tr>
<th>Requirements</th>
<th>#Classes</th>
<th>Hours</th>
<th>Classes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Religion Cornerstones</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Teachings and Doctrine of The Book of Mormon</td>
<td>1</td>
<td>2.0</td>
<td>REL A 275</td>
</tr>
<tr>
<td>Jesus Christ and the Everlasting Gospel</td>
<td>1</td>
<td>2.0</td>
<td>REL A 250</td>
</tr>
<tr>
<td>Foundations of the Restoration</td>
<td>1</td>
<td>2.0</td>
<td>REL C 225</td>
</tr>
<tr>
<td>The Eternal Family</td>
<td>1</td>
<td>2.0</td>
<td>REL C 200</td>
</tr>
<tr>
<td><strong>The Individual and Society</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>American Heritage</td>
<td>1-2</td>
<td>3-6.0</td>
<td>from approved list</td>
</tr>
<tr>
<td>Global and Cultural Awareness</td>
<td>1</td>
<td>3.0</td>
<td>from approved list</td>
</tr>
<tr>
<td><strong>Skills</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>First Year Writing</td>
<td>1</td>
<td>3.0</td>
<td>from approved list</td>
</tr>
<tr>
<td>Advanced Written and Oral Communications</td>
<td>1</td>
<td>3.0</td>
<td>WRTG 316 recommended</td>
</tr>
<tr>
<td>Quantitative Reasoning</td>
<td>1</td>
<td>3-4.0</td>
<td>from approved list</td>
</tr>
<tr>
<td>Languages of Learning (Math or Language)</td>
<td>1</td>
<td>3-4.0</td>
<td>MATH 112*, 119*, or STAT 121*</td>
</tr>
<tr>
<td><strong>Arts, Letters, and Sciences</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Civilization 1</td>
<td>1</td>
<td>3.0</td>
<td>from approved list</td>
</tr>
<tr>
<td>Civilization 2</td>
<td>1</td>
<td>3.0</td>
<td>from approved list</td>
</tr>
<tr>
<td>Arts</td>
<td>1</td>
<td>3.0</td>
<td>from approved list</td>
</tr>
<tr>
<td>Letters</td>
<td>1</td>
<td>3.0</td>
<td>from approved list</td>
</tr>
<tr>
<td>Biological Science</td>
<td>1-2</td>
<td>3-4.0</td>
<td>BIO 130*, PDBIO 120*, or MMBIO 121*</td>
</tr>
<tr>
<td>Physical Science</td>
<td>1</td>
<td>3.0</td>
<td>CHEM 105*, PHSCS 105*</td>
</tr>
<tr>
<td>Social Science</td>
<td>1</td>
<td>3.0</td>
<td>from approved list</td>
</tr>
<tr>
<td><strong>Core Enrichment: Electives</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Religion Electives</td>
<td>3-4</td>
<td>6.0</td>
<td>from approved list</td>
</tr>
<tr>
<td>Open Electives</td>
<td>Variable</td>
<td>Variable</td>
<td>personal choice</td>
</tr>
</tbody>
</table>

*THESE CLASSES FILL BOTH UNIVERSITY CORE AND PROGRAM REQUIREMENTS (16 hours overlap)*

#### Graduation Requirements:

- Minimum residence hours required: 30.0
- Minimum hours needed to graduate: 120.0

### Suggested Sequence of Courses

#### Freshman Year

<table>
<thead>
<tr>
<th>Semester</th>
<th>Total Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st Semester</td>
<td>14.0-15.0</td>
</tr>
<tr>
<td>2nd Semester</td>
<td>15-16.0</td>
</tr>
</tbody>
</table>

#### Sophomore Year

<table>
<thead>
<tr>
<th>Semester</th>
<th>Total Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>3rd Semester</td>
<td>14.0-15.0</td>
</tr>
<tr>
<td>4th Semester</td>
<td>14.0-16.0</td>
</tr>
</tbody>
</table>

#### Junior Year

<table>
<thead>
<tr>
<th>Semester</th>
<th>Total Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>5th Semester</td>
<td>14.0-16.0</td>
</tr>
<tr>
<td>6th Semester</td>
<td>14.0-16.0</td>
</tr>
</tbody>
</table>

#### Senior Year

<table>
<thead>
<tr>
<th>Semester</th>
<th>Total Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>7th Semester</td>
<td>14.0-16.0</td>
</tr>
</tbody>
</table>

Note: Students are encouraged to complete an average of 15 credit hours each semester or 30 credit hours each year, which could include spring and/or summer terms. Taking fewer credits substantially increases the cost and the number of semesters to graduate.

*Double counting options available for some GE courses*
BS in Molecular Biology (285125)  
2022-2023 Program Requirements (57 - 60 Credit Hours)

**REQUIREMENT 1** Complete 1 course
- BIO 120 - Science of Biology  
- MMBIO 121 - General Biology: Health and Disease  
  3.0

**REQUIREMENT 2** Complete 10 courses
- BIO 165 - Introduction to Bioinformatics  
- BIO 250 - Evolutionary Medicine  
- CELL 360 - Cell Biology  
- MMBIO 240 - Molecular Biology  
- MMBIO 241 - Molecular and Cellular Biology Laboratory  
- MMBIO 390R - Readings in Molecular Biology  
- MMBIO 441 - Advanced Molecular Biology  
- MMBIO 468 - (MMBio-Bio PWS) Genomics  
- MMBIO 490R - Molecular Biology Seminar  
- MBS 340 - Genetics  
  3.0

**REQUIREMENT 3** Complete 2.0 hours from the following course(s)
- MMBIO 294R - Mentored Research  
- MMBIO 385 - Phage Genetics  
- MMBIO 442 - Advanced Molecular Biology Laboratory  
- MMBIO 494R - Advanced Mentored Research  
  3.0v

**REQUIREMENT 4** Complete 4 courses
- *CHEM 105 - General College Chemistry 1 with Lab (Integrated)  
- CHEM 106 - General College Chemistry 2  
- CHEM 107 - General College Chemistry Laboratory  
- *PHSCS 105 - General Physics 1  
  4.0

**REQUIREMENT 5** Complete 1 course
- CHEM 285 - Introductory Bio-organic Chemistry  
- CHEM 351 - Organic Chemistry 1  
- MMBIO 261 - Microbial Ecology  
  4.0

**REQUIREMENT 6** Complete 1 course
- *MATH 112 - Calculus 1  
- MATH 119 - Introduction to Calculus  
- STAT 121 - Principles of Statistics  
  4.0

**REQUIREMENT 7** Complete 12.0 hours from the following option(s)
- A COURSE USED TO FULFIL REQUIREMENTS 1 - 6 MAY NOT BE USED TO FULFIL REQUIREMENT 7.
- FOR CERTAIN ELECTIVE COURSES, A LIMITED NUMBER OF CREDIT HOURS CAN COUNT TOWARD THIS ELECTIVE REQUIREMENT.

**OPTION 7.1** Complete up to 12.0 hours from the following course(s)
- BIO 350 - Ecology  
- BIO 420 - Evolutionary Biology  
  4.0

**OPTION 7.2** Complete up to 4.0 hours from the following course(s)
- MMBIO 110R - Extremophiles: Life in Extreme Environments  
- MMBIO 122 - General Biology-Health and Disease Laboratory  
- MMBIO 151 - Introduction to Microbiology  
- MMBIO 162R - Careers in Biomedical Sciences  
- MMBIO 194 - Phage Hunters: Discovery  
- MMBIO 195 - Phage Hunters: Comparative Genomics  
- MMBIO 263 - Infection and Immunity  
- MMBIO 294R - Mentored Research  
  4.0v

**OPTION 7.3** Complete 10.0 hours from the following course(s)
- MMBIO 265 - Advanced Molecular Biology  
- MMBIO 365 - Bacterial Pathogenesis Laboratory  
- MMBIO 366 - Microbial Ecology Laboratory  
- MMBIO 390R - Academic Internship  
  3.0v

**OPTION 7.4** Complete 2.0 hours from the following course(s)
- MBBIO 411 - Molecular Diagnostics  
- MBBIO 418 - Medical Parasitology  
- MBBIO 465 - Advanced Bacterial Physiology  
- MBBIO 466 - Virology Laboratory  
- MBBIO 467 - Immunology Lab  
  3.0

You may take up to 2 credit hours.

**OPTION 7.5** Complete 1.0 hour from the following course(s)
- MMBIO 471 - Applied and Industrial Microbiology  
- MMBIO 493R - Curriculum and Instruction Practicum  
- MMBIO 494R - Advanced Mentored Research  
  3.0v

**OPTION 7.6** Complete 4.0 hours from the following course(s)
- MBBIO 419 - Advanced Molecular Biology  
- MBBIO 472 - Phage Hunters: Discovery  
- MBBIO 473 - Phage Hunters: Comparative Genomics  
- MBBIO 474 - Phage Hunters: Discovery  
  3.0

**REQUIREMENT 8** Complete 1 course
- MMBIO 498 - Reflections on Learning  
  0.0

**THE DISCIPLINE:**
Molecular biology is the basic science that has as its goal an explanation of life processes at the subcellular and molecular level. Recent years have seen explosive advances in the study of DNA and molecular genetics, including gene cloning, sequencing, and mapping. Developments in molecular biology have opened new areas of study and provided powerful techniques that are revolutionizing the pharmaceutical, health, and agricultural industries. They have spawned new industries in biotechnology, and opened avenues for answering basic and applied questions in all of the life sciences.

**PROGRAM OBJECTIVES:**
The objectives of the molecular biology major are to provide a conceptual knowledge base and critical thinking skills related to the following areas:

- Molecular biology
- Cell biology
- Integrating themes (biochemistry, evolution, and diversity)
At the completion of the program, the student will be able to:

1. Possess basic knowledge and demonstrate critical thinking in molecular biology, cell biology, and evaluate literature in related areas.

2. Demonstrate basic laboratory skills including laboratory safety and basic molecular biology techniques.

3. Demonstrate laboratory thinking skills including cognitive processes, analytical skills, communication skills, and interpersonal and citizenry skills.

4. Demonstrate basic research skills to include formulating a clear, answerable question, developing a testable hypothesis, predicting expected results, developing, modifying, and/or following an experimental protocol, collecting and organizing data in a systematic fashion, presenting data in an appropriate form, assessing the validity of the data and drawing appropriate conclusions based on the results.

CAREER OPPORTUNITIES:
Graduates are well prepared for continued study toward advanced degrees in agriculture, animal science biochemistry, biology, microbiology, molecular biology, medicine, and related fields or to enter the biotechnology work force. Molecular biology is an excellent pre-professional course of study for those interested in health professions, law, or business.

FINANCING:
Students may be employed either as research or teaching assistants. Several endowed scholarships are available.

MAP DISCLAIMER
While every reasonable effort is made to ensure accuracy, there are some student populations that could have exceptions to listed requirements. Please refer to the university catalog and your college advisement center/department for complete guidelines.

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