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>
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<tr>
<td>Foundations of the Restoration</td>
<td>1</td>
<td>2.0</td>
<td>REL C 225</td>
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<tr>
<td>The Eternal Family</td>
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<td>2.0</td>
<td>REL C 200</td>
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<tr>
<td><strong>The Individual and Society</strong></td>
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<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>
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<td></td>
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<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>
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<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>
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<td>3.0</td>
<td>from approved list</td>
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<tr>
<td>Letters</td>
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<td>from approved list</td>
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<tr>
<td>Biological Science</td>
<td>1-2</td>
<td>3-4.0</td>
<td>BIO 130*, PDBIO 120*, or MMBIO 121*</td>
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<tr>
<td>Physical Science</td>
<td>1</td>
<td>3.0</td>
<td>CHEM 105*, PHSCS 105*</td>
</tr>
<tr>
<td>Social Science</td>
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<td>3.0</td>
<td>from approved list</td>
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<tr>
<td><strong>Core Enrichment: Electives</strong></td>
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<tr>
<td>Religion Electives</td>
<td>3-4</td>
<td>6.0</td>
<td>from approved list</td>
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<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

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### Suggested Sequence of Courses

#### FRESHMAN YEAR

<table>
<thead>
<tr>
<th>Semester</th>
<th>Total Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st</td>
<td>14.0-15.0</td>
</tr>
<tr>
<td>2nd</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</td>
<td>14.0-16.0</td>
</tr>
<tr>
<td>6th</td>
<td>14.0-16.0</td>
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</tbody>
</table>

#### SOPHOMORE YEAR

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

#### SENIOR YEAR

<table>
<thead>
<tr>
<th>Semester</th>
<th>Total Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>7th</td>
<td>14.0-16.0</td>
</tr>
<tr>
<td>8th</td>
<td></td>
</tr>
</tbody>
</table>

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Note: Qualitative Reasoning elective fulfilled by Math 112 or Math 119. 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*
REQUIREMENT 1: Complete 1 course
- BIO 130 - Biology
- MMBIO 121 - General Biology: Health and Disease

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
- PWS 340 - Genetics

REQUIREMENT 3: Complete 2.0 hours from the following course(s)
- CHEM 105 - General College Chemistry 1 with Lab (Integrated)
- CHEM 106 - General College Chemistry 2
- CHEM 107 - General College Chemistry Laboratory
- CHEM 285 - Introductory Bio-organic Chemistry
- CHEM 351 - Organic Chemistry 1
- CHEM 352 - Organic Chemistry 2
- CHEM 353 - Organic Chemistry Laboratory - Nonmajors
- CHEM 481 - Biochemistry
- CHEM 482 - Mechanisms of Molecular Biology
- MMBIO 151 - Introduction to Microbiology
- MMBIO 162R - Careers in Biomedical Sciences
- MMBIO 195 - Careers in Biomedical Sciences
- MMBIO 210 - Extremophiles: Life in Extreme Environments
- MMBIO 261 - Infection and Immunity
- MMBIO 294R - Mentored Research
- MMBIO 363 - Microbial Ecology
- MMBIO 364 - Bacterial Pathogenesis
- MMBIO 365 - Bacterial Pathogenesis Laboratory
- MMBIO 366 - Microbial Ecology Laboratory
- MMBIO 399R - Academic Internship
- MMBIO 411 - Genetics
- MMBIO 414 - Advanced Genetics
- MMBIO 418 - Medical Parasitology
- MMBIO 420 - Immunology
- MMBIO 441 - Advanced Molecular Biology
- MMBIO 442 - Advanced Molecular Biology Laboratory
- MMBIO 451 - Modern Genetics
- MMBIO 456 - Virology
- MMBIO 468 - (MMBio-Bio-PWS) Genomics
- MMBIO 490R - Molecular Biology Seminar
- PWS 340 - Genetics

REQUIREMENT 4: Complete 4 courses
- CHEM 285 - Introductory Bio-organic Chemistry
- CHEM 351 - Organic Chemistry 1
- CHEM 352 - Organic Chemistry 2
- CHEM 353 - Organic Chemistry Laboratory - Nonmajors

REQUIREMENT 5: Complete 1 course
- MMBIO 467

REQUIREMENT 6: Complete 1 course
- CHEM 351 - Organic Chemistry 1

REQUIREMENT 7: Complete 12.0 hours from the following course(s)
- MMBIO 294R - Mentored Research
- MMBIO 490R - Molecular Biology Seminar
- PWS 340 - Genetics

REQUIREMENT 8: Pass the Biology Major Field Exam.
REQUIREMENT 9: Complete an exit interview.

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
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.

DEPARTMENT INFORMATION
Microbiology and Molecular Biology
Brigham Young University
4007 Life Sciences Building
Provo, UT 84602
Telephone: (801) 422-2889

ADVISEMENT CENTER INFORMATION
Life Sciences Advisement
Brigham Young University
2060 Life Sciences Building
Provo, UT 84602
Telephone: (801) 422-3042
lifesciences@byu.edu