**University Core and Graduation Requirements**

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<th>University Core Requirements:</th>
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<td><strong>Hours</strong></td>
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<td><strong>Classes</strong></td>
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**Religion Cornerstones**
- Teachings and Doctrine of The Book of Mormon
  - REL A 275
- Jesus Christ and the Everlasting Gospel
  - REL A 250
- Foundations of the Restoration
  - REL C 225
- The Eternal Family
  - REL C 200

**The Individual and Society**
- American Heritage
  - 1-2
  - 3-6.0 from approved list
- Global and Cultural Awareness
  - 1
  - 3.0 from approved list

**Skills**
- First Year Writing
  - 1
  - 3.0 from approved list
- Advanced Written and Oral Communications
  - 1
  - 3.0 WRTG 316 recommended
- Quantitative Reasoning
  - 1
  - 3-4.0 from approved list
- Languages of Learning (Math or Language)
  - 1
  - 3-4.0 MATH 112*, 119*, or STAT 121*

**Arts, Letters, and Sciences**
- Civilization 1
  - 1
  - 3.0 from approved list
- Civilization 2
  - 1
  - 3.0 from approved list
- Arts
  - 1
  - 3.0 from approved list
- Letters
  - 1
  - 3.0 from approved list
- Biological Science
  - 1-2
  - 3-4.0 BIO 130*, PDBIO 120*, or MMBIO 121*
- Physical Science
  - 1
  - 3.0 CHEM 105*, PHSCS 105*
- Social Science
  - 1
  - 3.0 from approved list

**Core Enrichment: Electives**
- Religion Electives
  - 3-4
  - 6.0 from approved list
- Open Electives
  - Variable
  - Personal choice

*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

Note: Quantitative 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.

Note: Quantitative Reasoning can be fulfilled by ACT Math subscore of 22 or higher.

*Double counting options available for some GE courses

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**BS in Molecular Biology (285125) MAP Sheet**

Life Sciences, Microbiology and Molecular Biology

For students entering the degree program during the 2021-2022 curricular year.
### BS in Molecular Biology (285125)
#### 2021-2022 Program Requirements (57 - 60 Credit Hours)

**Requirement 1**: Complete 1 course
- BIO 120 - Introduction to Bioinformatics 3.0
- CHEM 120 - General Chemistry 1 3.0
- MBBIO 121 - General Biology: Health and Disease 3.0

**Requirement 2**: Complete 10 courses
- BIO 165 - Introduction to Bioinformatics 3.0
- BIO 250 - Evolutionary Medicine 2.0
- CELL 360 - Cell Biology 3.0
- CHEM 361 - Advanced Organic Chemistry 3.0
- CHEM 370R - Readings in Molecular Biology 1.0
- MBBIO 411 - Advanced Molecular Biology 3.0
- MBBIO 418 - Genomics 3.0
- MBBIO 440 - Advanced Molecular Biology 3.0
- MBBIO 441 - Advanced Molecular Biology 3.0

You may take up to 2 credit hours.

**Requirement 3**: Complete 2.0 hours from the following course(s)
- MMBIO 294R - Mentored Research 3.0
- MBBIO 442 - Advanced Molecular Biology Laboratory 2.0
- MMBIO 494R - Advanced Mentored Research 3.0

**Requirement 4**: Complete 4 courses
- *CHEM 105 - General College Chemistry 1 with Lab (Integrated) 4.0
- CHEM 106 - General College Chemistry 2 3.0
- CHEM 107 - General College Chemistry Laboratory 1.0
- *PHSCS 105 - General Physics 1 3.0

**Requirement 5**: Complete 1 course
- CHEM 285 - Introductory Bio-organic Chemistry 4.0
- CHEM 351 - Organic Chemistry 1 3.0

**Requirement 6**: Complete 1 course
- *MATH 112 - Calculus 1 4.0
- MATH 119 - Introduction to Calculus 4.0
- STAT 121 - Principles of Statistics 3.0

**Requirement 7**: Complete 12.0 hours from the following course(s)
- **Course used to fulfill Requirements 1-6 may not be used to fulfill Requirement 7. For certain elective courses, a limited number of credit hours can count toward this elective requirement.**
- BIO 350 - Ecology 3.0
- BIO 420 - Evolutionary Biology 4.0
- BIO 463 - Genetics of Human Disease 3.0
- BIO 465 - Capstone in Bioinformatics 3.0
- CELL 210 - Human Anatomy (with virtual lab) 3.0
- CELL 220 - Human Anatomy (with lab) 4.0
- CELL 305 - Human Physiology 4.0
- CELL 325 - Tissue Biology (with lab) 3.0
- CELL 362 - Advanced Physiology 3.0
- CELL 363 - Advanced Physiology Laboratory 1.0
- CELL 382 - Developmental Biology 3.0
- CELL 444 - Bio-Innovation and -Entrepreneurship 1 2.0
- CELL 445 - Bio-Innovation and -Entrepreneurship 2 2.0
- CHEM 351 - Organic Chemistry 1 3.0
- CHEM 352 - Organic Chemistry 2 3.0
- CHEM 353 - Organic Chemistry Laboratory - Nonmajors 2.0
- CHEM 481 - Biochemistry 3.0
- CHEM 482 - Mechanisms of Molecular Biology 3.0
- MBBIO 110R - Extremophiles: Life in Extreme Environments 1.0
- MBBIO 122 - General Biology: Health and Disease Laboratory 1.0
- MBBIO 151 - Introduction to Microbiology 4.0
- MBBIO 162R - Careers in Biomedical Sciences 1.0
- MBBIO 194 - MBBIO-Bio-PWS 3.0
- MBBIO 210 - Extremophiles: Life in Extreme Environments 1.0
- MBBIO 215 - MBBIO-Bio-PWS 3.0
- MBBIO 219 - MBBIO-Bio-PWS 3.0
- MBBIO 350 - Principles of Statistics 4.0
- MBBIO 359R - Academic Internship 4.0
- MBBIO 360 - Microbial Genetics 4.0
- MBBIO 363 - Microbial Ecology 2.0
- MBBIO 364 - Bacterial Pathogenesis 3.0
- MBBIO 365 - Bacterial Pathogenesis Laboratory 1.0
- MBBIO 366 - Microbial Ecology Laboratory 1.0
- MBBIO 399R - Academic Internship 9.0
- MBBIO 409 - Hematology 3.0
- MBBIO 411 - Molecular Diagnostics 3.0
- MBBIO 418 - Medical Parasitology 2.0
- MBBIO 461 - Advanced Bacterial Physiology 3.0
- MBBIO 463 - Immunology 3.0
- MBBIO 465 - Virology 3.0
- MBBIO 466 - Virology Laboratory 1.0
- MBBIO 467 - Immunology Lab 1.0
- MMBIO 471 - Applied and Industrial Microbiology 2.0
- MMBIO 493R - Biology and Instruction Practicum 2.0
- MMBIO 494R - Advanced Mentored Research 3.0

You may take up to 2 credit hours.

**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
• 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.

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