BS in Molecular Biology (285125) MAP Sheet
Life Sciences, Microbiology and Molecular Biology
For students entering the degree program during the 2022-2023 curricular year.

University Core and Graduation Requirements
University Core Requirements:
Requirements#ClassesHoursClasses
Religion Cornerstones
Teachings and Doctrine of The Book of Mormon12.0REL A 275
Jesus Christ and the Everlasting Gospel12.0REL A 250
Foundations of the Restoration12.0REL C 225
The Eternal Family12.0REL C 200
The Individual and Society
American Heritage1-23.0from approved list
Global and Cultural Awareness13.0from approved list
Skills
First Year Writing13.0from approved list
Advanced Written and Oral Communications13.0WRTG 316 recommended
Quantitative Reasoning13-4.0from approved list
Languages of Learning (Math or Language)13-4.0MATH 112*, 119*, or STAT 121*
Arts, Letters, and Sciences
Civilization 113.0from approved list
Civilization 213.0from approved list
Arts13.0from approved list
Letters13.0from approved list
Biological Science1-23-4.0BIO 130*, PDBIO 120*, or MMBIO 121*
Physical Science13.0CHEM 105*, PHSCS 105*
Social Science13.0from approved list
Core Enrichment: Electives
Religion Electives3-46.0from approved list
Open ElectivesVariableVariablepersonal choice
*THESE CLASSES FILL BOTH UNIVERSITY
CORE AND PROGRAM REQUIREMENTS
(16 hours overlap)
Graduation Requirements:
Minimum residence hours required30.0
Minimum hours needed to graduate120.0
Suggested Sequence of Courses
Freshman Year
1st Semester
First-year Writing or American Heritage*3.0
REL A 2752.0
MMBIO 121 or BIO 130 or CELL 1203-4.0
CHEM 1054.0
Open electives3.0
Total Hours15-16.0
2nd Semester
First-year Writing or American Heritage*3.0
REL A 2502.0
MMBIO 2403.0
MMBIO 2411.0
CHEM 1063.0
CHEM 1071.0
Requirement 2 choice 3.0
Total Hours 16.0
Sophomore Year
3rd Semester
BIO 1653.0
BIO 2502.0
MATH 112 or 119 or STAT 1213.0-4.0
PHSCS 1053.0
Civilization 1 elective 3.0
Total Hours 14.0-15.0
4th Semester
PWS 3403.0
Requirement 3 choice 2.0
Major Elective (Requirement 7) 3.0
REL C 2002.0
Civilization 2 elective 3.0
Social Science elective 3.0
Total Hours 16.0
Junior Year
5th Semester
CHEM 351 or CHEM 2853.0
CELL 3603.0
Religion elective 2.0
Letters elective 3.0
Arts elective 3.0
Total Hours 14.0
6th Semester
MMBIO 390R1.0
MMBIO 490R1.0
Major electives (Requirement 7) 6.0
REL C 2252.0
Requirement 2 choice 4.0-6.0
Total Hours 14.0-16.0
Senior Year
7th Semester
MMBIO 4413.0
Open electives 2.0
Major electives (Requirement 7) 3.0
Religion elective 2.0
Global & Cultural Awareness elective 3.0
Requirement 2 choice 1-3.0
Total Hours 14.0-16.0
8th Semester
Religion Elective 2.0
MMBIO 4683.0
Adv. Written & Oral Communication (WRTG 316 recommended) 3.0
Open electives 3.0
Total Hours 11-14.0

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

BS in Molecular Biology (285125) 2022-2023 Program Requirements (57 - 60 Credit Hours)

requirement 1: Complete 1 course
*BIO 130 - Biology 4.0
CELL 120 - Science of Biology 3.0
MMBIO 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
MMBIO 240 - Molecular Biology 3.0
MMBIO 241 - Molecular and Cellular Biology Laboratory 1.0
MMBIO 390R - Readings in Molecular Biology 1.0
MMBIO 441 - Advanced Molecular Biology 3.0
MMBIO 468 - (MMBio-Bio-PWS) Genomics 3.0
MMBIO 490R - Molecular Biology Seminar 1.0
PWS 340 - Genetics 3.0

requirement 3: Complete 2.0 hours from the following course(s)
MMBIO 294R - Mentored Research 3.0v
You may take up to 2 credit hours.
MMBIO 385 - Phage Genetics 3.0
MMBIO 442 - Advanced Molecular Biology Laboratory 2.0
MMBIO 494R - Advanced Mentored Research 3.0v
You may take up to 2 credit hours.

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 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 3.0
BIO 420 - Evolutionary Biology 4.0
BIO 463 - Genetics of Human Disease 3.0
BIO 465 - Capstone in Bioinformatics 3.0
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
CELL 582 - Developmental Genetics 3.0
CHEM 351 - Organic Chemistry 1 3.0
CHEM 352 - Organic Chemistry 2 3.0
CHEM 353 - Organic Chemistry Laboratory--Nonmajors 2.0v
CHEM 481 - Biochemistry 3.0
CHEM 482 - Mechanisms of Molecular Biology 3.0
MMBIO 110R - Extremophiles: Life in Extreme Environments 1.0
MMBIO 122 - General Biology: Health and Disease Laboratory 1.0
MMBIO 151 - Introduction to Microbiology 4.0
MMBIO 162R - Careers in Biomedical Sciences 1.0
MMBIO 194 - Phage Hunters: Discovery 3.0
MMBIO 195 - Phage Hunters: Comparative Genomics 3.0
MMBIO 261 - Infection and Immunity 3.0
MMBIO 294R - Mentored Research 3.0v
You may take up to 2 credit hours.
MMBIO 350 - Genetic Counseling 3.0
MMBIO 360 - Bacterial Genetics 4.0
MMBIO 363 - Microbial Ecology 2.0
MMBIO 364 - Bacterial Pathogenesis 3.0
MMBIO 365 - Bacterial Pathogenesis Laboratory 1.0
MMBIO 366 - Microbial Ecology Laboratory 1.0
MMBIO 399R - Academic Internship 9.0v
You may take up to 2 credit hours.
MMBIO 409 - Hematology 3.0
MMBIO 411 - Molecular Diagnostics 3.0
MMBIO 418 - Medical Parasitology 2.0
MMBIO 461 - Advanced Bacterial Physiology 3.0
MMBIO 463 - Immunology 3.0
MMBIO 465 - Virology 3.0
MMBIO 466 - Virology Laboratory 1.0
MMBIO 467 - Immunology Lab 1.0
MMBIO 471 - Applied and Industrial Microbiology 2.0
MMBIO 493R - Curriculum and Instruction Practicum 2.0
MMBIO 494R - Advanced Mentored Research 3.0v
You may take up to 2 credit hours.
MMBIO 510 - History and Philosophy of Microbiology and Molecular Biology 2.0
MMBIO 512 - Gene Regulation 2.0
MMBIO 514 - Advanced Immunology 2.0
MMBIO 516 - Bacteria-Host Interactions 2.0
MMBIO 518 - Select Pathogens 2.0
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

BS in Molecular Biology (285125) 2022-2023
- 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