

BS in Molecular Biology (285125) MAP Sheet

Life Sciences, Microbiology and Molecular Biology

For students entering the degree program during the 2024-2025 curricular year.



University Core and Graduation Requirements				Suggested Sequence of Courses			
University Core Requirements:							
Requirements	#Classes	Hours	Classes	FRESHMAN YEAR		JUNIOR YEAR	
Religion Cornerstones				1st Semester		5th Semester	
Teachings and Doctrine of The Book of Mormon	1	2.0	REL A 275	First-year Writing or American Heritage*	3.0	CHEM 351 or CHEM 285	3.0
Jesus Christ and the Everlasting Gospel	1	2.0	REL A 250	Religion Cornerstone course	2.0	CELL 360	3.0
Foundations of the Restoration	1	2.0	REL C 225	MMBIO 121 or BIO 130 or CELL 120	3-4.0	Religion elective*	2.0
The Eternal Family	1	2.0	REL C 200	CHEM 105	4.0	Letters elective*	3.0
				UNIV 101	2.0	Arts elective*	3.0
				Total Hours	14-15.0	Total Hours	14.0
BYU Foundations for Student Success				2nd Semester		6th Semester	
BYU Foundations (complete during the first semester)	1	2.0	UNIV 101	First-year Writing or American Heritage*	3.0	MMBIO 390R	1.0
	1-2	3-6.0	from approved list	Religion Cornerstone course	2.0	MMBIO 490R	1.0
The Individual and Society	1	3.0	from approved list	MMBIO 240	3.0	Major electives (Requirement 7)	6.0
American Heritage	1	3.0	from approved list	MMBIO 241	1.0	Religion Cornerstone course	2.0
Global and Cultural Awareness	1	3.0	WRTG 316	CHEM 106	3.0	Requirement 2 choice	4.0-6.0
Skills				CHEM 107	1.0	Total Hours	14.0-16.0
First Year Writing	1	3-4.0	recommended	Requirement 2 choice	3.0	SENIOR YEAR	
Advanced Written and Oral Communications	1	3-4.0	from approved list	Total Hours	16.0	7th Semester	
			MATH 112*, 119*, or STAT 121*	SOPHOMORE YEAR		MMBIO 441	
Quantitative Reasoning				3rd Semester		Open electives	
Languages of Learning (Math or Language)	1	3.0	from approved list	BIO 165	3.0	Major electives (Requirement 7)	
	1	3.0	from approved list	BIO 250	2.0	Religion elective	
Arts, Letters, and Sciences (complete 6 of 7)	1	3.0	from approved list	MATH 112 or 119 or STAT 121	3.0-4.0	Global & Cultural Awareness elective*	
Civilization 1	1	3.0	from approved list	PHSCS 105	3.0	Requirement 2 choice	
Civilization 2	1	3.0	from approved list	Civilization 1 elective	3.0	Total Hours	
Arts	1-2	3-4.0	BIO 130*, PDBIO 120*, or MMBIO 121*	Total Hours	14.0-15.0	8th Semester	
Letters	1	3.0	CHEM 105*, PHSCS 105*	4th Semester		Religion Elective	
Biological Science	1	3.0	from approved list	PWS 340	3.0	MMBIO 468	
Physical Science				Requirement 3 choice	2.0	Adv. Written & Oral Communication (WRTG 316 recommended)	
	3-4	6.0	from approved list	Major Elective (Requirement 7)	3.0	Open electives	
Social Science	Variable	Variable	personal choice	Religion Cornerstone course	2.0	Total Hours	
Core Enrichment: Electives				Civilization 2 elective*	3.0	11-14.0	
Religion Electives				Social Science elective*	3.0		
Open Electives				Total Hours	16.0		
*THESE CLASSES FILL BOTH UNIVERSITY CORE AND PROGRAM REQUIREMENTS (16 hours overlap)		30.0		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.			
		120.0		Note: Quantitative Reasoning can be fulfilled by ACT Math subscore of 22 or higher.			
				*Double counting options available for some GE courses			
Graduation Requirements:							
Minimum residence hours required							
Minimum hours needed to graduate							

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

Program Requirements

Requirement 1 — Complete 1 of 3 Courses

BIO 130 - Biology 4.0

CELL 120 - Science of Biology 3.0

MMBIO 121 - Gen Biology: Health & 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 & Cellular Bio Lab 1.0

MMBIO 390R - Readings in Molecular Biology - You may take once 1.

MMBIO 441 - Adv Molecular Biology 3.0

MMBIO 368 - Genomics 3.0

MMBIO 490R - Molecular Biology Seminar - You may take once 1.0

PWS 340 - Genetics 3.0

Requirement 3 — Complete 2 hours

MMBIO 294R - Mentored Research - You may take up to 2.0 credit hours 0.5v

MMBIO 385 - Phage Genetics 3.0

MMBIO 442 - Adv Molecular Biology Lab 2.0

MMBIO 494R - Advanced Mentored Research - You may take up to 2.0 credit hours 0.5v

Requirement 4 — Complete 4 Courses

CHEM 105 - Gen College Chem 1+Lab Integr 4.0

CHEM 106 - General College Chemistry 2 3.0

CHEM 107 - Gen Coll Chem Lab 1.0

PHSCS 105 - General Physics 1 3.0

Requirement 5 — Complete 1 of 2 Courses

CHEM 285 - Intro Bio-organic Chemistry 4.0

CHEM 351 - Organic Chemistry 1 3.0

Requirement 6 — Complete 1 of 2 Courses

MATH 112 - Calculus 1 4.0

STAT 121 - Intro to Stat Data Analysis 3.0

Requirement 7 — Complete 12 hours

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 at least 8 hours up to 12 hours

BIO 264 - Stat Analysis for Biologists 4.0

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 - Adv Physiology Lab 1.0

CELL 382 - Developmental Biology 3.0

CELL 444 - Bio-Innovation 1 2.0

CELL 445 - Bio-Innovation II 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 Chem Lab-Nonmajors 1.0v

CHEM 481 - Biochemistry 3.0

CHEM 482 - Mechanisms of Molecular Biol 3.0

MMBIO 110R - Extremophiles - You may take once 1.0

MMBIO 122 - Gen Biol: Health/Disease Lab 1.0

MMBIO 151 - Microbiology 4.0

MMBIO 162R - Careers in Biomed Sciences - You may take once 1.0

MMBIO 194 - Phage Discovery 3.0

MMBIO 195 - Phage Comparative Genomics 3.

MMBIO 261 - Infection & Immunity 3.0

MMBIO 294R - Mentored Research - You may take up to 2.0 credit hours 0.5v

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 Lab 1.0

MMBIO 366 - Microbial Ecology Lab 1.0

MMBIO 399R - Academic Internship - You may take up to 2.0 credit hours 1.0v

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 Microbiology 2.0

MMBIO 493R - Curr and Instruct Practicum - You may take once 2.0

MMBIO 494R - Advanced Mentored Research - You may take up to 2.0 credit hours 0.5v

MMBIO 510 - Hist & Philos Micro & Mol Biol 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

MMBIO 520 - Molecular Virology 2.0

MMBIO 522 - Flow Cytometry 2.0

MMBIO 528R - Current Topics in Pathogenesis - You may take once 1.0

PHSCS 106 - General Physics 2 3.0

PWS 470 - Genomic Analysis 3.

Option 7.2 — Complete up to 4 hours

CELL 210 - Human Anatomy (w/ virtual lab) 3.0

CELL 220 - Human Anatomy (with lab) 4.0

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.

DEPARTMENT INFORMATION

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