

BS in Genetics, Genomics & Biotechnology (285823) MAP Sheet

Life Sciences, Plant and Wildlife Sciences

For students entering the degree program during the 2017-2018 curricular year.



University Core and Graduation Requirements				Suggested Sequence of Courses			
University Core Requirements:				FRESHMAN YEAR			
Requirements	#Classes	Hours	Classes	1st Semester		JUNIOR YEAR	
Religion Cornerstones				First-year Writing or American Heritage 3.0		5th Semester	
Teachings and Doctrine of The Book of Mormon	1	2.0	REL A 275	CHEM 105 4.0	Advanced Written & Oral Communication 3.0		3.0
Jesus Christ and the Everlasting Gospel	1	2.0	REL A 250	PDBIO 120 or MMBIO 121 3.0	PDBIO 360 3.0		3.0
Foundations of the Restoration	1	2.0	REL C 225	Religion Cornerstone course 2.0	Civilization 2 3.0		3.0
The Eternal Family	1	2.0	REL C 200	Quantitative Reasoning (if needed) 3.0-4.0	Religion elective 2.0		2.0
The Individual and Society				Total Hours 15.0-16.0	Total Hours 14.0-15.0		
American Heritage	1-2	3-6.0	from approved list	2nd Semester		6th Semester	
Global and Cultural Awareness	1	3.0	from approved list	First-year Writing or American Heritage 3.0	Arts or Letters 3.0		3.0
Skills				MMBIO 240 3.0	Major elective 3.0		3.0
First Year Writing	1	3.0	from approved list	CHEM 106, 107 4.0	General elective (4.0 credits for Biom. track) 3-4.0		3-4.0
Advanced Written and Oral Communications	1	3.0	ENGL 316 recommended	Religion Cornerstone course 2.0	CHEM 352 (Sci. track) (3.0)		(3.0)
Quantitative Reasoning	1	3-4.0	from approved list	BIO 165 3.0	Physiology (Sci. track) (3-4.0)		(3-4.0)
Languages of Learning (Math or Language)	1	4.0	MATH 112* or 119*	PWS 188 1.0	ORG B 320 (Bus. Track) (3.0)		(3.0)
Arts, Letters, and Sciences				Total Hours 16.0	Total Hours 15.0-17.0		
Civilization 1	1	3.0	from approved list	SOPHOMORE YEAR		SENIOR YEAR	
Civilization 2	1	3.0	from approved list	3rd Semester		7th Semester	
Arts	1	3.0	from approved list	MATH 112 4.0	PWS 468 3.0		3.0
Letters	1	3.0	from approved list	PWS 288 2.0	PWS 470 2.0		2.0
Biological Science	1	3.0	MMBIO 240*	PWS 340 3.0	Religion Elective 2.0		2.0
Physical Science	2	7.0	CHEM 105* + one course from approved list	Physical Science 3.0	BIO 420 (Sci. track) (2.0)		(2.0)
Social Science	1	3.0	from approved list	Religion Cornerstone course 2.0	General or Major elective (4.0 credits for Plant or Biom. track) (3-4.0)		(3-4.0)
Core Enrichment: Electives				ACC 200 (Bus. track) or PWS 100 (Plant track) (3.0)	MMBIO 360 (Microb. track) or BIO 463 (Biom. track) 4.0		4.0
Religion Electives	3-4	6.0	from approved list	Total Hours 14.0-17.0	BUS M 488 (Bus. Track) (3.0)		(3.0)
Open Electives	Variable	Variable	personal choice	4th Semester		Major elective (Bus. Track) (2.0)	
*THESE CLASSES FILL BOTH UNIVERSITY CORE AND PROGRAM REQUIREMENTS (13 hours overlap)				Civilization 1 3.0	BUS M 371R (Bus. Track) (1.0)		(1.0)
FOR UNIVERSITY CORE QUESTIONS CONTACT THE ADVISEMENT CENTER — FOR PROGRAM QUESTIONS SEE YOUR FACULTY ADVISOR				Religion Cornerstone course 2.0	Total Hours 12.0-17.0		
Graduation Requirements:				Arts or Letters 3.0	8th Semester		
Minimum residence hours required		30.0		BIO 230 (Plant track) or major elective (Biom. track) or MMBIO 151 (Microb. track) (3-4.0)	PWS 488 3.0		3.0
Minimum hours needed to graduate		120.0		Social Science (Sci. track) (3.0)	Global & Cultural Awareness 3.0		3.0
				ECON 110 (Bus. Track) (3.0)	Religion elective 2.0		2.0
				FIN 201 (Bus. Track) (3.0)	Major elective 4.0		4.0
				Total Hours 14.0-15.0	CHEM 481 (Sci. track) (3.0)		(3.0)
					BUS M 489 (Bus. track) (3.0)		(3.0)
					Total Hours 15.0		
				Note: The above course of study provides a guide in planning. However to meet special needs and interests of each student the courses taken and the order in which they are taken may require alteration. Study the requirements, plan a course of study, and consult with an advisor early in the program. This will save considerable time and minimize frustration.			
				Note 1: 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 2: Business majors should do PWS 199R (Academic Internship) during summer between Junior and Senior years.			

BS in Genetics, Genomics & Biotechnology (285823)

2017-2018 Program Requirements (60 - 62 Credit Hours)

<p>REQUIREMENT 1 Complete 13 courses</p> <p>CORE COURSES:</p> <p>BIO 165 - Introduction to Bioinformatics 3.0</p> <p>CHEM 105 - General College Chemistry 1 with Lab (Integrated) 4.0</p> <p>CHEM 106 - General College Chemistry 2 3.0</p> <p>CHEM 107 - General College Chemistry Laboratory 1.0</p> <p>MATH 112 - Calculus 1 4.0</p> <p>*MMBIO 240 - Molecular Biology 3.0</p> <p>PDBIO 360 - Cell Biology 3.0</p> <p>PWS 188 - Introduction to Genetics, Genomics, and Biotechnology 1.0</p> <p>PWS 288 - Molecular Genetics Laboratory 2.0</p> <p>PWS 340 - Genetics 3.0</p> <p>MMBIO 468 - (MMBio-Bio-PWS) Genomics 3.0</p> <p>PWS 470 - Analysis of Genetic and Genomic Data 2.0</p> <p>PWS 488 - Readings in Biotechnology 3.0</p> <p>REQUIREMENT 2 Complete 1 course</p> <p>MMBIO121 IS RECOMMENDED FOR TRACK C BELOW. PDBIO 120 IS RECOMMENDED FOR CORE TRACKS A AND B BELOW.</p> <p>MMBIO 121 - General Biology: Health and Disease 3.0</p> <p>PDBIO 120 - Science of Biology 3.0</p> <p>REQUIREMENT 3 Complete 1 option</p> <p>COMPLETE 24 HOURS FROM ONE OF THE FOLLOWING TRACKS:</p> <p>OPTION 3.1 Complete 2 groups</p> <p>A. PLANT GENETICS AND BIOTECHNOLOGY CORE TRACK:</p> <p>GROUP 3.1.1 Complete 7 courses</p> <p>BIO 230 - Biological Diversity: Plants 4.0</p> <p>BIO 420 - Evolutionary Biology 2.0</p> <p>CHEM 351 - Organic Chemistry 1 3.0</p> <p>CHEM 352 - Organic Chemistry 2 3.0</p> <p>CHEM 481 - Biochemistry 3.0</p> <p>PWS 100 - Plants in the Environment 3.0</p> <p>PWS 440 - Plant Physiology 3.0</p> <p>GROUP 3.1.2 Complete 3.0 hours from the following course(s)</p> <p>COMPLETE AN ADDITIONAL 3 HOURS FROM THE GENERAL MAJOR ELECTIVES LIST. RECOMMENDED COURSES ARE:</p> <p>BIO 220 - Biological Diversity: Animals 4.0</p> <p>BIO 230 - Biological Diversity: Plants 4.0</p> <p>BIO 350 - Ecology 3.0</p> <p>BIO 365 - Computational Biology 3.0</p> <p>BIO 370 - Bioethics 2.0</p> <p>BIO 421 - Evolutionary Biology Laboratory 1.0</p> <p>BIO 430 - Plant Classification and Identification 4.0</p> <p>BIO 450 - Conservation Biology 3.0</p>	<p>BIO 463 - Genetics of Human Disease 3.0</p> <p>BIO 465 - Bioinformatics 3.0</p> <p>BIO 560 - Population Genetics 4.0</p> <p>MMBIO 221 - General Microbiology 3.0</p> <p>MMBIO 241 - Molecular and Cellular Biology Laboratory 1.0</p> <p>MMBIO 261 - Infection and Immunity 3.0</p> <p>MMBIO 360 - Microbial Genetics 4.0</p> <p>MMBIO 363 - Microbial Ecology 3.0</p> <p>MMBIO 364 - Bacterial Pathogenesis 3.0</p> <p>MMBIO 390R - Readings in Molecular Biology 1.0</p> <p><i>You may take this course up to 1 time.</i></p> <p>MMBIO 441 - Advanced Molecular Biology 3.0</p> <p>MMBIO 442 - Advanced Molecular Biology Laboratory 2.0</p> <p>MMBIO 461 - Advanced Bacterial Physiology 3.0</p> <p>MMBIO 463 - Immunology 3.0</p> <p>MMBIO 465 - Virology 3.0</p> <p>MMBIO 466 - Virology Laboratory 1.0</p> <p>MMBIO 467 - Immunology Lab 1.0</p> <p>MMBIO 490R - Molecular Biology Seminar 1.0</p> <p><i>You may take this course up to 1 time.</i></p> <p>PDBIO 325 - Tissue Biology (with lab) 3.0</p> <p>PDBIO 363 - Advanced Physiology Laboratory 1.0</p> <p>PDBIO 382 - Developmental Biology 3.0</p> <p>PDBIO 444 - BIO-Innovation and -Entrepreneurship 1 2.0</p> <p>PDBIO 445 - BIO-Innovation and -Entrepreneurship 2 2.0</p> <p>PDBIO 562 - Reproductive Physiology 3.0</p> <p>PDBIO 582 - Developmental Genetics 3.0</p> <p>PWS 100 - Plants in the Environment 3.0</p> <p>PWS 199R - Academic Internship 3.0v</p> <p><i>You may take this course up to 1 time.</i></p> <p>PWS 282 - Soil Science 3.0</p> <p>PWS 283 - (Not currently offered)</p> <p>PWS 301 - Plant Growth and Reproduction 3.0</p> <p>PWS 305 - Soils and Water Quality 3.0</p> <p>PWS 306 - Soil and Water Quality Laboratory 1.0</p> <p>PWS 331 - Science of Plant Pest Control 3.0</p> <p>PWS 335 - Comparative Animal Nutrition 3.0</p> <p>PWS 431 - Plant Health Diagnostics 3.0</p> <p>PWS 494R - Mentored Learning Experience 6.0v</p> <p><i>You may take this course up to 1 time.</i></p> <p>PWS 514 - Soil Microbiology 2.0</p> <p>PWS 559 - Molecular Plant Breeding 3.0</p> <p>PWS 575 - Plant Pathology 3.0</p>	<p>PWS 586 - Plant Cell Biology 3.0</p> <p>PWS 588 - Metagenomics 3.0</p> <p>STAT 121 - Principles of Statistics 3.0</p> <p>OPTION 3.2 Complete 4 groups</p> <p>B. BIOMEDICAL GENETICS CORE TRACK:</p> <p>GROUP 3.2.1 Complete 4 courses</p> <p>BIO 420 - Evolutionary Biology 2.0</p> <p>CHEM 351 - Organic Chemistry 1 3.0</p> <p>CHEM 352 - Organic Chemistry 2 3.0</p> <p>CHEM 481 - Biochemistry 3.0</p> <p>GROUP 3.2.2 Complete 1 course</p> <p>BIO 463 - Genetics of Human Disease 3.0</p> <p>PDBIO 382 - Developmental Biology 3.0</p> <p>GROUP 3.2.3 Complete 1 course</p> <p>BIO 380 - Comparative Animal Physiology and Anatomy 4.0</p> <p>PDBIO 305 - Human Physiology 4.0</p> <p>PDBIO 362 - Advanced Physiology 3.0</p> <p>GROUP 3.2.4 Complete 6.0 hours from the following course(s)</p> <p>COMPLETE AN ADDITIONAL 6-7 HOURS FROM THE GENERAL MAJOR ELECTIVES LIST. RECOMMENDED COURSES ARE:</p> <p>BIO 220 - Biological Diversity: Animals 4.0</p> <p>BIO 370 - Bioethics 2.0</p> <p>MMBIO 221 - General Microbiology 3.0</p> <p>MMBIO 241 - Molecular and Cellular Biology Laboratory 1.0</p> <p>PDBIO 325 - Tissue Biology (with lab) 3.0</p> <p>PDBIO 363 - Advanced Physiology Laboratory 1.0</p> <p>PDBIO 444 - BIO-Innovation and -Entrepreneurship 1 2.0</p> <p>PDBIO 445 - BIO-Innovation and -Entrepreneurship 2 2.0</p> <p>PDBIO 562 - Reproductive Physiology 3.0</p> <p>PDBIO 582 - Developmental Genetics 3.0</p> <p>PWS 199R - Academic Internship 3.0v</p> <p><i>You may take this course up to 1 time.</i></p> <p>PWS 335 - Comparative Animal Nutrition 3.0</p> <p>PWS 494R - Mentored Learning Experience 6.0v</p> <p><i>You may take this course up to 1 time.</i></p> <p>PWS 588 - Metagenomics 3.0</p> <p>STAT 121 - Principles of Statistics 3.0</p> <p>OPTION 3.3 Complete 2 groups</p> <p>C. MICROBIAL GENETICS AND BIOTECHNOLOGY CORE TRACK:</p> <p>GROUP 3.3.1 Complete 7 courses</p> <p>BIO 420 - Evolutionary Biology 2.0</p> <p>CHEM 351 - Organic Chemistry 1 3.0</p> <p>CHEM 352 - Organic Chemistry 2 3.0</p>
---	--	--

BS in Genetics, Genomics & Biotechnology (285823)

2017-2018 Program Requirements Cont...

<p>CHEM 481 - Biochemistry 3.0</p> <p>MMBIO 151 - Introduction to Microbiology 4.0</p> <p>MMBIO 360 - Microbial Genetics 4.0</p> <p>MMBIO 461 - Advanced Bacterial Physiology 3.0</p> <p>GROUP 3.3.2 Complete 2.0 hours from the following course(s) COMPLETE AN ADDITIONAL 2 HOURS FROM THE GENERAL MAJOR ELECTIVES LIST. RECOMMENDED COURSES ARE:</p> <p>BIO 370 - Bioethics 2.0</p> <p>BIO 463 - Genetics of Human Disease 3.0</p> <p>MMBIO 241 - Molecular and Cellular Biology Laboratory 1.0</p> <p>MMBIO 261 - Infection and Immunity 3.0</p> <p>MMBIO 360 - Microbial Genetics 4.0</p> <p>MMBIO 363 - Microbial Ecology 3.0</p> <p>MMBIO 364 - Bacterial Pathogenesis 3.0</p> <p>MMBIO 390R - Readings in Molecular Biology 1.0 <i>You may take this course up to 1 time.</i></p> <p>MMBIO 441 - Advanced Molecular Biology 3.0</p> <p>MMBIO 442 - Advanced Molecular Biology Laboratory 2.0</p> <p>MMBIO 461 - Advanced Bacterial Physiology 3.0</p> <p>MMBIO 463 - Immunology 3.0</p> <p>MMBIO 465 - Virology 3.0</p> <p>MMBIO 466 - Virology Laboratory 1.0</p> <p>MMBIO 467 - Immunology Lab 1.0</p> <p>MMBIO 490R - Molecular Biology Seminar 1.0 <i>You may take this course up to 1 time.</i></p> <p>PWS 199R - Academic Internship 3.0v <i>You may take this course up to 1 time.</i></p> <p>PWS 494R - Mentored Learning Experience 6.0v <i>You may take this course up to 1 time.</i></p> <p>PWS 588 - Metagenomics 3.0</p> <p>STAT 121 - Principles of Statistics 3.0</p> <p>OPTION 3.4 Complete 4 groups D. BIO-BUSINESS CORE TRACK:</p> <p>GROUP 3.4.1 Complete 5 courses</p> <p>ACC 200 - Principles of Accounting 3.0</p> <p>BUS M 201 - Financial Management 3.0</p> <p>BUS M 488 - Agribusiness Management 1 3.0</p> <p>CHEM 285 - Introductory Bio-organic Chemistry 4.0</p> <p>ORG B 320 - Organizational Effectiveness 3.0</p> <p>GROUP 3.4.2 Complete 1 course</p> <p>BUS M 241 - Marketing Management 3.0</p> <p>BUS M 489 - Agribusiness Management 2 3.0</p> <p>GROUP 3.4.3 Complete 1 course</p>	<p>BUS M 371R - Entrepreneurship Lecture Series 1.0 <i>You may take this course up to 1 time.</i></p> <p>BUS M 380 - Executive Lectures 1.0</p> <p>GROUP 3.4.4 Complete 4.0 hours from the following course(s) COMPLETE AN ADDITIONAL 4 HOURS FROM THE GENERAL MAJOR ELECTIVES LIST. RECOMMENDED COURSES ARE:</p> <p>BIO 220 - Biological Diversity: Animals 4.0</p> <p>BIO 230 - Biological Diversity: Plants 4.0</p> <p>BIO 350 - Ecology 3.0</p> <p>BIO 365 - Computational Biology 3.0</p> <p>BIO 370 - Bioethics 2.0</p> <p>BIO 420 - Evolutionary Biology 2.0</p> <p>BIO 421 - Evolutionary Biology Laboratory 1.0</p> <p>BIO 430 - Plant Classification and Identification 4.0</p> <p>BIO 450 - Conservation Biology 3.0</p> <p>BIO 463 - Genetics of Human Disease 3.0</p> <p>BIO 465 - Bioinformatics 3.0</p> <p>BIO 560 - Population Genetics 4.0</p> <p>CHEM 353 - Organic Chemistry Laboratory--Nonmajors 2.0v</p> <p>MMBIO 221 - General Microbiology 3.0</p> <p>MMBIO 241 - Molecular and Cellular Biology Laboratory 1.0</p> <p>MMBIO 261 - Infection and Immunity 3.0</p> <p>MMBIO 360 - Microbial Genetics 4.0</p> <p>MMBIO 363 - Microbial Ecology 3.0</p> <p>MMBIO 364 - Bacterial Pathogenesis 3.0</p> <p>MMBIO 390R - Readings in Molecular Biology 1.0 <i>You may take this course up to 1 time.</i></p> <p>MMBIO 441 - Advanced Molecular Biology 3.0</p> <p>MMBIO 442 - Advanced Molecular Biology Laboratory 2.0</p> <p>MMBIO 461 - Advanced Bacterial Physiology 3.0</p> <p>MMBIO 463 - Immunology 3.0</p> <p>MMBIO 465 - Virology 3.0</p> <p>MMBIO 466 - Virology Laboratory 1.0</p> <p>MMBIO 467 - Immunology Lab 1.0</p> <p>MMBIO 490R - Molecular Biology Seminar 1.0 <i>You may take this course up to 1 time.</i></p> <p>PDBIO 325 - Tissue Biology (with lab) 3.0</p> <p>PDBIO 363 - Advanced Physiology Laboratory 1.0</p> <p>PDBIO 382 - Developmental Biology 3.0</p> <p>PDBIO 444 - BIO-Innovation and -Entrepreneurship 1 2.0</p> <p>PDBIO 445 - BIO-Innovation and -Entrepreneurship 2 2.0</p> <p>PDBIO 562 - Reproductive Physiology 3.0</p> <p>PDBIO 582 - Developmental Genetics 3.0</p>	<p>PWS 100 - Plants in the Environment 3.0</p> <p>PWS 199R - Academic Internship 3.0v <i>You may take this course up to 1 time.</i></p> <p>PWS 282 - Soil Science 3.0</p> <p>PWS 283 - (Not currently offered)</p> <p>PWS 301 - Plant Growth and Reproduction 3.0</p> <p>PWS 305 - Soils and Water Quality 3.0</p> <p>PWS 306 - Soil and Water Quality Laboratory 1.0</p> <p>PWS 331 - Science of Plant Pest Control 3.0</p> <p>PWS 335 - Comparative Animal Nutrition 3.0</p> <p>PWS 365 - Environmental Microbiology and Biogeochemistry 3.0</p> <p>PWS 366 - Environmental Microbiology and Biogeochemistry Labor 1.0</p> <p>PWS 431 - Plant Health Diagnostics 3.0</p> <p>PWS 494R - Mentored Learning Experience 6.0v <i>You may take this course up to 1 time.</i></p> <p>PWS 514 - Soil Microbiology 2.0</p> <p>PWS 559 - Molecular Plant Breeding 3.0</p> <p>PWS 575 - Plant Pathology 3.0</p> <p>PWS 586 - Plant Cell Biology 3.0</p> <p>PWS 588 - Metagenomics 3.0</p> <p>STAT 121 - Principles of Statistics 3.0</p> <p>RECOMMENDED Complete 4 options RECOMMENDED COURSES:</p> <p>RECOMMENDED Complete 6 courses FOR PREPROFESSIONAL STUDENTS IN TRACKS A, B, OR C ABOVE:</p> <p>ACC 200 - Principles of Accounting 3.0</p> <p>BUS M 201 - Financial Management 3.0</p> <p>PHSCS 105 - General Physics 1 3.0</p> <p>PHSCS 106 - General Physics 2 3.0</p> <p>PHSCS 107 - General Physics Lab 1 1.0</p> <p>PHSCS 108 - General Physics Lab 2 1.0</p> <p>RECOMMENDED Complete 4 courses FOR GRADUATE SCHOOL PREPARATION IN BIOTECHNOLOGY:</p> <p>PHSCS 105 - General Physics 1 3.0</p> <p>PHSCS 106 - General Physics 2 3.0</p> <p>PHSCS 107 - General Physics Lab 1 1.0</p> <p>PHSCS 108 - General Physics Lab 2 1.0</p> <p>RECOMMENDED Complete 1 course FOR STUDENTS SEEKING EMPLOYMENT IN THE BIOTECH INDUSTRY:</p> <p>PWS 199R - Academic Internship 3.0v</p> <p>RECOMMENDED Complete 2 courses GE COURSES FOR BIO-BUSINESS STUDENTS SEEKING A MARRIOTT SCHOOL OF MANAGEMENT MINOR:</p>
--	--	---

BS in Genetics, Genomics & Biotechnology (285823)

2017-2018 Program Requirements Cont...

ECON 110 - Economic Principles and Problems 3.0
STAT 121 - Principles of Statistics 3.0

THE DISCIPLINE:

This unique degree is for students who desire combined training in biotechnology and plant genetics. It is a relatively new discipline representing one of the most exciting developments in biological sciences in the 21st century. Students completing this degree will find themselves in the very forefront of biology in the 21st century.

CAREER OPPORTUNITIES:

The major is designed to provide a broad range of skills, including the following: quantitative reasoning; interpretation of scientific literature; recognition of historical and current scientific trends; principles of scientific data collection, interpretation, and assimilation; and critical writing. Graduates enter directly into industry, medical schools, or graduate programs in any of the many biological science disciplines.

HANDS-ON LEARNING OPPORTUNITIES:

Every student in this major is encouraged to seek mentored research opportunities with faculty in the life sciences. Completing one or more of these mentored research opportunities will set students apart and provide experience and credentials valuable in being admitted into the best graduate programs in the U.S.

FINANCING:

Scholarships are available for qualified students from the department, college, and university.

HONORARY SOCIETIES AND CLUBS:

The program encourages student participation in the Genetics and Biotechnology Club. Genetics students share a common study area, the Mendel Lab, in room 5114 LSB. Students are also active participants in professional societies; national honor societies; and in other BYU

campus academic, service, and social clubs. For more information on the Genetics and Biotechnology Club, contact Dr. Craig Coleman at (801) 422-5145.

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

Department of Plant and Wildlife Science

Brigham Young University
4105 Life Sciences Building
Provo, UT 84602
Telephone: (801) 422-2760

ADVISEMENT CENTER INFORMATION

Life Science Student Services

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