BS in Bioinformatics (282021) MAP Sheet

Life Sciences, Biology

For students entering the degree program during the 2018-2019 curricular year.

University Core and Graduation Requirements

University Core Requirements:

Requirements	#Classes	Hours	Classes
Religion Cornerstones			
Teachings and Doctrine of The Book of Mormon	1	2.0	REL A 275
Jesus Christ and the Everlasting Gospel	1	2.0	REL A 250
Foundations of the Restoration	1	2.0	REL C 225
The Eternal Family	1	2.0	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	from approved list
Quantitative Reasoning	1	3-4.0	from approved list
Languages of Learning (Math or Language)	1	4.0	MATH 112* or 113*
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	4.0	BIO 130*
Physical Science	2	7.0	CHEM 105* plus one course from approved list
Social Science	1	3.0	from approved list
Core Enrichment: Electives			
Religion Electives	3-4	6.0	from approved list
Open Electives	Variable	Variable	personal choice

*THESE CLASSES FULL BOTH UNIVERSITY CORE AND PROGRAM REQUIREMENTS (12 hours overlap)

Graduation Requirements:

Minimum residence hours required	30.0
Minimum hours needed to graduate	120.0

Suggested Sequence of Courses

FRESHMAN YEAR

1st Semester

First-year Writing or American Heritage	3.0
C S 142	3.0
BIO 130	4.0
Quantitative Reasoning	3.0
Religion Cornerstone course	2.0
Total Hours	**15.0**

2nd Semester

BIO 165	3.0
MATH 112	4.0
A HTG or First-Year Writing	3.0
CHEM 105	4.0
Religion Cornerstone course	2.0
Total Hours	**16.0**

SOPHOMORE YEAR

3rd Semester

CS 235	3.0
MMBIO 240	3.0
General Elective	7.0
Religion Cornerstone course	2.0
Total Hours	**15.0**

4th Semester

CHEM 106	3.0
C S 236	3.0
PWS 340	3.0
Global & Cultural Awareness	3.0
Religion Cornerstone course	2.0
Total Hours	**14.0**

JUNIOR YEAR

5th Semester

C S 240	4.0
STAT 151 or 201	3.0
General electives	4.0
Religion Elective	2.0
Arts or Letters elective	3.0
Total Hours	**16.0**

6th Semester

C S 312	3.0
Adv. Written and Oral Communication	3.0
General elective	3.0
Religion elective	2.0
Arts or Letters elective	3.0
Total Hours	**14.0**

SENIOR YEAR

7th Semester

BIO 365	3.0
Major elective	4.0
Civilization 1 elective	3.0
Religion elective	2.0
Physical Science elective	3.0
Total Hours	**15.0**

8th Semester

BIO 420	2.0
BIO 465	3.0
Major electives	5.0
Social Science elective	3.0
Civilization 2 elective	3.0
Total Hours	**16.0**

Note: This degree program requires a minimum of 120.0 hours for graduation. 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.

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2018-2019 Program Requirements (60 Credit Hours)

REQUIREMENT 1 Complete 7 courses

*BIO 130 - Biology	4.0
BIO 165 - Introduction to Bioinformatics	3.0
BIO 250 - Evolutionary Medicine	2.0
BIO 365 - Computational Biology	3.0
BIO 465 - Capstone in Bioinformatics	3.0
MMBIO 240 - Molecular Biology	3.0
PWS 340 - Genetics	3.0

REQUIREMENT 2 Complete 8 courses

C S 142 - Introduction to Computer Programming	3.0
C S 235 - Data Structures and Algorithms	3.0
C S 236 - Discrete Structures	3.0
C S 240 - Advanced Programming Concepts	4.0
C S 312 - Algorithm Design and Analysis	3.0
CHEM 105 - General College Chemistry 1 with Lab (Integrated)	4.0
CHEM 106 - General College Chemistry 2	3.0
MATH 112 - Calculus 1	4.0

REQUIREMENT 3 Complete 12.0 hours from the following course(s)

BIO 194 - Introduction to Mentored Research	0.5
BIO 370 - Bioethics	2.0
BIO 463 - Genetics of Human Disease	3.0
BIO 468 - (Bio-MMBio-PWS) Genomics	3.0
BIO 494R - Plant Biology	6.0v
You may take up to 2 credit hours.	
BIO 555 - Evolutionary and Ecological Modeling	2.0
BIO 560 - Population Genetics	4.0
C S 340 - Software Design and Testing	3.0
C S 418 - Bioinformatics	3.0
C S 450 - Computer Vision	3.0
C S 452 - Database Modeling Concepts	3.0
C S 470 - Introduction to Artificial Intelligence	3.0
C S 478 - Tools for Machine Learning	3.0
C S 484 - Parallel Processing	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
CHEM 489 - Structural Biochemistry	3.0
CHEM 584 - Advanced Biochemistry Methods 1	3.0
CHEM 586 - Advanced Biochemistry Methods 2	3.0
MATH 113 - Calculus 2	4.0
MATH 313 - Elementary Linear Algebra	3.0
MATH 334 - Ordinary Differential Equations	3.0
MATH 410 - Introduction to Numerical Methods	3.0
MATH 411 - Numerical Methods	3.0
MATH 431 - Probability Theory	3.0
MATH 450 - Combinatorics	3.0
MMBIO 360 - Microbial Genetics	4.0
MMBIO 465 - Virology	3.0
PDBIO 360 - Cell Biology	3.0
PDBIO 362 - Advanced Physiology	3.0
PDBIO 382 - Developmental Biology	3.0
PDBIO 582 - Developmental Genetics	3.0
STAT 381 - Statistical Computing	3.0
STAT 435 - Nonparametric Statistical Methods	3.0
STAT 531 - Experimental Design	3.0

THE DISCIPLINE:

Bioinformatics is an interdisciplinary program offering substantial training in both the biological sciences and the physical and mathematical sciences with an emphasis on computer programming coupled with genetics and molecular biology. Students are expected to acquire programming, databasing, and operating system skills coupled with a foundation in mathematics and statistics. In addition, students will be well trained in molecular biology and genetics and can pursue individual interests in a variety of areas (chemistry, physics, bioengineering, computer science, molecular biology, genetics, etc.).

RESEARCH OPPORTUNITIES:

Undergraduates majoring in bioinformatics are expected to participate in research training both on and off campus. The bioinformatics faculty has substantial research programs in phylogenetics, biophysics, ecological modeling, and proteomics with developing programs in biodiversity informatics and biotechnology/agricultural genomics. Students are encouraged to participate in one of these bioinformatic research programs.

For a further description of research opportunities and research groups on campus see our website at http://bioinformatics.byu.edu.

INTERNSHIPS, CO-OP ED, PRACTICAL EXPERIENCE:

The bioinformatics major offers an abundance of internship opportunities off campus in addition to working with faculty on campus as described above. Students have worked at federal research labs (NIH, NCBI, NCI), at other universities, and at private biotech and pharmaceutical companies seeking summer interns in bioinformatics. The bioinformatics major offers placement assistance for such programs and encourages students to gain a variety of external research experiences.

CAREERS:

The bioinformatics major is designed to develop the skills of those students with interests in both computer science and the biological sciences and to merge these interests in the area of bioinformatics or computational biology. The breadth of skills acquired will provide students with exciting options from graduate school, professional school (medical, dental, law), to employment opportunities directly out of this undergraduate program, especially with biotechnology companies.

FINANCING:

Students in this major may apply for university, college, and department scholarships. A limited number of research or teaching assistant positions for undergraduate students also exist.

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

BS in Bioinformatics (282021)
2018-2019

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ADVISEMENT CENTER INFORMATION

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