BS in Biophysics (285720) MAP Sheet

Life Sciences, Cell Biology and Physiology

For students entering the degree program during the 2021-2022 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	WRTG 316 recommended
Quantitative Reasoning	1	4.0	MATH 112*
Languages of Learning (Math or Language)	1	4.0	MATH 112*
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	3.0	CELL 120*
Physical Science	1	3.0	CHEM 105*, PHSCS 121*
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

FOR GE QUESTIONS CONTACT THE ADVISEMENT CENTER.
FOR PROGRAM QUESTIONS SEE YOUR MAJOR ADVISOR.
*ASTERISKED CLASSES FILL BOTH UNIVERSITY CORE AND PROGRAM REQUIREMENTS

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
CELL 120 (Biological Science)	3.0
CHEM 105	4.0
MATH 112 (Languages of Learning & Quantitative Reasoning)	4.0
Religion Cornerstone Course	2.0
Total Hours	**16.0**

2nd Semester

First-Year Writing or American Heritage	3.0
BIO 250	2.0
CHEM 106	3.0
CHEM 107	1.0
MATH 113	4.0
Religion Cornerstone Course	2.0
Total Hours	**15.0**

SOPHOMORE YEAR

3rd Semester

MMBIO 240	3.0
MMBIO 241	1.0
CHEM 351	3.0
PHSCS 121	3.0
Civilization 1 Elective	3.0
Religion Cornerstone Course	2.0
Total Hours	**15.0**

4th Semester

PWS 340	3.0
CHEM 352	3.0
CHEM 353	1.0
PHSCS 123	3.0
Civilization 2 Elective	3.0
Religion Cornerstone Course	2.0
Mentored Lab Experience (CELL 295R)	1-2.0
Total Hours	**16-17.0**

JUNIOR YEAR

5th Semester

CELL 360	3.0
CHEM 481	3.0
PHSCS 220	3.0
PHSCS 225	2.0
Religion Elective	2.0
Mentored Lab Experience (CELL 495R)	1-2.0
Total Hours	**14-15.0**

6th Semester

CELL 362	3.0
CELL 363	1.0
CHEM 468	3.0
Advanced Writing (WRTG 316 recommended)	3.0
Global & Cultural Awareness Elective	3.0
Religion Elective	2.0
Total Hours	**15.0**

SENIOR YEAR

7th Semester

CELL 455R	0.5
CELL 568	3.0
Mentored Lab Experience (CELL 495R or 498)	2.5-3.0
Arts or Letters Elective	3.0
Social Science Elective	3.0
Religion Elective	2.0
Total Hours	**14-14.5**

8th Semester

Arts of Letters Elective	3.0
Major Electives	6.0
General Electives	6.0
Complete Senior Survey/Exit Interview (See Department)	0.0
Pass ETS Biology Field Exam (See College Advisement Center)	0.0
Total Hours	**15.0**

Note: The Senior Survey, Exit Interview, and ETS Biology Field Exam must be completed during the last semester. You will be contacted during the graduation clearance process.

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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2021-2022 Program Requirements (72.5 - 73.5 Credit Hours)

REQUIREMENT 1 Complete 6 courses

LIFE SCIENCES CORE COURSES:

BIO 250 - Evolutionary Medicine	2.0
*CELL 120 - Science of Biology	3.0
CELL 360 - Cell Biology	3.0
MMBIO 240 - Molecular Biology	3.0
MMBIO 241 - Molecular and Cellular Biology Laboratory	1.0
PWS 340 - Genetics	3.0

REQUIREMENT 2 Complete 22.0 hours from the following course(s)

CHEMISTRY 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
CHEM 351 - Organic Chemistry 1	3.0
CHEM 352 - Organic Chemistry 2	3.0
CHEM 353 - Organic Chemistry Laboratory--Nonmajors	2.0v
CHEM 468 - Biophysical Chemistry	3.0
CHEM 481 - Biochemistry	3.0

REQUIREMENT 3 Complete 6 courses

MATH AND PHYSICS COURSES:

*MATH 112 - Calculus 1	4.0
MATH 113 - Calculus 2	4.0
*PHSCS 121 - Introduction to Newtonian Mechanics	3.0
PHSCS 123 - Introduction to Waves, Optics, and Thermodynamics	3.0
PHSCS 220 - Introduction to Electricity and Magnetism	3.0
PHSCS 225 - Introduction to Experimental Physics	2.0

REQUIREMENT 4 Complete 4 courses

MAJOR CORE COURSES:

CELL 362 - Advanced Physiology	3.0
CELL 363 - Advanced Physiology Laboratory	1.0
CELL 455R - Cell Biology and Physiology Seminar	0.5
CELL 568 - Cellular Electrophysiology and Biophysics	3.0

REQUIREMENT 5 Complete 10.0 hours from the following option(s)

COMPLETE 10 HOURS FROM THE FOLLOWING. AT LEAST 4 HOURS MUST COME FROM THE MENTORED EXPERIENCE AND AT LEAST 5 HOURS FROM ELECTIVES.

OPTION 5.1 Complete up to 5.0 hours from the following course(s)

A. MENTORED LABORATORY EXPERIENCE (MUST BE IN AN APPROVED BIOPHYSICS LAB) (AT LEAST 4 HOURS REQUIRED):

CELL 295R - Introductory Undergraduate Research in Cell Biology and	2.0v
You may take up to 5 credit hours.	
CELL 495R - Advanced Undergraduate Research in Cell Biology and Ph	4.0v
You may take up to 5 credit hours.	
CELL 498 - Advanced Senior Research Project	3.0

OPTION 5.2 Complete up to 6.0 hours from the following course(s)

B. ELECTIVES (AT LEAST 5 HOURS REQUIRED):

CELL 365 - Pathophysiology	4.0
CELL 450R - Readings and Discussion in Cell Biology and Physiology	2.0v
CELL 498 - Advanced Senior Research Project	3.0
CELL 561 - Physiology of Drug Mechanisms	3.0
CELL 565 - Endocrinology	3.0
CHEM 223 - Quantitative and Qualitative Analysis	4.0
CHEM 227 - Principles of Chemical Analysis	4.0
CHEM 482 - Mechanisms of Molecular Biology	3.0
CHEM 489 - Structural Biochemistry	3.0
CHEM 581 - Advanced Biochemical Methodology 1	3.0
CHEM 583 - Advanced Biochemical Methodology 2	3.0
CHEM 584 - Advanced Biochemistry Methods 1	3.0
CHEM 586 - Advanced Biochemistry Methods 2	3.0
EC EN 301 - Elements of Electrical Engineering	3.0
MATH 302 - Mathematics for Engineering 1	4.0
MATH 303 - Mathematics for Engineering 2	4.0
MMBIO 441 - Advanced Molecular Biology	3.0
MMBIO 442 - Advanced Molecular Biology Laboratory	2.0
NEURO 480 - Advanced Neuroscience	3.0
PHSCS 145 - Experimental Methods in Physics	1.0
PHSCS 230 - Computational Physics Lab 1	1.0
PHSCS 240 - Design, Fabrication, and Use of Scientific Apparatus	2.0
STAT 121 - Principles of Statistics	3.0

THE DISCIPLINE:

Biophysics is the use of physics, chemistry, mathematics, and biology to investigate the physical basis of life. Upper-division courses require synthesis and integration of information from many areas of science to allow understanding of such processes as protein folding, function of ion channels, and how the nervous system works. The requirements of advanced chemistry, physics, and math courses set this major apart from other life science majors.

CAREER OPPORTUNITIES:

A major in biophysics prepares students to pursue advanced degrees in the biological sciences. This major also provides outstanding preparation for students seeking admittance into professional programs. Graduates of this program will also have the academic and laboratory skills necessary for direct employment in medical, biotechnological, and pharmaceutical industries. Biophysicists whose primary interest is research often work in government agencies, such as the National Institutes of Health, NASA, and the Departments of Agriculture or Defense. Many new positions have been created in industry as a result of recent developments in molecular biophysics and molecular biology. Regardless of the setting, biophysicists generally work in groups with people with different backgrounds, interests, and abilities who collaborate to solve common problems.

MENTORED RESEARCH OPPORTUNITIES:

Students majoring in biophysics work closely with a faculty member doing research in biophysics (CELL 295R/495R). Faculty research interests are listed under the RESEARCH tab at cell.byu.edu. Current topics include:

- Biophysics of membrane structure and function.
- Molecular and functional characterization of ligand-gated ion channels in the central nervous system.
- Molecular mechanisms of neurotransmitter release.

FINANCING:

Various private, federal, and university sources of scholarships, fellowships, and grants are available. Please see the Life Sciences Advisement Center (2060 LSB) for information regarding college- level and department-level scholarships. Advanced undergraduates may be hired to teach labs or help sections for CELL courses.

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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BS in Biophysics (285720)

2021-2021

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ADVISEMENT CENTER INFORMATION

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