

BS in Cell Biology and Physiology (285721) MAP Sheet

Life Sciences, Cell Biology and Physiology

For students entering the degree program during the 2023-2024 curricular year.



University Core and Graduation Requirements				Suggested Sequence of Courses			
University Core Requirements:							
Requirements	#Classes	Hours	Classes				
Religion Cornerstones				FRESHMAN YEAR			
Teachings and Doctrine of The Book of Mormon	1	2.0	REL A 275	<u>1st Semester</u>			
Jesus Christ and the Everlasting Gospel	1	2.0	REL A 250	CELL 120 (Biological Science)	3.0	<u>JUNIOR YEAR</u>	
Foundations of the Restoration	1	2.0	REL C 225	CHEM 105	4.0	CELL 360	3.0
The Eternal Family	1	2.0	REL C 200	First-Year Writing or American Heritage	3.0	CELL Experiential Learning (see major requirement #4)	1-2.0
The Individual and Society				Religion Cornerstone Course	2.0	CHEM 481	3.0
American Heritage	1-2	3-6.0	from approved list	Quantitative Reasoning (if needed)	0-3.0	PWS 340	3.0
Global and Cultural Awareness	1	3.0	from approved list	Global & Cultural Awareness Elective	3.0	Civilization 1 Elective	3.0
Skills				Total Hours	15-18.0	Religion Elective	2.0
First Year Writing	1	3.0	from approved list	<u>2nd Semester</u>			
Advanced Written and Oral Communications	1	3.0	ENGL 316 recommended	BIO 250	2.0	<u>6th Semester</u>	
Quantitative Reasoning	0-1	0-3.0	from approved list	CHEM 106	3.0	CELL 362	3.0
Languages of Learning (Math or Language)	1-4	3-20.0	MATH 112 or STAT 121 recommended	CHEM 107	1.0	CELL 363	1.0
Arts, Letters, and Sciences				PHSCS 105	3.0	CELL 382	3.0
Civilization 1	1	3.0	from approved list	First-Year Writing or American Heritage	3.0	Advanced Writing (WRTG 316 Recommended)	3.0
Civilization 2	1	3.0	from approved list	Religion Cornerstone Course	2.0	Civilization 2 Elective	3.0
Arts	1	3.0	from approved list	Total Hours	14.0	Religion Elective	2.0
Letters	1	3.0	from approved list	SOPHOMORE YEAR			
Biological Science	1	3.0	CELL 120*	<u>3rd Semester</u>			
Physical Science	2	7.0	CHEM 105*, PHSCS 105*	CELL 220	4.0	CELL 455R	0.5
Social Science	1	3.0	from approved list	MMBIO 240	3.0	Major Elective or Capstone	3.0
Core Enrichment: Electives				MMBIO 241	1.0	Major Elective	3.0
Religion Electives	3-4	6.0	from approved list	CHEM 351	3.0	General Electives	3.0
Open Electives	Variable	Variable	personal choice	Languages of Learning Elective	3-4.0	Arts or Letter Elective	3.0
				Religion Cornerstone Course	2.0	Religion Elective	2.0
				Total Hours	16-17.0	Total Hours	14.5
				<u>4th Semester</u>			
				CELL 325	3.0	<u>8th Semester</u>	
				CELL Experiential Learning (see major requirement #4)	1-2.0	Major Elective or Capstone	3.0
				CHEM 352	3.0	Major Elective	3.0
				PHSCS 106	3.0	Social Sciences Elective	3.0
				Arts or Letter Elective	3.0	General Electives	6.0
				Religion Cornerstone Course	2.0	Complete Senior Survey/Exit Interview (See Department)	0.0
				Total Hours	15-16.0	Pass ETS Biology Field Exam (See College Advisement Center)	0.0
				Total Hours			
				15-16.0			
				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.			
Graduation Requirements:							
Minimum residence hours required		30.0					
Minimum hours needed to graduate		120.0					
FOR GE QUESTIONS CONTACT THE ADVISEMENT CENTER.							
FOR PROGRAM QUESTIONS SEE YOUR MAJOR ADVISOR.							
*ASTERISKED CLASSES FILL BOTH UNIVERSITY CORE AND PROGRAM REQUIREMENTS							

Requirement 1 — Complete 8 Courses

Major core courses: (Note: CELL 210 can be substituted for CELL 220 upon request.)

CELL 120 - Science of Biology 3.0
 CELL 220 - Human Anatomy (with lab) 4.0
 CELL 325 - Tissue Biology (with lab) 3.0
 CELL 360 - Cell Biology 3.0
 CELL 362 - Advanced Physiology 3.0
 CELL 363 - Adv Physiology Lab 1.0
 CELL 382 - Developmental Biology 3.0
 CELL 455R - Cell Bio & Physiology Seminar 0.5

Requirement 2 — Complete 4 Courses

Additional biology courses:

BIO 250 - Evolutionary Medicine 2.0
 MMBIO 240 - Molecular Biology 3.0
 MMBIO 241 - Molecular & Cellular Bio Lab 1.0
 PWS 340 - Genetics 3.0

Requirement 3 — Complete 8 Courses

Chemistry and physics 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
 CHEM 351 - Organic Chemistry 1 3.0
 CHEM 352 - Organic Chemistry 2 3.0
 CHEM 481 - Biochemistry 3.0
 PHSCS 105 - General Physics 1 3.0
 PHSCS 106 - General Physics 2 3.0

Requirement 4 — Complete 3 hours

Experiential learning options. Experiences should be sought early in your BYU education.

CELL 295R - Introductory Undgrad Research 0.5-2.0
 CELL 349R - Cell Bio & Physiology Teaching 1.0-3.0
 CELL 399R - Academic Internship 3.0-9.0
 CELL 444 - Bio-Innovation 1 2.0
 CELL 445 - Bio-Innovation 2 2.0
 CELL 450R - Readings in Cell Bio & Physiol 1.0-2.0
 CELL 495R - Adv Undergraduate Research 0.5-4.0
 LFSCI 199R - Nonresearch Academic Internship - You may take up to 1.0 credit hour 0.5-3.0
 STDEV 132 - Peer Education Level 1 1.0
 STDEV 133 - Peer Education Level 2 1.0

Requirement 5 — Complete 1 of 7 Courses

Capstone courses:

CELL 498 - Advanced Senior Research 3.0
 CELL 561 - Physiology of Drug Mechanisms 3.0
 CELL 562 - Reproductive Physiology 3.0
 CELL 565 - Endocrinology 3.0
 CELL 568 - Biophysics 3.0
 CELL 582 - Developmental Genetics 3.0
 NEURO 480 - Cellular Neuroscience 3.0

Requirement 6 — Complete 9 hours

Elective courses (at least 3 hours must be CELL). Courses taken to fulfill the requirements above cannot double count in this requirement.

BIO 165 - Introduction to Bioinformatics 3.0
 BIO 463 - Genetics of Human Disease 3.0
 BIO 368 - Genomics 3.0
 BIO 375 - Plant Developmental Biology 3.0
 CELL 320 - Dissection Tech Human Anatomy 1.0
 CELL 365 - Pathophysiology 4.0

CELL 455R - Cell Bio & Physiology Seminar 0.5
 CELL 484 - Human Embryology 3.0
 CELL 498 - Advanced Senior Research 3.0
 CELL 520R - Adv Topics in Human Anatomy 1.0-2.0
 CELL 550R - Adv Topics-Cell Bio & Physiol 1.0-4.0
 CELL 561 - Physiology of Drug Mechanisms 3.0
 CELL 562 - Reproductive Physiology 3.0
 CELL 565 - Endocrinology 3.0
 CELL 568 - Biophysics 3.0
 CELL 582 - Developmental Genetics 3.0
 CHEM 482 - Mechanisms of Molecular Biol 3.0
 EXSC 463 - Exercise Physiology 3.0
 EXSC 464 - Exercise Physiology Lab 0.5
 MMBIO 221 - General Microbiology 3.0
 MMBIO 222 - Gen Micro Lab 1.0
 MMBIO 261 - Infection & Immunity 3.0
 MMBIO 441 - Adv Molecular Biology 3.0
 MMBIO 442 - Adv Molecular Biology Lab 2.0
 MMBIO 463 - Immunology 3.0
 NEURO 480 - Cellular Neuroscience 3.0

Professional schools and graduate programs may require additional courses not required for this major, such as physics labs, chemistry, calculus, or statistics. Contact the programs to which you may apply to determine the specific courses required. Students should work closely with the Life Science Advisement Center and BYU's Pre-Professional Advisement Center.

THE DISCIPLINE:

Cell Biology and Physiology are exciting branches of biology that study the structure, function, and molecular mechanisms of cells, tissues, organs, and organ systems of living organisms. Knowledge and advancement in these fields underlies our modern understanding of human health and disease. Faculty and students work to understand such remarkable processes as how the heart develops and works to pump blood, how brain cells communicate with one another, how insulin regulates blood sugar, and how specific gene products determine the morphology and functional capacity of the nervous system. Building on a foundation of chemistry, physics, and biology, the integration of molecular, cellular, systems, and whole-body function is what distinguishes the Cell Biology and Physiology major from other life science majors.

CAREER OPPORTUNITIES:

A major in Cell Biology and Physiology prepares students to pursue advanced professional or graduate degrees or to enter directly into employment. This major provides outstanding preparation for students seeking admittance into professional programs in medicine, dentistry, optometry, podiatry, chiropractic, or pharmacy. Students who have aspirations of doing health-related research, postsecondary life science teaching, or biotech innovation will find excellent preparation for entrance into graduate programs and beyond. Graduates will also have the academic and laboratory skills necessary for employment in medical, biotech, and pharmaceutical industries. This degree offer students pursuing advanced degrees in business, public management, or law the knowledge and training necessary for admission to professional schools and work in governmental agencies, health care and biotechnical industries, and patent or health care law.

STUDENT INVOLVEMENT IN RESEARCH:

Students majoring in Cell Biology and Physiology have the opportunity to become involved in mentored laboratory research with the faculty (CELL 295R and 495R) and to participate in off-campus research internships (CELL 399R). Both types of research experiences should be sought early in your BYU education to allow sufficient time for development of the knowledge and skills needed to be proficient in the lab. Students that become highly engaged in on-campus research and generate sufficient data to participate with faculty in writing a peer-reviewed primary research article reporting their results can fulfill their capstone requirement (CELL 498 in requirement 5 of the MAP). Explore faculty research interests under the RESEARCH tab at cell.byu.edu.

EXPERIENTIAL LEARNING:

The Cell Biology and Physiology major provides many fantastic options for students to participate in experiential learning. Students may choose to participate in on-campus mentored research (CELL 295 and CELL 495), off-campus internships (LFSCI199R and CELL 399R), life science teaching (CELL 349, STDEV 132, and STDEV 133), biotech innovation and entrepreneurship (CELL 444 and CELL 445), or exploring current research by directed literature readings (CELL 450R). Students may choose any combination of experiential learning courses that best supports their goals and desires. Experiential learning options should be sought out early in your BYU education.

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 as teaching assistants for CELL courses or research assistants in CELL labs.

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 Cell Biology and Physiology**

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