



BS in PHYSIOLOGY AND DEVELOPMENTAL BIOLOGY (285721) MAP Sheet

Department of Physiology and Developmental Biology

For students entering the degree program during the 2014–2015

UNIVERSITY CORE AND GRADUATION REQUIREMENTS				PROGRAM REQUIREMENTS (66-67 total hours)			
UNIVERSITY CORE REQUIREMENTS				Complete the following life sciences core courses:			
Requirements	#Classes	Hours	Classes	Bio 420	Evolutionary Biology	2.0	Complete 6.5 hours from the following courses, including at least 1 hour from the mentored experience list and at least 2 hours from the advanced laboratory requirement list.
Doctrinal Foundation				MMBio 240*	Molecular Biology	3.0	
Book of Mormon	2	4.0	Rel A 121 and 122	MMBio 241	Molecular & Cellular Biology Lab	1.0	
New Testament	1	2.0	Rel A 211 or 212	PDBio 120*	Science of Biology	2.0	
Doctrine and Covenants	1	2.0	Rel C 324 or 325	PDBio 360	Cell Biology	3.0	
The Individual and Society				PWS 340	Genetics	3.0	
Citizenship				Complete the following chemistry and physics courses:			
American Heritage	1–2	3–6.0	from approved list	Chem 105*	General College Chemistry	4.0	
Global & Cultural Awareness	1	3.0	from approved list	Chem 106	General College Chemistry	3.0	
Skills				Chem 107	General College Chemistry Lab	1.0	
Effective Communication				Chem 351	Organic Chemistry	3.0	
First-Year Writing	1	3.0	from approved list	Chem 352	Organic Chemistry	3.0	
Adv Written & Oral Communication	1	3.0	Engl 316 recommended	Chem 481	Biochemistry	3.0	
Quantitative Reasoning	0–1	0–3.0	from approved list	Phscs 105	General Physics 1	3.0	
Languages of Learning (Math or Language)	1–4	3–20.0	Math 112 or Stat 121 recommended	Phscs 106	General Physics 2	3.0	
Arts, Letters, and Sciences				Complete the following major core courses:			
Civilization 1 and 2	2	6.0	from approved list	PDBio 325	Tissue Biology (with lab)	3.0	
Arts	1	3.0	from approved list	PDBio 362	Advanced Physiology	3.0	
Letters	1	3.0	from approved list	PDBio 363	Advanced Physiology Laboratory	1.0	
Scientific Principles & Reasoning				PDBio 455R	PDBio Seminar	0.5	
Biological Science	2	5.0	MMBio 240* and PDBio 120*	PDBio 482	Developmental Biology	3.0	
Physical Science	2	7.0	Chem 105*, Phscs 105*	Complete one course from the following:			
Social Science	1	3.0	from approved list	PDBio 210	Human Anatomy (with virtual lab)	3.0	
Core Enrichment: Electives				PDBio 220	Human Anatomy (with lab)	3.0	
Religion Electives	3–4	6.0	from approved list	Complete one course from the following:			
Open Electives	Variable	Variable	personal choice	PDBio 365	Pathophysiology	4.0	
				PDBio 484	Human Embryology	3.0	
GRADUATION REQUIREMENTS:				Complete one course from the following advanced molecular courses:			
Minimum residence hours required		30.0		Bio 468	(Bio-MMBio-PWS) Genomics	3.0	
Minimum hours needed to graduate		120.0		Chem 482	Mechanisms of Molecular Biology	3.0	
				Chem 489	Structural Biochemistry	3.0	
				MMBio 430	Advanced Cell Biology	3.0	
				MMBio 441	Adv Molecular Biology	3.0	
				Complete one course from the following capstone courses:			
				Neuro 480	Advanced Neuroscience	3.0	
				PDBio 498	Advanced Senior Research Project	3.0	
				PDBio 561	Physiology of Drug Mechanisms	3.0	
				PDBio 562	Reproductive Physiology	3.0	
				PDBio 565	Endocrinology	3.0	
				PDBio 568	Cellular Electrophysiology/Biophys	3.0	
				PDBio 582	Developmental Genetics	3.0	
				Complete 6.5 hours from the following courses, including at least 1 hour from the mentored experience list and at least 2 hours from the advanced laboratory requirement list.			
				A. Mentored experience:			
				PDBio 349R	PDBio Teaching Seminar	3.0V	
				PDBio 494R	Undergraduate Research in PDBio	4.0V	
				PDBio 550R	Advanced Topics in PDBio	4.0V	
				B. Advanced laboratory experience (courses used to fill any requirements listed above cannot count for this requirement):			
				Bio 468	(Bio-MMBio-PWS) Genomics	3.0	
				Chem 581	Advanced Biochemical Methodology 1	3.0	
				Chem 583	Advanced Biochemical Methodology 2	3.0	
				Chem 584	Biochemistry Lab / Proteins	3.0	
				Chem 586	Biochemistry Lab / Nucleic Acids	3.0	
				MMBio 442	Adv Molecular Biology Lab	2.0	
				PDBio 399R	Academic Internship: PDBio	9.0V	
				PDBio 495R	Adv Undergraduate Research in PDBio	4.0V	
				C. Elective courses (courses used to fill any requirements listed above cannot count for this requirement):			
				Bio 350	Ecology	3.0	
				Bio 370	Bioethics	2.0	
				Bio 421	Evolutionary Biology Lab	1.0	
				Bio 463	Genetics of Human Disease	3.0	
				Bio 468	(Bio-MMBio-PWS) Genomics	3.0	
				Bio 475	Plant Developmental Biology	3.0	
				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	Biochemistry Lab / Proteins	3.0	
				Chem 586	Biochemistry Lab / Nucleic Acids	3.0	
				ExSc 463	Exercise Physiology	3.0	
				ExSc 464	Exercise Physiology Lab	0.5	
				MMBio 261	Infection and Immunity	3.0	
				MMBio 417	Medical Parasitology	3.0	
				MMBio 430	Advanced Cell Biology	3.0	
				MMBio 441	Advanced Molecular Biology	3.0	
				MMBio 442	Advanced Molecular Biology Lab	2.0	
				NDFS 200	Nutrient Metabolism	3.0	
				Neuro 480	Advanced Neuroscience	3.0	
				PDBio 320	Dissection Techniques in Human Anat	1.0	
				PDBio 365	Pathophysiology	4.0	
				PDBio 450R	Topics in PDBio	3.0V	
				PDBio 455R	PDBio Seminar	0.5	
				PDBio 484	Human Embryology	3.0	
				PDBio 498	Advanced Senior Research Project	3.0	
				PDBio 561	Physiology of Drug Mechanisms	3.0	
				PDBio 562	Reproductive Physiology	3.0	
				PDBio 565	Endocrinology	3.0	
				PDBio 568	Cellular Electrophysiology & Biophys	3.0	
				PDBio 582	Developmental Genetics	3.0	

FOR GE QUESTIONS CONTACT THE ADVISEMENT CENTER ♦ FOR PROGRAM QUESTIONS SEE YOUR FACULTY ADVISOR

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

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2014–2015**

Recommended Courses

Professional schools and graduate programs may require additional courses not required for this major, such as Phscs 107, 108, Chem, calculus, or statistics. Contact the programs to which you may apply to determine the specific courses required.

Students considering professional or graduate degrees should take at least two semesters of mathematical courses. The recommended sequences are:

1. Math 112, Stat 121 for students who want exposure to calculus and statistics.
2. Math 112, 113 for students who want a firm foundation in calculus.
3. Math 112, 113, Stat 121 for students who want a firm foundation in both calculus and statistics.

Suggested Sequence of Courses:

FRESHMAN YEAR

<u>1st Semester</u>	
PDBio 120	2.0
Chem 105	4.0
1 st Year Writing	3.0
or A Htg 100	(3.0)
Rel A 121 (FWSpSu)	2.0
Quantitative Reasoning (if needed)	0–3.0
Global & Cultural Awareness elective	3.0
Total Hours	14–16.0

<u>2nd Semester</u>	
A Htg 100	3.0
or 1 st Year Writing	(3.0)
PDBio 210 or 220	3.0
Chem 106	3.0
Chem 107	1.0
Rel A 122 (FWSpSu)	2.0
Languages of Learning elective	3–4.0
Total Hours	15–16.0

SOPHOMORE YEAR

<u>3rd Semester</u>	
MMBio 240 (Biological Science)	2.0
MMBio 241	1.0
Chem 351	3.0
Civilization 1 elective	3.0
Phscs 105 (Physical Science)	3.0
Rel A 211 or 212 (FWSpSu)	2.0
PDBio Mentored Experience	1–2.0
Total Hours	15–16.0

<u>4th Semester</u>	
PDBio 360	3.0
Chem 352	3.0
Phscs 106	3.0
PDBio 325	3.0
Rel C 324 or 325 (FWSpSu)	2.0
General electives or PDBio Mentored Exper.	2.0
Total Hours	16.0

JUNIOR YEAR

<u>5th Semester</u>	
PWS 340	3.0
Chem 481	3.0
Civilization 2 elective	3.0
PDBio 362	3.0
PDBio 363	1.0
General elective	1–2.0
Religion elective (FWSpSu)	2.0
Total Hours	16–17.0

<u>6th Semester</u>	
PDBio 482	3.0
Advanced Laboratory Course	3.0
Advanced Writing (Engl 316 recommended)	3.0
Arts or Letter elective	3.0
Religion elective (FWSpSu)	2.0
Major electives	2.5
Total Hours	16.5

SENIOR YEAR

<u>7th Semester</u>	
PDBio 365 or 484 or PDBio Capstone	3–4.0
PDBio 455R	0.5
PDBio Elective	2.0
Advanced Molecular requirement	3.0
Religion elective (FWSpSu)	2.0
General electives	5.0
Total Hours	15.5–16.5

<u>8th Semester</u>	
PDBio 365 or 484 or PDBio Capstone	3–4.0
Arts or Letters elective	3.0
Social Sciences elective	3.0
Biol 420	2.0
General electives	3.0
Total Hours	14–15.0

THE DISCIPLINE:

Physiology is the study of the *functions* of the body systems. Developmental biology is the study of how genes govern differentiation of cells, tissues, and organs with unique structures and functions. Both disciplines require a foundation of mathematics, chemistry, physics, and cellular biology. Upper-division courses require synthesis and integration of information from many areas of science to allow understanding of such remarkable processes of how the heart pumps blood, how neurons communicate with one another, how insulin regulates blood sugar, or how specific gene products determine the morphology and functional capacity of the nervous system. Knowledge in these areas is expanding rapidly due to application of new techniques in molecular biology. Hence, significant exposure to concepts and techniques of molecular biology is an important component of the major.

CAREER OPPORTUNITIES:

A major in physiology and developmental biology prepares students to pursue advanced degrees in the biological sciences and non-biological fields or to directly enter into employment. This major provides outstanding preparation for students seeking admittance into professional programs in medicine, dentistry, optometry, podiatry, chiropractics, and pharmacy. For students who have aspirations of doing health-related research, this major will provide a challenging, thorough preparation for entrance into graduate programs and beyond. Graduates of this program will also have the academic and laboratory skills necessary for employment in medical, biotechnological, and pharmaceutical industries. This degree provides students pursuing advanced degrees in business, public management, or law the knowledge and training necessary to be admitted into professional schools and work in governmental agencies, health care and biotechnical industries, and patent or health care law.

RESEARCH AREAS:

Students majoring in physiology and developmental biology have the opportunity to become involved in laboratory research with the faculty (PDBio 495R). Funding for this research comes from such sources as the National Institutes of Health, National Science Foundation, American Heart Association, and U.S. Department of Agriculture. Research topics such as the following are being investigated:

- Molecular modeling and regulation of voltage-gated ion channels.
- Biophysics of membrane structure and function.
- Role of cytokines in regulation of the adrenal gland.
- Interaction between the nervous system and hormones in blood pressure regulation.
- Hereditary connective tissue disorders.
- Targeting of muscle AMP-activated protein kinase for prevention and treatment of type 2 diabetes.
- Control of sexual differentiation of the brain.
- Molecular mechanisms of control of embryonic development of the nervous system.
- Effects of phytoestrogens on gene expression in the brain.
- Molecular and functional characterization of ligand-gated ion channels in the central nervous system.
- Molecular mechanisms of neurotransmitter release.

MENTORED EXPERIENCE:

This involves working closely with a faculty member in teaching (PDBio 349R), laboratory research (PDBio 494R), or research in current literature (PDBio 550R).

FINANCING:

Various private, federal, and university sources of scholarships, fellowships, and grants are available. Most faculty attract grant funds to hire undergraduates to help with their research. Advanced undergraduates may be hired to teach labs or help sections for PDBio courses.

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.

Department of Physiology and Developmental Biology
4005 Life Sciences Building
Brigham Young University, Provo, UT 84602
Telephone: (801) 422-2006