### UNIVERSITY CORE AND GRADUATION REQUIREMENTS

<table>
<thead>
<tr>
<th>Requirements</th>
<th>#Classes</th>
<th>Hours</th>
<th>Classes</th>
</tr>
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<tbody>
<tr>
<td>Religion Cornerstones</td>
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<tr>
<td>Teachings &amp; Doctrine, Book of Mormon</td>
<td>1</td>
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<td>Rel A 275</td>
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<td>Jesus Christ &amp; the Everlasting Gospel</td>
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<td>Rel A 250</td>
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<td>Foundations of the Restoration</td>
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<td>Rel C 225</td>
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<td>The Eternal Family</td>
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<td>Rel C 200</td>
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<td>The Individual and Society</td>
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<tr>
<td>Citizenship</td>
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<tr>
<td>Global &amp; Cultural Awareness</td>
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<td>3.0</td>
<td>from approved list</td>
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<tr>
<td>Skills</td>
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<td>Effective Communication</td>
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<tr>
<td>First-Year Writing</td>
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<tr>
<td>Adv Written &amp; Oral Communication</td>
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<tr>
<td>Quantitative Reasoning</td>
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<tr>
<td>Languages of Learning (Math or Language)</td>
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<td>3-20.0</td>
<td>Math 112 or Stat 121 recommended</td>
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<td>Arts, Letters, and Sciences</td>
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<td>Civilization 1 and 2</td>
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<td>Scientific Principles &amp; Reasoning</td>
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<td>Biological Science</td>
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<td>Physical Science</td>
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<td>Chem 105*. Phscs 105*</td>
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<td>Core Enrichment: Electives</td>
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<tr>
<td>Religion Electives</td>
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<td>Open Electives</td>
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<td><strong>GRADUATION REQUIREMENTS:</strong></td>
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<tr>
<td>Minimum residence hours required</td>
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<tr>
<td>Minimum hours needed to graduate</td>
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<td>120.0</td>
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### PROGRAM REQUIREMENTS (66-67 total hours)

**Complete the following life sciences core courses:**
- Bio 420 Evolutionary Biology 2.0
- MMBio 240* Molecular Biology 3.0
- MMBio 241 Molecular & Cellular Biology Lab 1.0
- PDBio 120* Science of Biology 2.0
- PDBio 360 Cell Biology 3.0
- PWS 340 Genetics 3.0

**Complete the following chemistry and physics courses:**
- Chem 105* General College Chemistry 4.0
- Chem 106 General College Chemistry 3.0
- Chem 107 General College Chemistry Lab 1.0
- Chem 351 Organic Chemistry 3.0
- Chem 352 Organic Chemistry 3.0
- Chem 481 Biochemistry 3.0
- Phscs 105 General Physics 1 3.0
- Phscs 106 General Physics 2 3.0

**Complete the following major core courses:**
- PDBio 325 Tissue Biology (with lab) 3.0
- PDBio 362 Advanced Physiology 3.0
- PDBio 363 Advanced Physiology Laboratory 1.0
- PDBio 455R PDBio Seminar 0.5
- PDBio 482 Developmental Biology 3.0

**Complete one course from the following:**
- PDBio 210 Human Anatomy (with virtual lab) 3.0
- PDBio 220 Human Anatomy (with lab) 3.0

**Complete one course from the following:**
- PDBio 365 Pathophysiology 4.0
- PDBio 484 Human Embryology 3.0

**Complete one course from the following advanced molecular courses:**
- Bio 468 (Bio-MMBio-PWS) Genomics 3.0
- Chem 482 Mechanisms of Molecular Biology 3.0
- Chem 483 Structural Biochemistry 3.0
- Chem 581 Advanced Biochemical Methodology 1 3.0
- Chem 582 Advanced Biochemical Methodology 2 3.0
- Chem 584 Biochemistry Lab / Proteins 3.0
- Chem 586 Biochemistry Lab / Nucleic Acids 3.0
- ExSc 436 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

**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 559R Undergraduate Research 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 582 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 3.0V
- 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 483 Structural Biochemistry 3.0
- Chem 581 Advanced Biochemical Methodology 1 3.0
- Chem 582 Advanced Biochemical Methodology 2 3.0
- Chem 584 Biochemistry Lab / Proteins 3.0
- Chem 586 Biochemistry Lab / Nucleic Acids 3.0
- ExSc 436 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 559R Undergraduate Research in PDBio 4.0V
- Phys 561 Physiology of Drug Mechanisms 3.0
- Phys 562 Reproductive Physiology 3.0
- Phys 565 Endocrinology 3.0
- Phys 568 Cellular Electrophysiology & Biophys 3.0
- Phys 582 Developmental Genetics 3.0

**FOR GE QUESTIONS CONTACT THE ADVISEMENT CENTER**

*THESE CLASSES FILL BOTH UNIVERSITY CORE AND PROGRAM REQUIREMENTS (12 hours overlap)*
Recommended Courses
Professional schools and graduate programs may require additional courses not required for this major, such as Pscs 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
1st Semester
- PDBio 120 2.0
- Chem 105 4.0
- PWS 100 4.0
- Religion Cornerstone course 2.0
- Quantitative Reasoning (if needed) 0–3.0
- Global & Cultural Awareness elective 3.0
Total Hours 14–16.0

2nd Semester
- A Htg 100 3.0
- PDBio 210 or 220 3.0
- Chem 106 3.0
- Chem 107 3.0
- Religion Cornerstone course 2.0
- Languages of Learning elective 3–4.0
Total Hours 15–16.0

SOPHOMORE YEAR
3rd Semester
- MMBio 240 (Biological Science) 2.0
- MMBio 241 1.0
- Chem 351 3.0
- Civilization 1 elective 3.0
- Pscs 105 (Physical Science) 3.0
- Religion Cornerstone course 2.0
- PDBio Mentored Experience 1–2.0
Total Hours 15–16.0

4th Semester
- PDBio 380 3.0
- Chem 352 3.0
- Pscs 106 3.0
- PDBio 325 3.0
- Religion Cornerstone course 2.0
- General electives or PDBio Mentored Exp. 2.0
Total Hours 16.0

JUNIOR YEAR
5th Semester
- 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 16.0

6th Semester
- 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
7th Semester
- 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

8th Semester
- 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

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.

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 in 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.

MENTORED EXPERIENCE:
This involves working closely with a faculty member in teaching (PDBio 349R), laboratory research (PDBio 4th Semester), or A Htg 100 (3.0) exposure to calculus and statistics.

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.

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.
- Control of sexual differentiation of the brain.
- 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.

BS in PHYSIOLOGY AND DEVELOPMENTAL BIOLOGY (285721)
2016–2017

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