BS in BIOPHYSICS (285720) MAP Sheet
Department of Physiology and Developmental Biology
For students entering the degree program during the 2015–2016 curricular year.

### UNIVERSITY CORE AND GRADUATION REQUIREMENTS

<table>
<thead>
<tr>
<th>UNIVERSITY CORE REQUIREMENTS</th>
<th>REQUIREMENTS</th>
<th>#Classes</th>
<th>Hours</th>
<th>Classes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Religion Cornerstones</td>
<td>Teachings &amp; Doctrine, Book of Mormon</td>
<td>1</td>
<td>2.0</td>
<td>Rel A 275</td>
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<td></td>
<td>Jesus Christ &amp; the Everlasting Gospel</td>
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<td>2.0</td>
<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>2.0</td>
<td>Rel C 200</td>
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<td>The Individual and Society</td>
<td>Citizenship</td>
<td>1–2</td>
<td>3–6.0</td>
<td>from approved list</td>
</tr>
<tr>
<td></td>
<td>American Heritage</td>
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<td>3.0</td>
<td>from approved list</td>
</tr>
<tr>
<td></td>
<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>
<td>Effective Communication</td>
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<td>3.0</td>
<td>from approved list</td>
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<td>First-Year Writing</td>
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<td>Adv Written &amp; Oral Communication</td>
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<td>0–3.0</td>
<td>from approved list</td>
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<tr>
<td></td>
<td>Quantitative Reasoning</td>
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<td>3–20.0</td>
<td>Math 112 recommended</td>
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<td>Languages of Learning (Math or Language)</td>
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<td>3–20.0</td>
<td>Math 112 recommended</td>
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<tr>
<td>Arts, Letters, and Sciences</td>
<td>Civilization 1 and 2</td>
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<td>Arts</td>
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<td>3.0</td>
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<td>Letters</td>
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<td>Scientific Principles &amp; Reasoning</td>
<td>2</td>
<td>5.0</td>
<td>MMBio 240* and PDBio 120*</td>
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<td>Biological Science</td>
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<td>7.0</td>
<td>Chem 105*, Phscs 105* or 121*</td>
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<td>Physical Science</td>
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<td>Chem 105*, Phscs 105* or 121*</td>
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<td>Social Science</td>
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<td>Core Enrichment: Electives</td>
<td>Religion Electives</td>
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<td>6.0</td>
<td>from approved list</td>
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<td>Open Electives</td>
<td>Variable</td>
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<td>personal choice</td>
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</table>

**GRADUATION REQUIREMENTS:**

- Minimum residence hours required: 30.0
- Minimum hours needed to graduate: 120.0

### PROGRAM REQUIREMENTS (71.5 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 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 353 Organic Chemistry Lab - Nonmajor (1 hour required): 2.0V
- Chem 468 Biophysical Chemistry: 3.0
- Chem 481 Biochemistry: 3.0

#### Complete the following math and physics courses:
- Math 112 Calculus 1: 4.0
- Math 113 Calculus 2: 4.0
- Phscs 121 Intro to Newtonian Mechanics: 3.0
- Phscs 123 Intro to Waves, Optics, & Thermodynamics: 3.0
- Phscs 140 Electronics Lab: 1.0
- Phscs 220 Intro to Electricity & Magnetism: 3.0

#### Complete the following major core courses:
- PDBio 362 Advanced Physiology: 3.0
- PDBio 363 Advanced Physiology Laboratory: 1.0
- PDBio 455R PDBio Seminar: 0.5
- PDBio 568 Cellular Electrophysiology & Bioph: 3.0

**Complete 11 hours from the following.**

- At least 4 hours must come from the mentored experience and at least 5 hours from electives.

**A. Mentored Laboratory Experience** (must be in an approved biophysics lab):
- PDBio 494R Undergraduate Research in PDBio: 4.0V
- PDBio 495R Adv Undergraduate Research in PDBio: 4.0V
- PDBio 498 Advanced Senior Research Project: 3.0

**B. Electives**
- 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: 1.0
- Chem 583 Advanced Biochemical Methodology 2: 3.0
- Chem 584 Biochemistry Laboratory: 3.0
- Chem 586 Biochemistry Laboratory: 3.0
- ECE 301 Elements of Electrical Engineering: 3.0
- Math 302 Mathematics for Engineering 1: 4.0
- Math 303 Mathematics for Engineering 2: 4.0
- MMBio 430 Advanced Cell Biology: 3.0
- MMBio 441 Advanced Molecular Biology: 3.0
- MMBio 442 Advanced Molecular Biology Lab: 2.0
- Neuro 480 Advanced Neuroscience: 3.0
- PDBio 365 Pathophysiology: 4.0
- PDBio 450R Topics in PDBio: 3.0V
- PDBio 498 Advanced Senior Research Project: 3.0
- PDBio 561 Physiology of Drug Mechanisms: 3.0
- PDBio 565 Endocrinology: 3.0
- Phscs 145 Experimental Methods in Physics: 1.0
- Phscs 230 Computational Physics Lab: 1.0
- Phscs 240 Design Fabrication, and Use of Scientific Apparatus: 2.0
- Stat 121 Principles of Statistics: 3.0

*THESE CLASSES FILL BOTH UNIVERSITY CORE AND PROGRAM REQUIREMENTS (12 hours overlap)*
BS in BIOPHYSICS (285720)
2015–2016

Suggested Sequence of Courses:

FRESHMAN YEAR
1st Semester
PDBio 120 2.0
Chem 105 (FWSpSu) 4.0
1st Year Writing 3.0
Or A Htg 100 (3.0)
Religion Cornerstone course 2.0
Math 112 4.0
(Lang. of Learning or Quant. Reason.)
Total Hours 15.0

2nd Semester
A Htg 100 3.0
or 1st Year Writing (3.0)
Math 113 4.0
Chem 106 (FWSpSu) 3.0
Chem 107 (FWSpSu) 1.0
Religion Cornerstone course 2.0
Arts or Letters elective 3.0
Total Hours 16.0

SOPHOMORE YEAR
3rd Semester
MMBio 240 (Biological Science) 3.0
MMBio 241 1.0
Civilization 1 elective 3.0
Chem 351 (FWSp) 3.0
Phsces 121 (Physical Science) 3.0
Religion Cornerstone course 2.0
Total Hours 15.0

4th Semester
PWS 340 3.0
Chem 352 (FWSpSu) 3.0
Chem 353 (FWSpSu) 1.0
Civilization 2 elective 3.0
Phsces 123 3.0
Religion Cornerstone course 2.0
Mentored Lab Experience 1–2.0
Total Hours 16–17.0

JUNIOR YEAR
5th Semester
PDBio 360 3.0
Chem 481 3.0
PDBio 494R 2.0
Phsces 140 1.0
Phsces 220 3.0
Religion elective 2.0
Mentored Lab Experience 1–2.0
Total Hours 15–16.0

6th Semester
PDBio 362 3.0
PDBio 363 1.0
Chem 468 3.0
Phsces 140 1.0
Adv. Writing (Engl 316 recommended) 3.0
Global & Cultural Awareness 3.0
Religion elective 2.0
Total Hours 16.0

SENIOR YEAR
7th Semester
PDBio 455R 0.5
PDBio 495R or 498 2.5–3.0
PDBio 568 (F) 3.0
Arts or Letters elective 3.0
Religion elective (FWSpSu) 2.0
Social Science 3.0
Total Hours 14–14.5

8th Semester
Biol 420 2.0
Major electives 6.0
General electives 6.0
Total Hours 14.0

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.

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 EXPERIENCE:
This involves working closely with a faculty member doing research in biophysics (PDBio 494R and 495R).

FINANCING:
Various private, federal, and university sources of scholarships, fellowships, and grants are available. Advanced undergraduates may be hired to teach labs or help sections for PDBio courses.

RESEARCH AREAS:
Students majoring in biophysics have the opportunity to become involved in laboratory research with the faculty. Funding for this research comes from such sources as the National Institutes of Health, and National Science Foundation. Research topics such as the following are being investigated:
- Molecular modeling and regulation of voltage-gated ion channels.
- 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.

HONORARY SOCIETIES & CLUBS:
Membership in the Premedical or Predental Clubs, as well as service on the Student Council of the College of Biology & Agriculture, promotes fellowship among students and develops professionalism.

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.