

# BS in Physics with Emphasis in Biological Physics

## Degree Program Description

Physics is the science that studies the structure and properties of matter and transformations of energy. With math as the language and experimental verification as a guide, physical study has established the fundamental laws of nature that are the foundation of all natural science and technology. The study of physics includes learning the general principles and the phenomena that have been discovered and developing the skills that enable such knowledge to be advanced through research. Biological physics is an interdisciplinary area that employs and develops theories and methods of the physical sciences for the investigation of biological systems. There is a long history of the quantitative tools and techniques originally developed within the physics community finding critical applications in biology. Examples range from the first visualization of the DNA double helix via X-ray diffraction to the widespread use of magnetic resonance imaging in hospitals throughout the world. Currently, biological physics is one of the fastest growing physics research areas that is vital for many other fields, including medicine, bioengineering, and biology. Students specializing in this area have career opportunities in medical centers, research institutes and biotechnology industries, as well as the more traditional academic venues.

## Major Program Requirements

In addition to University (<https://catalog.missouri.edu/academicdegreerequirements/universityrequirements/>), general education (<https://catalog.missouri.edu/academicdegreerequirements/generaleducationrequirements/>), and College of Arts and Science (<https://catalog.missouri.edu/collegeofartsandscience/#undergraduatetext>) requirements, students must also meet the following major program requirements. All major requirements in the College of Arts and Science must be completed with grades of C- or higher unless otherwise indicated.

Students interested in biological physics may choose to pursue a BS in Physics with an Emphasis in Biological Physics (the emphasis will show up on the transcript). For this option, students must take the required physics courses (<https://catalog.missouri.edu/collegeofartsandscience/physics/bs-physics/>), and five additional physics elective courses. Four of the physics electives must be chosen from the list below:

PHYSICS 4190	Physics and Chemistry of Materials	3
PHYSICS 4420	Introduction to Biomedical Imaging	3
PHYSICS 4500	Computational Biological Physics	3
PHYSICS 4510	Single Molecule Biophysics	3
PHYSICS 4520	Introduction to Biophysics	3
PHYSICS 4950	Undergraduate Research in Physics	1-3
PHYSICS 4960	Senior Thesis in Physics	3

## Semester Plan

Below is a sample plan of study, semester by semester. A student's actual plan may vary based on course choices where options are available.

First Year			
Fall	CR	Spring	CR
PHYSICS 2010		1 PHYSICS 2750	5
MATH 1500 (Math and Quantitative Reasoning)		5 MATH 1700	5
CHEM 1400		3 Missouri State Law Requirement: Social Science from Arts and Science	3
CHEM 1401 (Biological or Physical Science Lab)		1 Second major, minor, certificate, or elective	3
ENGLSH 1000 Behavioral Science	3	3	
		<b>16</b>	<b>16</b>
Second Year			
Fall	CR	Spring	CR
PHYSICS 2760		5 PHYSICS 3150W	3
MATH 2300		3 PHYSICS 4100	3
Humanities, First Writing Intensive		3 MATH 4100	3
Second Language or Second Language Alternative		4 Second Language or Second Language Alternative	4
		Second major, minor, certificate, or elective	3
		<b>15</b>	<b>16</b>
Third Year			
Fall	CR	Spring	CR
PHYSICS 4140		3 PHYSICS 4120	3
PHYSICS 4060		4 Physics; 3000+ Level	3
Physics; 3000+ Level		3 Math Elective	3
Second Language or Second Language Alternative		4 Humanities, Depth of Study	3
		Second major, minor, certificate, or elective	3
		<b>14</b>	<b>15</b>
Fourth Year			
Fall	CR	Spring	CR
PHYSICS 4800		3 Physics; 3000+ Level	3
Physics; 3000+ Level		3 Physics; 3000+ Level	3
Math elective		3 Humanities	3
Social Science		3 Second major, minor, certificate, or elective	4
Second major, minor, certificate, or elective		3	
		<b>15</b>	<b>13</b>

**Total Credits: 120**