

# 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

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 (<http://catalog.missouri.edu/collegeofartsandscience/physics/bs-physics/>) for the regular BS degree, PHYSCS 4520 Introduction to Biophysics, and four additional physics elective courses. Three of the physics electives must be chosen from the list below:

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

Only courses with a grade of C- or above will be counted toward the emphasis area. In addition, students must complete all College of Arts and Science and University graduation requirements (<http://catalog.missouri.edu/academicdegreerequirements/universityrequirements/>), including University general education (<http://catalog.missouri.edu/academicdegreerequirements/generaleducationrequirements/>).

## 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
PHYSCS 2010		1 PHYSCS 2750 <sup>1</sup>	5
MATH 1500 <sup>1</sup>		5 MATH 1700 <sup>1</sup>	5
CHEM 1320, CMP_SC 1050, or INFOTC 1040 <sup>1</sup>		3-4 General Education <sup>*</sup>	3
ENGLISH 1000 <sup>*</sup>		3	
			<b>13</b>
Second Year			
Fall	CR	Spring	CR
PHYSCS 2760 <sup>1</sup>		5 PHYSCS 3150W	3
MATH 2300 <sup>1</sup>		3 PHYSCS 4100	3
General Education <sup>*</sup>		3 MATH 4100 <sup>1</sup>	3
Foreign Language/Alternative <sup>*</sup>		5 Foreign Language/Alternative General Education <sup>*</sup>	5 3
			<b>17</b>
Third Year			
Fall	CR	Spring	CR
PHYSCS 4140		3 PHYSCS 4120 <sup>1</sup>	3
PHYSCS 4060 <sup>1</sup>		4 Physics Elective <sup>1</sup>	6
Math Elective <sup>1</sup>		3 Math Elective <sup>1</sup>	3
Foreign Language/Alternative <sup>*</sup>		3 General Elective <sup>*</sup>	3
General Education		3	
			<b>15</b>
Fourth Year			
Fall	CR	Spring	CR
PHYSCS 4800 <sup>1</sup>		3 Physics Electives/Research <sup>1</sup>	6
Physics Elective/Research <sup>1</sup>		6 Elective Courses	9-10
General Education <sup>*</sup>		3	
Elective courses		3	
			<b>15-16</b>

**Total Credits: 119-121**

<sup>1</sup> Course meets degree program requirements

<sup>\*</sup> Course meets University general education and/or campus graduation requirements