

# BS in Physics with Emphasis in Materials Science

## 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. Materials Science is an interdisciplinary field encompassing several disciplines of science and technology. Physics lies at the heart of materials science since it provides a rationale for understanding the mechanical, thermal, optical, and magnetic properties of matter. The emphasis area in materials science prepares students in areas of high demand for the 21st century workforce in the US. Materials scientists are employed by companies who make products ranging from metals, ceramics, and biomedical implants to integrated-circuit chips and superconducting materials. A major concentration of the program is on nanomaterials, which prepares students in areas of nanotechnology and energy-related issues.

## Major Program Requirements

Students interested in materials science may choose to pursue a BS in Physics with an Emphasis in Materials Science (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.

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.

Four of the physics electives must be chosen from the list below:

PHYSICS 4190	Physics and Chemistry of Materials	3
PHYSICS 4230	Electron Microscopy and Microanalysis	3
PHYSICS 4400	The Physics of Electronic Devices	3
PHYSICS 4600	Semiconductor Optics	3
PHYSICS 4620	Introduction to Materials Science	3
PHYSICS 4650	Modern Condensed Matter Physics	3
PHYSICS 4680	Introduction to Density-Functional Theory	3
PHYSICS 4950	Undergraduate Research in Physics	1-3
PHYSICS 4960	Senior Thesis in Physics	3

## Semester Plan

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

Total Credits: 120