

PHYSICS MAJOR: MATERIALS SCIENCE OPTION (B.S.)

<https://ceps.unh.edu/physics/program/bs/physics-major-materials-science-option>

Description

This option combines courses from the Physics and other departments to provide training in physics and materials science, an area that has proven industrial demand. In addition to the core courses in classical and modern physics, the students will take six courses in which they will study materials synthesis and properties and get hands-on training in materials characterization techniques, such as diffraction, electron microscopy, scanning probe microscopy, and photoelectron spectroscopy. Two semesters of thesis work in a research lab complement the training in the classroom. Students completing this program will have a wide variety of career opportunities to pursue, for example, in microelectronics, advanced materials synthesis and design, and thin film engineering. Alternatively, they are qualified for postgraduate programs in condensed matter physics or materials science.

Requirements

Code	Title	Credits
University Discovery requirements ¹		
Bachelor of Science requirements		
Physics requirements:		
PHYS 400	Freshman Seminar	1
PHYS 407	General Physics I	4
PHYS 408	General Physics II	4
PHYS 505 & PHYS 506	General Physics III and General Physics III Laboratory	4
PHYS 508	Thermodynamics and Statistical Mechanics	4
PHYS 605	Experimental Physics I	5
PHYS 615	Classical Mechanics and Mathematical Physics I	4
PHYS 616	Classical Mechanics and Mathematical Physics II	4
PHYS 701	Quantum Mechanics I	4
PHYS 703	Electricity and Magnetism I	4
PHYS 705	Experimental Physics II	4
Capstone:		
PHYS 795 & PHYS 799 or PHYS 798	Independent Study and Thesis Senior Project	
Mechanical Engineering:		
ME 561	Introduction to Materials Science	4
ME 730	Mechanical Behavior of Materials	4
ME #760	Physical Metallurgy I	4
Mathematics:		
MATH 425	Calculus I	4
MATH 426	Calculus II	4
Select one of the following options: ²		12
Option A:		

MATH 525	Linearity I	
MATH 526	Linearity II	
Option B:		
MATH 528	Multidimensional Calculus	
MATH 527	Differential Equations with Linear Algebra	
MATH 545	Introduction to Linear Algebra	
	or MATH 645 Linear Algebra for Applications	
Computer Programming:		
CS 410P	Introduction to Scientific Programming/Python	4
	or IAM 550 Introduction to Engineering Computing	
Electives in Option		
Select three courses of the following:		
ME #731	Fracture and Fatigue Engineering Material	
ME 761	Diffraction and Imaging Methods in Materials Science	
ME 795	Special Topics	
PHYS 718	Condensed Matter Physics	
Chemistry:		
CHEM 403	General Chemistry I	4
	or CHEM 405 Chemical Principles for Engineers	

¹ Note that no physics course can satisfy these requirements for a physics major. The rationale behind this is that a course in physics does not broaden the education of a physics major.

² The Department generally recommends MATH 645 Linear Algebra for Applications over MATH 545 Introduction to Linear Algebra for physics majors, but the best option, when possible, is MATH 525 Linearity I-MATH 526 Linearity II.

By the end of the spring semester of the sophomore year, a student must have a minimum grade of C in each 400- or 500-level course specifically required for the B.S. degree and an overall grade-point average of at least 2.33 in these courses in order to continue in the B.S. program.