

MATERIALS SCIENCE PH.D.

All students must meet the Requirements for the Doctor of Philosophy Degree (<http://catalogue.uvm.edu/graduate/degree/requirements/requirementsforthedoctorofphilosophydegree/>)

OVERVIEW

The Materials Science Ph.D. leads to a degree in 5 years. Students must engage in research and defend a dissertation. Successful completion of a comprehensive exam within the first 2 years of the program is required.

SPECIFIC REQUIREMENTS

Requirements for Admission to Graduate Studies for the Degree of Doctor of Philosophy

An accredited Master's Degree (or equivalent) in physics, chemistry, metallurgy, engineering, mathematics, or materials science.

Minimum Degree Requirements

In addition to the above, the following are required:

- A minimum of 75 graduate credits including a minimum of 20 in dissertation research. An overall grade point average in graduate courses of 3.00 or better
- Completion of at least one 3-credit course in 5 of the following 6 categories (other appropriate core area courses may be approved by the Program Director). Note that 2 of the selected courses need to be from the following categories: Quantum Properties of Materials, Computational Materials Science, Synthesis and Characterization of Materials, and 3 of the selected courses need to be from the following categories: Electrical and Optical Properties of Materials, Thermodynamics and Kinetics, and Mechanical Properties of Materials.

Electrical and Optical Properties of Materials - Core Courses:		
PHYS 242	Intro to Solid State Physics	
PHYS 341	Solid State Physics	
EE 261	Semiconductor Materials/Device	
Thermodynamics and Kinetics - Core Courses:		
CHEM 260	Advanced Physical Chemistry (cannot be double-counted to simultaneously satisfy 2 categories)	
PHYS 265	Thermal & Statistical Physics	
ME 204	Biothermodynamics	
Mechanical Properties of Materials - Core Courses:		
ME 252	Mechanical Behavior Materials	
ME 255	Adv Engineering Materials	

ME 201	Biomaterials Engineering	
Quantum Properties of Materials - Core Courses:		
CHEM 260	Advanced Physical Chemistry (cannot be double-counted to simultaneously satisfy 2 categories)	
PHYS 273	Quantum Mechanics I	
PHYS 362	Quantum Mechanics II	
Computational Materials Science - Core Courses:		
PHYS 256	Computational Physics	
CHEM 275	Computational Chemistry	
ME 350	Multiscale Modeling	
Synthesis and Characterization of Materials - Core Courses:		
CHEM 231	Advanced Inorganic Chemistry	
CHEM 214	Polymer Chemistry	
CHEM 226	Analytical Spectroscopy	

- Satisfactory completion of a Ph.D. dissertation including its defense at an oral examination

Comprehensive Examination

Full-time Materials Science Ph.D. candidates are required to pass a written Comprehensive (Qualifying) Exam with a score of 50% or better, no later than 4 semesters after joining the program. Failure to pass the test will result in dismissal from the program. The deadline for part-time students is the semester they complete 24 credits. All students (full and part-time) are allowed a maximum of 2 attempts to pass the exam. Offered annually, the 3-hour exam requires students to solve a minimum of 4 problems that cover the following topics: electrical and optical properties of materials, thermodynamics and kinetics, mechanical properties of materials, quantum properties of materials, computational materials science, synthesis and characterization of materials or equivalent core course requirements.

Requirements for Advancement to Candidacy for the Degree of Doctor of Philosophy

Successful completion of a comprehensive examination in Materials Science.