

## MATERIALS SCIENCE PH.D.

All students must meet the Requirements for the Doctor of Philosophy Degree

### OVERVIEW

The Materials Science Ph.D. leads to a degree in approximately 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

A Bachelor's Degree in physics, chemistry, metallurgy, engineering, materials science, or mathematics. Applicants with other backgrounds will be evaluated individually.

#### 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 and 30 in coursework, at least 15 of which must be graded and 9 of which must be at the 6000- or 7000-level. 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.

Requirement Description		Credits
Electrical and Optical Properties of Materials - Core Courses:		
EE 5440	Gr Semiconductor Materials/Dev	0 or 4
Thermodynamics and Kinetics - Core Courses:		
CHEM 5600	Gr Advanced Physical Chemistry	3
ME 5440	Biothermodynamics	3
Mechanical Properties of Materials - Core Courses:		
ME 5120	Adv Engineering Materials	3
Quantum Properties of Materials - Core Courses:		
CHEM 5600	Gr Advanced Physical Chemistry (cannot be double-counted to simultaneously satisfy 2 categories)	3

PHYS 5500	Quantum Mechanics II	3
Computational Materials Science - Core Courses:		
CHEM 6620	Computational Chemistry	3
ME 6550	Multiscale Modeling	3
Synthesis and Characterization of Materials - Core Courses:		
CHEM 5400	Gr Advanced Inorganic Chem	3

- 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.