MATERIALS SCIENCE AND ENGINEERING (PHD)

Graduate School

Program Website (https://www.engineering.cornell.edu/mse/degree/materials-science-engineering-phd-requirements/)

CIP: 14.1801 | **HEGIS:** 0915.00 | **NYSED:** 13333

Graduate Field

Materials Science and Engineering (https://catalog.cornell.edu/graduate-school/materials-science-engineering/)

Program Description

The focus of current advanced materials research at Cornell includes ceramics, complex fluids, metals, polymers and semiconductors in the form of thin films and in the bulk. Electrical, magnetic, mechanical, optical, and structural properties are investigated. Some special topics of interest are composites, inorganic-organic hybrids, nanocomposites, organic optoelectronics, and, in relation to the structure of materials, the investigation of grain boundaries, surfaces and structural defects. Also studied are materials synthesis and processing and solid state reactions in model systems. Many faculty are involved in electronic packaging. Numerous interactions exist with other fields at Cornell.

A strong catalyst for materials research activities at Cornell has been provided by the Cornell Center for Materials Research (https://www.ccmr.cornell.edu/) (formerly: Materials Science Center), which provides substantial financial assistance to graduate students and maintains central research facilities.

Concentrations

- Materials engineering
- Materials science

Program Information

- Instruction Mode: In Person
- Location: Ithaca, NY
- Minimum Credits for Degree: 75

Program Requirements

- Minimum Semesters for Degree: 10

Graduate School Milestones

- Responsible Conduct of Research Training: Required
- Open Researcher and Contributor ID (ORCID): Required
- Student Progress Reviews (SPR) begin: Second Year
- Examination for admission to candidacy (A Exam): Spring of second year
- Defense of Dissertation (B Exam): Spring of fifth year

Field Specific Milestones

- Qualifying Examination (Q Exam): Spring of first year
- Field progress review conducted in the spring of the first year

Course Requirements

Additional course requirements may be set by the student's Special Committee. Program specific requirements that apply to all students are included below.

Year 1 (Fall)

- MSE 5801 Materials Structure and Electronic Properties
- MSE 8020 Materials Science Research Group Seminars
- MSE 8000 Research in Materials Science
- MSE 8005 Principles and Practices of Graduate Research
- MSE 8010 Materials Science and Engineering Colloquium

Year 1 (Spring)

- MSE 5802 Materials Structure and Mechanical Properties
- MSE 8000 Research in Materials Science
- MSE 8010 Materials Science and Engineering Colloquium
- MSE 8020 Materials Science Research Group Seminars

Year 2 (Fall)

- MSE 8000 Research in Materials Science
- MSE 8010 Materials Science and Engineering Colloquium
- MSE 8020 Materials Science Research Group Seminars

Year 2 (Spring)

- MSE 8000 Research in Materials Science
- MSE 8010 Materials Science and Engineering Colloquium
- MSE 8020 Materials Science Research Group Seminars

University Graduation Requirements

Requirements for All Students

In order to receive a Cornell degree, a student must satisfy academic and non-academic requirements.

Academic Requirements

A student's college determines degree requirements such as residency, number of credits, distribution of credits, and grade averages. It is the student's responsibility to be aware of the specific major, degree, distribution, college, and graduation requirements for completing their chosen program of study. See the individual requirements listed by each college or school or contact the college registrar's office (https://registrar.cornell.edu/service-resources/college-registrar-directory/) for more information.

Non-academic Requirements

Conduct Matters. Students must satisfy any outstanding sanctions, penalties or remedies imposed or agreed to under the Student Code of Conduct (Code) or Policy 6.4. Where a formal complaint under the Code or Policy 6.4 is pending, the University will withhold awarding a degree otherwise earned until the adjudication process set forth in those procedures is complete, including the satisfaction of any sanctions, penalties or remedies imposed.

Financial Obligations. Outstanding financial obligations will not impact the awarding of a degree otherwise earned or a student's ability to access their official transcript. However, the University may withhold issuing a diploma until any outstanding financial obligations owing to the University are satisfied.

Learning Outcomes

- Demonstrate broad knowledge in the fundamental core topics of Materials Science and Engineering, advanced knowledge topics central to their chosen research direction, and broad interdisciplinary training
  -Proficiency in six core topics: Materials chemistry, Mechanical properties of materials, Materials thermodynamics, Kinetics, Electronic properties of materials, and Structure of materials.
  -Advanced knowledge in at least three core topics relevant to their research.
  -Interdisciplinary training.
- Demonstrate the ability to acquire skills to perform independent advanced research
  -Demonstrate ability to identify and seek out resources and information; apply these to guide research plan development.
  -Demonstrate the ability to master and/or innovate research methodologies, and techniques.
  -Demonstrate oral and written communication skills.
- Make an original and substantial contribution to the discipline
  -Demonstrate independent thinking and creativity.
  -Develop and execute original research plan.
  -Generate publishable advances in an area of Materials Science and Engineering.
- Demonstrate a commitment to advancing scholarship
  -Maintain familiarity with advances in the field.
  -Demonstrate commitment to personal professional development through engagement in professional societies, conference participations and publications.
  -Show commitment to learning, collaborative inquiry, and mentoring.
- Demonstrate professional skills
  -Understand and maintain ethical standards in the field.
  -Listen, give, and receive feedback effectively.