

DOCTOR OF PHILOSOPHY WITH A MAJOR IN MATERIALS SCIENCE AND ENGINEERING

The School of Materials Science and Engineering offers a program of study and research leading to the Doctor of Philosophy degree. The Ph.D. degree recognizes demonstrated proficiency and high achievement in research. Beyond mandatory core classes the students in the Ph.D. program pursue an individually structured study plan culminating in a dissertation that makes an original and substantial contribution to the fundamental knowledge in the field of study.

Students with a BS or MS degree in Materials Science and Engineering, Polymer Science and Engineering, Ceramic Engineering, Metallurgical Engineering, Chemical Engineering, Mechanical Engineering, Textile Engineering, Biomedical Engineering, Chemistry, Biology, Physics, or in a related field of science and engineering can be admitted in the Ph.D. program. Ph.D. admissions are generally granted with tuition waivers and financial assistance in the form of graduate research assistantships.

The MSE faculty have diverse research backgrounds and expertise in various areas of Materials Science and Engineering constituting three typical working groups: (a) Functional Materials, (b) Soft and Biomaterials, (c) Structural Materials, and spanning all forms and functions of materials. MSE students, research scientists, and faculty are currently engaged in research in the following general areas:

- *Polymers and Macromolecules*
- *Biologically Enabled and Bioinspired Materials*
- *Nanomaterials and Nanoengineered Devices*
- *Computational Design, Modeling, and Simulations*
- *Functional Electronic and Optical Materials*
- *Fibers and Composites*
- *Energy Storage and Harvesting*
- *Advanced Structural Materials*
- *Multi-scale Structural & Chemical Characterization*

When starting the Ph.D. program, students are considered to be 'probational' Ph.D. students, until they successfully complete the qualifying requirements at which point, they become 'candidate' Ph.D. students. The requirements for the Ph. D. candidacy are outlined below:

All graduate students starting their Ph.D. program are expected to take the core courses in the 1st year. Students must pass the three core courses (i.e. MSE 6411, MSE 6402, and MSE 6768). (If a student gets a "F" grade in a core course then they must retake that course and get a passing grade)

The total number of hours required for a Ph.D. depends on whether the student enters with a BS or suitable MS. Three credit hours toward a graduate degree may be taken for elective courses under the pass/fail system, only if the major school has approved the course prior to taking it. The rules for withdrawal from letter grade courses apply to pass/fail courses as well. Institute rules for the pass/fail system can be found at: <http://www.catalog.gatech.edu/rules/10/>.

Code	Title	Credit Hours
Core Courses		
MSE 6411	Thermodynamics of Materials	3
MSE 6402	Crystallography, Structure and Defects	3
MSE 6768	Polymer Structure, Physical Properties, and Characterization	3
Other Required Courses		
MSE 8200	Advanced Presentation Skills ¹	1
MSE 8801	Special Topics (Seminar)	1
Responsible Conduct of Research (Online CITI and in-person PHIL 6000 class)		
Safety Seminar and MSE Safety Exam		

- ¹ Minimum requirement – can be substituted for an approved technical communication alternative. Alternative advanced technical communication courses include MSE 6754, Engineering Communication. Only 1 hour of the alternative course credit will be allowed to satisfy total MSE hours required.

Other PhD requirements

- Students must pass the three core courses. (If a student gets a 'F' grade in a core course then they must retake that course and get a passing grade)
- Twelve hours from approved MSE curriculum (12 hours), if direct from B.S.
- Six hours from approved MSE curriculum (6.0 hours), if direct from M.S.
- Nine hours in an approved minor (9 hours)
- Pass the qualifying exam
- Complete all course work with a minimum GPA of 3.0
- Write, present and defend a Ph.D. dissertation
- Technical Communications (1.0 hour)
- Teaching assistant duties*
- 31 credit hours are required for Ph.D. if direct from BS
- 25 course credit hours are required for Ph.D. if direct from MS

*Teaching assistant assignments are part of the MSE graduate educational process as it contributes to training graduate students as academics and in research; consequently, all graduate students (GRA) are required to participate in TA activities.