

# MATERIALS SCIENCE AND ENGINEERING

## Degree Requirements

### Master of Science (M.S.)

Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Policies. (<https://gradschool.psu.edu/graduate-education-policies/>)

A minimum of 30 credits is required for the completion of the M.S. degree. At least 18 credits must be at the 500 or 600 level, and the remaining credits may be at the 400 or 800 level. There are 12 credits required in the following core courses:

Code	Title	Credits
<b>Required Courses</b>		
MATSE 501	Thermodynamics of Materials	3
MATSE 512	Principles of Crystal Chemistry	3
MATSE 542 or MATSE 503	Polymeric Materials: The Solid State Kinetics of Materials Processes	3
MATSE 582	Materials Science and Engineering Professional Development	1
MATSE 590	Colloquium	2
<b>Electives</b>		
The remaining elective credits may be chosen from a list of approved electives maintained by the program office.		12
<b>Culminating Experience</b>		
MATSE 600 or MATSE 596	Thesis Research Individual Studies	6
<b>Total Credits</b>		<b>30</b>

As a culminating experience for the M.S. degree, students may choose to complete either a thesis or a scholarly paper. Students who choose to complete a thesis must take at least 6 credits of thesis research (MATSE 600). A thesis describing independent research performed by the student must be written and defended at an oral examination. Bound copies will be made available for the University Libraries and the thesis adviser. A thesis committee will administer the final oral examination of the thesis. The committee must consist of at least three Graduate Faculty members. The thesis must be accepted by the committee members, the head of the graduate program, and the Graduate School, and the student must pass the thesis defense.

The non-thesis track is designed to be completed in 3 semesters, or one calendar year (fall, spring, and summer). Students in this program will be required to begin in the fall semester and be registered continuously until the culminating research experience is completed at the end of the summer. A research adviser will be assigned to students in their first semester. Students in the non-thesis option must write a satisfactory scholarly paper while enrolled in MATSE 596. A total of 6 credits of MATSE 596 will be taken, 1 credit each in the fall and spring, and 4 credits in the summer. It is expected that the scholarly paper will be submitted and approved at the end of the summer semester. Students who need more time to complete the final paper will be allowed to complete the paper, and have it reviewed and approved after the third semester has ended. Students are not required to remain in residence while they complete the final paper. However, extensions granted to students in

this program must comply with the Graduate Council policy on deferred grades (<http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-400/grading-system/>).

### Doctor of Philosophy (Ph.D.)

Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Policies. (<https://gradschool.psu.edu/graduate-education-policies/>)

A doctoral program consists of a combination of courses, seminars, and research that fulfills the minimum requirements of Graduate Council and is approved by the Ph.D. committee for each individual student. A master's degree is not a prerequisite for the doctorate. However, the first year of graduate study leading to the Ph.D. may be the same as that provided for the M. S. degree. Acceptance into the Ph.D. program is based on the student's performance on the Ph.D. qualifying exam, which is administered by a graduate qualifying exam committee of the department.

A minimum of 18 credits of 500-level courses is required for completing a Ph.D. degree in Materials Science and Engineering, including 9 credits in required core courses:

Code	Title	Credits
<b>Required Courses</b>		
MATSE 501	Thermodynamics of Materials	3
MATSE 503	Kinetics of Materials Processes	3
MATSE 512	Principles of Crystal Chemistry	3

Ph.D. students are also required to take 2 credits of MATSE 590 each year, and complete MATSE 582; credits for MATSE 582 and MATSE 590 will not count towards the minimum 18 credits required. Additional specific course requirements are determined by the student and the adviser in consultation with the student's Ph.D. committee. A student with an M.S. degree from Penn State can use credits earned during his or her M.S. study to fulfill the Ph.D. course requirements. Upon approval by the Ph.D. committee and the graduate program coordinator, some or all of the course requirements may be waived for students holding an M.S. degree from another institution.