



# INTERCOLLEGE GRADUATE DEGREE PROGRAM (IGDP) MATERIALS SCIENCE AND ENGINEERING (MATSE)

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<https://www.matse.psu.edu/graduate/graduate-degree-programs>

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# General Information

## Program Overview

The Intercollege Graduate Degree Program (IGDP) in Materials Science and Engineering (MatSE) offers comprehensive graduate education in the fundamentals of materials science and engineering (e.g., synthesis-structure-property-performance relationships). The program has strong research and educational thrusts across the entire spectrum of materials, including inorganic and structural materials, electronic and photonic materials, polymers and biomaterials, and computational materials science. Students may choose to study across the major themes of materials today, including materials in energy applications, nanotechnology, materials in medicine, materials in communications, materials for sensor applications, structural materials, etc., by using a combination of MatSE courses and a myriad of materials-related courses offered in the science and engineering departments at Penn State.

MatSE is shaping the diverse leaders of tomorrow while driving sustainable discoveries that will transform our world. Through educational innovation, pioneering research, entrepreneurial spirit, and active community engagement, we are enabling the technologies that will meet the needs of the 21st century.

## Program Faculty and Staff

IGDP faculty are driving innovation through pioneering research and dynamic teaching. Their discoveries shape the future of materials and are integrated into the classroom, enriching the learning experience for both undergraduate and graduate students. With more than 152 faculty members spread across diverse departments, the program fosters collaboration across Penn State and with institutions around the globe. Together, we are cultivating diverse leaders and advancing sustainable solutions.

**Department Directory:** <https://www.matse.psu.edu/about/who-we-are/directory>

# Program standards and expectations

## Academic Integrity

All students are required to adhere to the Pennsylvania State University Academic Integrity [Policy](#).

***Academic integrity is the pursuit of scholarly activity in an open, honest and responsible manner. Academic integrity is a basic guiding principle for all academic activity at The Pennsylvania State University, and all members of the University community are expected to act in accordance with this principle. Consistent with this expectation, the University's Code of Conduct states that all students should act with personal integrity, respect other students' dignity, rights and property, and help create and maintain an environment in which all can succeed through the fruits of their efforts.***

***Academic integrity includes a commitment by all members of the University community not to engage in or tolerate acts of falsification, misrepresentation or deception. Such acts of dishonesty violate the fundamental ethical principles of the University community and compromise the worth of work completed by others.***

- [GCAC-805 – Academic Integrity](#)

## Student Advising

Advising is normally performed by a student's thesis advisor, but in circumstances where an advisor has not been identified, the chair or co-chair of the graduate program will act in this role initially. For students in the Ph.D. program, advising is also performed by a Doctoral Committee.

- [Compact between Graduate Students and their Mentors](#)
- [Guide for Developing Shared Expectations and Goals](#)

## Changing Advisor

Students wishing to change their advisor within the MATSE/IGDP Program must first meet with the Graduate Program Head to discuss the reason for the request. The Graduate Program Head will determine the next steps for the request.

## Graduate Assistantships

The policies regarding [graduate assistantships \(GSAD-901\)](#) are governed by the J. Jeffrey and Ann

Marie Fox Graduate School at The Pennsylvania State University and can be found online at

Due to unanticipated funding cuts, assistantships may not be guaranteed each semester. Students affected by cuts will have the opportunity to (a) move to another MATSE/IGDP faculty member who can provide full funding to continue their assistantship or (b) continue in their current group without financial support.

## Student Conduct

The Department of Materials Science and Engineering complies with policies set forth by the Fox Graduate School. <https://gradschool.psu.edu/graduate-education-policies/gcac/gcac-800/gcac-801-conduct>

## Course Registration

After consultation with their advisor, a student should register for courses using LionPATH ([lionpath.psu.edu](http://lionpath.psu.edu)). The majority of graduate students in the program are appointed at a half-time graduate assistantship or the equivalent.

## Accommodations for Students with Disabilities

Penn State welcomes students with disabilities, whether permanent or temporary, visible or hidden, into the university's educational programs. The Office for Student Disability Resources (SDR) offers support specifically tailored to the needs of graduate students. The Student Disability Resources (SDR) [website](#) provides information and [contact information for every Penn State campus](#).

To be considered for reasonable accommodations, you must contact the appropriate disability services office at the campus where you are officially enrolled, participate in an intake interview, and provide documentation: [see documentation guidelines here](#). If the submitted documentation supports your request for reasonable accommodations, your campus disability services office will provide you with an accommodation letter or help you discuss reasonable accommodations with your instructor and/or graduate program chair. Please share this accommodation letter with your course instructors and discuss the accommodations with them as early as possible; this process is **required** for **each** semester for which you request accommodations.

An overview of disability resources specific to graduate students can be found here: <https://equity.psu.edu/offices/student-disability-resources/graduate-students-with-disabilities>

## Fall and Spring Semesters

To be considered full-time, all M.S. students and Ph.D. students who have not passed the comprehensive exam must register for 12 credits in the Fall and Spring semesters. Students typically register for a combination of course credits and research credits (MatSE 600) in order to meet the full-time requirements.

Ph.D. students who have passed the comprehensive exam and are working full-time on their thesis should register for non-credit MatSE 601. Students registered for MatSE 601 may audit up to three (3) credits of coursework per semester with the approval of the Graduate Office.

## Summer Semester

If a Ph.D. student is taking his/her comprehensive exam during the summer, he/she should register for summer tuition assistance and schedule a minimum of 1 credit of MatSE 600. If a Ph.D. student is defending his/her thesis during the summer, he/she should apply for summer tuition assistance and register for non-credit MatSE 601. If an International student is taking part in a Summer internship, he/she should apply for summer tuition assistance and register for 1 credit MatSE 596 (DISSA requirement).

## MatSE 590 and MatSE 582 Requirements

For students who are required to take a minimum number of credits (e.g., international students), it is important to note that audited courses do not count in this total. All graduate students are expected to register for MatSE 590 (graduate seminar); those who have passed their comprehensive exam are required to attend the seminar but should register for the course as an audit, which can be done by contacting the IGDP MatSE Graduate Office. All graduate students beginning their studies in Fall 2009 or later are also required to complete an online training program in the responsible and ethical conduct of research and register for the 1-credit MatSE 582 course (Materials Science and Engineering Professional Development) within their first year of study in order to fulfill the requirements described in the Responsible Conduct of Research (RCR) section of this document.

## Responsible Conduct of Research (RCR)

Penn State is committed to modeling, teaching and promoting responsible conduct of research (RCR) within the University community. Research integrity is fundamental to good research and crosses all disciplines and areas of focus. The recent AMERICA Competes Act, which was signed into law in 2007, includes a requirement that graduate students who are supported as research personnel on National Science Foundation awards receive training in the responsible conduct of research. This regulation

adds to existing requirements from the National Institutes of Health mandating RCR education for all graduate students and postdocs supported by National Research Service Awards.

As research has become more complex, more collaborative, and more costly, issues of research ethics have become similarly complex, extensive, and important. The education of graduate students at Penn State must prepare students to face these issues in their professional lives. The Responsible Conduct of Research (RCR) program at Penn State is designed to offer graduate students comprehensive, multilevel training in the responsible conduct of research, in a way that is tailored to address the issues faced by individual disciplines.

The RCR program implemented by the IGDP MatSE program consists of two parts: an online training program to be completed in the first year of graduate study followed by five hours of discussion-based RCR education which the student will fulfill by registering and completing the 1 credit MatSE 582 course Materials Science and Engineering Professional Development offered each fall semester. The students will receive instructions from the IGDP MatSE Graduate Office on the procedure to be followed to complete the online training program. RCR training is required of all graduate students who begin their studies in Fall 2009 or later. Additional information on the RCR program is available on the Penn State Office of Research Protections website (<https://researchsupport.psu.edu/orp/>).

## Academic Credit and Appointments

The IGDP MatSE Program requires students on an assistantship to be registered as full-time status as described in the Course Registration section of this document. Maintenance of the established credit loads and responsibility for the consequences of a graduate student's change of course load rests with the student. The course load is a factor in determining whether a graduate student is classified as a full-time or part-time student, has met residence requirements, and is eligible to hold a fellowship, scholarship, assistantship, or departmental appointment. Students holding fellowships, traineeships, or other awards based on academic excellence are required to carry 12 credits each semester.

# Graduate Degree Requirements

## Master of Science Degree: Thesis-Based Program

The program for the M.S. degree must include a total of at least 30 credits. Subject to the approval by the graduate program chair or co-chair and the graduate school, a maximum of 10 credits of high-quality graduate work conducted at an accredited U.S. institution may be applied toward the requirements for the master's degree, provided that those credits had not already been applied toward a previous degree and must have been earned within 5 years preceding entry into the degree program. A minimum of six research credits (MatSE 600) is required. The minimum number of formal course credits required is 18 [excluding MatSE 590 and 600], with a minimum of 12 credits at the 500-level [excluding MatSE 590 and MatSE 582 Professional Development]. Effective Fall 2011, the instructional program includes three required graduate core courses in materials including Thermodynamics of Materials (MATSE 501), Kinetics of Materials Processes (MATSE 503) and Principles of Crystal Chemistry (MATSE 512). Core Courses must be passed with a "C" or higher. If the student does not obtain a "C" or higher, the student will be provided one additional opportunity the next time the course is offered to take the course and pass with a "C" or higher. If the student does not receive a "C" or higher on the second opportunity, they will be dismissed from the program. Any substitution of courses must be approved by the graduate program chair or co-chair. All candidates for advanced degrees are also expected to attend the MatSE 590 colloquium unless they have a schedule conflict with a course in which they are enrolled. Any substitution of courses must be approved by the graduate program chair or co-chair.

The Graduate School requires that all candidates for advanced degrees complete training in Scholarship and Research Integrity (SARI). The SARI requirements for the IGDP MatSE program include completion of an online Responsible Conduct of Research training program and a 1-credit Professional Development course (MATSE 582). Students should complete the SARI requirements by the end of their first year of study.

A thesis describing independent research performed by the student shall be written and defended in an oral examination. An electronic version is available through The Pennsylvania State University Libraries at <https://etda.libraries.psu.edu/>

A thesis committee will administer the final oral examination of the thesis. The M.S. committee will consist of a minimum of three (3) graduate faculty members. At least two (2) of these must be members of the IGDP MatSE graduate faculty. The MS Defense may be held fully in-person, fully remote, or

hybrid with some individuals participating in-person while others participate remotely. Student preference for delivery mode should be strongly considered, but the student and adviser must agree on the mode. If the student and adviser cannot agree on the mode, the Graduate Program Head will make the final decision. The student (in conjunction with his/her advisor) will recommend appropriate members for the committee. The MS defense is comprised of the oral and final written thesis. The use of generative artificial intelligence (AI) programs is not permitted in preparation of the oral and written thesis deliverables. A favorable vote of at least two-thirds of the members of the committee is required for passing the MS Defense. A student must have their written thesis **and** oral presentation approved for their MS defense to be considered a Pass. Requested committee changes to the written thesis must be completed within two (2) weeks of completion of the oral exam. ***Students intending to graduate in a particular semester must activate their intent to graduate, submit the thesis for format review, and submit a final version of the thesis to the graduate school by the specific dates listed on the graduate school website.***

Table 1 below summarizes the M.S. degree requirements.

Thesis requirement A written thesis and an oral defense administered by a committee of 3 faculty members with at least 2 from the IGDP MatSE graduate program. The student and advisor are responsible for assuring the draft of the thesis is complete and in acceptable format for the Graduate School, and acceptable for evaluation by the committee. The thesis is to be provided to the committee **no later than two weeks prior** to the defense date.

*Table 1. Summary of M.S. Requirements*

Description	Requirements
Minimum total credits	30
Minimum research credits	6
Minimum formal course credits	18
Minimum 500-level credits (excluding MATSE 582 and 590)	12
Core Graduate Course credits (students beginning Fall 2011 or later)	9
Seminar	2 credits/year
Scholarship and Research Integrity (students beginning Fall 2009 or later)	On-line training and 1 credit MatSE 582 "Materials Science and Engineering Professional Development"
Minimum GPA for graduation	3.0
Thesis requirement	A written thesis and an oral defense administered by a committee of 3 faculty members with at least 2 from the IGDP MatSE graduate program

## Doctoral Degree Requirements

General requirements are based upon completing the required course work, passing the qualifying examination, a period of residence, passing the comprehensive examination, the writing of a satisfactory thesis (and its acceptance by the doctoral committee and the Graduate School). A doctoral program consists of a combination of courses and research that fulfills the requirements of the Graduate School and is approved by the student's doctoral committee. A master's degree is not a pre-requisite for the doctorate. However, the first year of graduate study leading to the Ph.D. may be the same as that 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. Although there is no specified graduate school requirement for the number of course credits required for a Ph.D. degree, the IGDP MatSE program requires a minimum of 18 credits of 500-level courses [excluding MatSE 590 and MatSE 582 Professional Development] for completing a doctoral degree. The instructional program includes three required graduate core courses in materials: Thermodynamics of Materials (MATSE 501), Kinetics of Materials Processes (MATSE 503), and Principles of Crystal Chemistry (MATSE 512). Core Courses must be passed with a "C" or higher. If the student does not obtain a "C" or higher, the student will be provided one additional opportunity the next time the course is offered to take the course and pass with a "C" or higher. If the student does not receive a "C" or higher on the second opportunity, they will be dismissed from the program. Any course substitution must be approved by the graduate program chair. Additional courses are determined by the student and the advisor, in consultation with the student's doctoral committee. A student with an M.S. degree from Penn State can use the 500-level credits earned during his or her M.S. study to (partially) fulfill the course requirement. However, credits earned to complete a previous master's degree, whether at Penn State or elsewhere, may not be applied to a second master's or doctoral degree at Penn State.

The Graduate School requires that all candidates for advanced degrees complete training in Scholarship and Research Integrity (SARI). The SARI requirements for the IGDP MatSE program include completion of an online Responsible Conduct of Research training program and a 1 credit Professional Development course (MATSE 582). Students should complete the SARI requirements by the end of their first year of study.

**The IGDP PHD requires a minimum of 30 credits Graduate Credits (includes minimum of 6 MATSE 600 research credits.**

Table 2: Summary of Ph.D. Requirements

MATSE Core Courses Credit Requirements - Must have at least 30 credits prior to completing Comprehensive Exam		
MATSE 501	Thermodynamics of Materials	3 credits

MATSE 503	Kinetics of Materials Processes	3 credits
MATSE 512/GEOSC512	Principles of Crystal Chemistry	3 credits
MATSE 590 Colloquium	Fall/Spring – Must be completed each semester	1 credit each semester
<b>*500-Level Elective Credits:</b>		
500 Level courses (excluding MATSE 582 and MATSE 590)		9 credits (minimum)
<b>Research Credits:</b>		
MATSE 600		6 credits (minimum)
<b>Research and Integrity Credits:</b>		
MATSE 582		1 credit
CITI SARI on-line course		Included with MATSE 582 course

**\*Core Courses cannot be used to satisfy the 500-level elective requirement**

## Ph.D. Committee Formulation

The Ph.D. Committee will be appointed by the Dean of the Graduate School upon the recommendation/request of the IGDP MatSE chair or co-chair, in consultation with the student's advisor. A student's Ph.D. Committee shall be nominated to the J. Jeffrey and Ann Marie Fox Graduate School by the student's major Graduate Program Head as soon as possible after the student has secured an adviser, but in no event later than one calendar year following the date of the student's successful completion of the Qualifying Examination.

For students entering with a Master's degree from another university, the committee should be chosen within six months of enrolling at Penn State. The Ph.D. committee must consist of a minimum of four members of the Graduate Faculty, including at least two from the IGDP MatSE Graduate Faculty. The committee must contain at least one representative from outside the student's major field. This point requires clarification for an Intercollege Graduate Degree Program: the "outside" member of the student's committee is a faculty member from a Department that differs from the student's advisor's tenure home. The committee chair will normally be an IGDP MatSE faculty member, generally the student's research advisor. If the student is pursuing a minor, a representative from the minor field must be on the committee. Persons from outside of Penn State can be listed as a Special Member of the Ph.D. Committee with approval (see Graduate Degree Programs Bulletin): <https://bulletins.psu.edu/graduate/>

## Qualifying Examination

### Objectives and Scope

The objectives of the qualifying exam are to assess whether a student has the necessary background and skills to successfully pursue a Ph.D. in Materials Science and Engineering and to provide an opportunity for the student to obtain guidance and feedback on their short-term research objectives and

direction. The exam is composed of an oral component to take place within 8 to 16 months of the student's start date, and a written component is due two weeks prior to the oral exam.

The exam will be centered on the development of the student's initial research efforts and, as such, the scope will be focused on recent, preliminary results or mastery of one or more techniques relevant to the student's research project. Both deliverables of the exam must contain the following:

1. Brief introduction of the broad motivation and objectives of the research task described during the exam, including a short summary of critical literature relevant to the field.
2. Description of the research hypothesis and approach(es) taken to evaluate the hypothesis
3. Summary of recent results or recent research efforts by the student
4. Description of the research plan and direction for the next 6 months to a year

Examples of research efforts include, but are not limited to, experiments, modeling, simulations, technique development, data interpretation, and mastery of a research-related technique. Students may seek assistance from their advisor and their peers, although their oral and written exam deliverables must be their own work and abide by all standards for academic integrity at Penn State (see <https://www.ems.psu.edu/graduate/academic-resources/academic-integrity-graduate-students> ).

***The use of generative artificial intelligence (AI) programs is not permitted in preparation of the oral and written exam deliverables.***

## Criteria for a Successful Qualifying Exam and Possible Outcomes

Students will be assessed through a written report, oral presentation (approximately 20 minutes), and responses to questions after the oral presentation. Altogether, the oral exam should last no more than about 1.5 hr. A suggested schedule is 20 min for student's presentation, 50 min for a question-and-answer period, and 20 min for deliberation of the committee (during which time the student is not present). The written report is to be a maximum of 10 double-spaced pages, including figures but not including references. The font and margins of the document must follow the guidelines for theses and dissertations at Penn State. In order to successfully pass the qualifying exam a student must:

1. Demonstrate mastery of Materials Science and Engineering fundamentals
2. Demonstrate an understanding of the scientific method (observation, hypothesis generation, hypothesis testing, analysis)
3. Effectively present and communicate technical ideas and concepts related to the student's research

Failure of the student to demonstrate one or more of the criteria listed above will result in failure of the exam. Whether or not a retake is allowed shall be decided by the qualifying exam committee. Retakes of the exam must be held within six months of the original exam with the same committee members, and scheduling is the responsibility of the student. All provisions that are provided by the committee must be completed by the end of the following semester. A maximum of one retake is possible for any student. The retake must be completed by the end of the following semester.

## Qualifying Exam Committee

The qualifying exam committee will be composed of the student's proposed thesis committee. As such, it will be the responsibility of the student to form their thesis committee prior to the exam with the help of their thesis advisor. The thesis committee may evolve during a student's PhD as appropriate. One faculty member is designated by the thesis advisor to serve as the chair of the qualifying exam committee and is responsible for guiding the discussion in the question-and-answer period. Advisors can attend the qualifying exam but may not speak or offer verbal/non-verbal cues to the student during the exam. The outcome of the exam is based solely on the student's performance. Advisors may not seek to influence the exam outcome and must exit the room during the post-exam deliberation by the committee.

## English Competency

English competency will be assessed by the Qualifying Exam Committee through the students written and oral presentation. If a student is found to be deficient in this area, the committee will provide an improvement plan that needs to be completed by the end of the following semester.

## Scheduling of the Qualifying Exam

The qualifying exam will be scheduled within 8 to 16 months of the student's start date. The exam dates will be scheduled by the student with support from the Graduate Program Coordinator. The written part must be submitted to the Graduate Program Coordinator and to the exam committee at least two weeks prior to the oral exam.

The Qualifying Exam may be held fully in-person, fully remote, or hybrid with some individuals participating in-person while others participate remotely. Student preference for delivery mode should be strongly considered, but the student and adviser must agree on the mode. If the student and adviser cannot agree on the mode, the Graduate Program Head will make the final decision. Either the student or adviser can appeal the decision of the Graduate Program Head to the Associate Dean for Graduate Studies.

## Comprehensive Examination

The purpose of the comprehensive exam is to ensure that the student has developed a comprehensive and integrated knowledge in the field and has developed a sound plan for doctoral thesis research. ***The Comprehensive Examination should be scheduled within a year of completion of all required course work to provide students with timely assessment of their ability to complete their dissertation, but it must be scheduled no later than five years following the passing of the Qualifying Examination.***

It is appropriate to take the comprehensive exam before preliminary work for the thesis proposal has been published. It is also desirable to take the exam before work is too far along to take full advantage of feedback from the committee at all stages of the project. Although prior versions of the handbook have stipulated that the comprehensive exam should be completed no later than the 7th semester, students are encouraged to do so even earlier.

The comprehensive exam consists of a written review of the student's thesis research and future research plans, and their defense in an oral presentation. The exam involves a research progress report, plans for further work, and a review of academic progress. The committee shall make recommendations for modifying the research plan, alerting the student to related work, and identifying unforeseen pitfalls. In addition, the committee may recommend additional research and/or coursework at this time. ***The student must complete paperwork to schedule the comprehensive exam and receive approval from the graduate school at least three weeks before the exam. Please contact the IGDP MatSE graduate office to schedule the exam. Also, students must be registered during the semester they take the comprehensive exam.***

Unlike the qualifying exam, the proposal for the comprehensive exam should be prepared with guidance from the student's thesis advisor. It is commonplace for the thesis advisor to review versions of the document and make suggestions prior to its distribution to the committee members. ***The use of generative artificial intelligence (AI) programs is not permitted in preparation of the comprehensive exam document.*** More detailed requirements for the comprehensive examination proposal are listed below. The comprehensive examination may be held fully in-person, fully remote, or hybrid with some individuals participating in-person while others participate remotely. Student preference for delivery mode should be strongly considered, but the student and adviser must agree on the mode. If the student and adviser cannot agree on the mode, the Graduate Program Head will make the final decision. Either the student or adviser can appeal the decision of the Graduate Program Head to the Associate Dean for Graduate Studies.

## Broad Guidelines

- Report not to exceed twenty (20) pages (excluding cover page, citations and appendix), double spaced, written in Times New Roman or Arial 12-point font with embedded figures no smaller than 1.25” in the shortest dimension. Figures must be sequentially numbered and include captions. Margins no smaller than 0.5” all around.
- *Report distributed to committee no less than 2 weeks before exam date.*
- Exam includes a 30-minute presentation introducing research topic and summarizing important outcomes, ending with a statement of aims/tasks required to complete dissertation work with a timeline leading to projected date of thesis defense.

## Comprehensive Report Outline

### I. Cover page

- a. Title
- b. Exam date/time/place
- c. Author address and contact information

### II. Dissertation Overview

- a. ~1-2 pages summarizing project rationale: scientific contributions and/or socioeconomic benefit
- b. Itemized descriptive list (itemized paragraphs) of significant research accomplishments to date
- c. Itemized descriptive list of publications in print, press, or submitted (not to include planned publications or in preparation)

### III. Introduction

- a. Introduces thesis topic background written in terms broadly understandable by faculty who are not directly involved in this research

### IV. Hypothesis or Project Objective Statement

- a. Statement of overarching hypothesis OR objective
- b. Expected outcomes

## V. Brief Overview of Methods and Materials

- a. Key experimental/theoretical methods required to understand how work has been done and/or will be completed

## VI. Key Findings

- a. Succinct paragraphs highlighting significant research results

## VII. Ongoing Research and Future Work

- a. Itemized descriptive list of specific aims/tasks to complete dissertation work
- b. Timeline leading to projected date of thesis defense

## VIII. References

## IX. Appendix

- a. Copies of papers in print, press, or submitted to a journal (not including papers in preparation)

*Table 3: Summary of Ph.D. Degree Requirements*

<b>Qualifying exam</b>	Successful completion of a qualifying examination is required for formal admission into the IGDP MatSE Ph.D. program. The exam is scheduled each Fall and Spring semester. It is recommended that the exam be taken after completion of at least 12 graduate course credits which includes the 9 credits of required graduate core courses.
<b>Minimum formal course work requirements</b>	18 credits of 500-level courses after B.S. [ <i>excluding</i> MatSE 590 and MatSE 582 Professional Development]. The instructional program includes three required graduate core courses in materials including Thermodynamics of Materials (MATSE 501), Kinetics of Materials Processes (MATSE 503) and Principles of Crystal Chemistry (MATSE 512). Any substitution of courses must be approved by the graduate program chair or co-chair. Additional courses to be taken are determined by the student, their advisor, and a thesis committee made up of at least 4 faculty members, including a minimum of 2 faculty members from the program.
<b>Comprehensive exam</b>	Progress report and thesis proposal (administered by the student's Doctoral Committee)
<b>Seminar</b>	2 credits of MatSE 590/year
<b>Scholarship and Research Integrity</b> (students beginning Fall 2009 or later)	Online training and 1-credit MatSE 582 "Materials Science and Engineering Professional Development"
<b>Minimum GPA</b>	3.0
<b>Thesis</b>	A written thesis and an oral defense administered by the Doctoral committee

## Final Oral Examination

Upon completion of the thesis, the Doctoral Committee examines the thesis and administers the final oral examination. ***The student and advisor are responsible for assuring that the defense draft of the thesis is complete, of acceptable format for the Graduate School, and in a form acceptable for evaluation by the committee, no later than two weeks prior to the defense date. The student must complete paperwork to schedule the oral defense and receive approval from the graduate school at least three weeks in advance of the exam date.*** Please contact the IGDP MatSE graduate office to schedule the Ph.D. defense. ***Also note that students must be registered during the semester they complete the thesis defense as described in the Course Registration section of this handbook.*** Students intending to graduate in a particular semester must activate their intent to graduate, submit the thesis for format review and submit a final version of the thesis to the graduate school by the specific dates listed on the graduate school website. After the defense, the committee then makes recommendations as to the student's status (pass/fail) to the IGDP MatSE Graduate Office and Graduate School. When a period of more than six years has elapsed between the passing of the comprehensive examination and the completion of the thesis defense, the student is required to pass a second comprehensive examination before the final oral examination will be scheduled.

The final oral examination (dissertation defense) may be held fully in-person, fully remote, or hybrid with some individuals participating in-person while others participate remotely. Student preference for delivery mode should be strongly considered, but the student and adviser must agree on the mode. If the student and adviser cannot agree on the mode, the Graduate Program Head will make the final decision. Either the student or adviser can appeal the decision of the Graduate Program Head to the Associate Dean for Graduate Studies. ***The use of generative artificial intelligence (AI) programs is not permitted in preparation of the oral and written dissertation documents.***

## Ph.D. Continuous Registration Requirements

A candidate for the Ph.D. degree is required to register continuously for each fall and spring semester from the time the comprehensive examination is passed and the two-semester residence requirement is met until the dissertation is accepted by the doctoral committee and the final oral examination is passed, regardless of whether work is being done on the thesis during this interval. (See [GCAC-513 Registration](#) and [GCAC-514 Continuity of Registration](#)).

Post-comprehensive Ph.D. students can maintain registration by registering for credits in the usual way, or by registering for noncredit 601 or 611, depending upon whether they are devoting full-time or part-

time to thesis preparation. Note that the least expensive way for a student to maintain full-time status while working on research and thesis preparation is to register for 601. This clearly is the procedure of choice for international students who need to maintain status as full-time students for visa purposes.

If a Ph.D. student will not be in residence for an extended period for compelling reasons, the director of Graduate Enrollment Services will consider a petition for a waiver of the continuous registration requirement. The petition must come from the doctoral committee chair and carry the endorsement of the department or program chair.

## Academic Credit and Appointments

The IGDP MatSE Program requires students on an assistantship to be registered as full-time status as described in the Course Registration section of this document. Maintenance of the established credit loads and responsibility for the consequences of a graduate student's change of course load rests with the student. The course load is a factor in determining whether a graduate student is classified as a full-time or part-time student, has met residence requirements, and is eligible to hold a fellowship, scholarship, assistantship, or departmental appointment. Students holding fellowships, traineeships, or other awards based on academic excellence are required to carry nine or more credits each.

## Ph.D. Residency Requirements

Over a twelve-month period the Ph.D. student must spend at least two consecutive semesters, exclusive of summer sessions, as a registered full-time student engaged in academic work at the Penn State campus(es) offering the Ph.D. degree in the student's graduate major program.

- SUBJECT 601 and SUBJECT 611 cannot be used to meet this requirement.

## Annual Evaluations

The goal of the annual assessment is to evaluate student progress toward the degree and in meeting the Graduate Council's Scholarly and Professional Goals for all graduate degree students.

The faculty advisor is required to provide a written evaluation of the student's progress in academics and research (signed by both the advisor and the student) to the IGDP MatSE Graduate Office on an annual basis. This typically occurs during the spring semester. The Annual Evaluation should also be discussed

with the student's Ph.D. committee, if formed. Continuation of funding is contingent upon receipt of the annual assessment.

## Graduate Assistantships

The policies regarding graduate assistantships ([GSAD-901](#)) are governed by the J. Jeffrey and Ann Marie Fox Graduate School at The Pennsylvania State University.

Due to unanticipated funding cuts, assistantships may not be guaranteed each semester. Students affected by cuts will have the opportunity to (a) move to another MATSE/IGDP faculty member who can provide full funding to continue their assistantship or (b) continue in their current group without financial support.

### Post-defense funding

Students cannot be appointed to assistantships during the semesters after they complete their final defense. If you wish to continue employment at Penn State in the semester after defending, Ph.D. graduates can be hired either as a post-doc (one-year contract which includes benefits) or on wage payroll (which does not include benefits).

### Out of State/Out of Country request for Remote Assistantships

An exception to the residency policy for Graduate Assistants for students who need to leave the state or country to conduct research, to participate in an educational program, or for an extenuating circumstance.

1. The Graduate School's overarching approach to this issue is that such requests must either be; a) required for the student's progress towards their degree, or b) due to a situation beyond the control of the student.
2. If a graduate student is appointed to an assistantship and will be physically located outside of Pennsylvania (domestic or international) for a period of 30 days or more, Graduate School approval is required.
  - a. Fellowships fall under different guidance. If the student will be traveling internationally for a fellowship and will be outside of the United States for 30 days or more, please contact Office of Graduate Fellowships and Awards to conduct an Export Control review.
3. Review and approval of each remote GA request is required, including the graduate student advisor, graduate program chair and associate dean.
4. We need to allow a minimum of 3 weeks for the review of a remote GA request to take place. The review time is subject to change during high volume periods.

5. International students requesting an exception for out-of-country (out-of-USA) assistantship need to contact and consult with DISSA.
6. For approved out-of-country requests, all students must register their travel in TSN, and depending on where they go, Export Control needs to review their travel.
7. Per the Office of General Counsel, if a student hits 180 days (6 months) within a 1-year period outside of the United States, we can no longer pay the student, and the student may not continue to perform activities related to the assistantship.

## Conflict Resolution

The Department of Materials Science and Engineering follows the following policies provided by the Fox Graduate School:

- [GCAC-802 – Procedures for Resolution of Problems](#)
- [GCAC-803 – Procedures for Discontinuation or Termination of the Degree Program of a Graduate Student for Unsatisfactory Scholarship](#)
- [GCAC-804- Termination of Assistantships Due to Inadequate Performance](#)

## MATSE Ombudsperson

In order to serve the needs of the MatSE community and assist with resolving problems and conflicts, faculty members are periodically appointed to serve as an Ombudsperson.

### Why is there an ombudsperson?

Students may serve in many roles during their academic careers such as students, teaching assistants, advisees, co-workers, colleagues or employees. Varying rules/policies apply for the many roles. As long as the expectations for behavior are understood and accepted by all parties, there is rarely a problem. However, challenges can arise when there are differing expectations or conflicting policies, or when one group is accused of violating the rules. The ombudsperson serves as a neutral party who is equally open and accessible to all parties including students, faculty, staff, and administrators.

Please visit the following link for the listing of the MATSE Ombudspersons:

<https://www.matse.psu.edu/undergraduate/undergraduate-resources/ombudsperson>

# Department of Materials Science and Engineering Resources

## Helpful Resources

**Counseling and Psychological Services (CAPS)** – CAPS goal is to address the psychological needs and personal concerns of students that may interfere with their academic progress, social development, and emotional wellbeing. CAPS services are available in a variety of modalities at this time. Please call to learn more about your options. If there is an emergency situation after hours, contact the 24/7 Penn State Crisis Line at 1-877-229-6400.

**Student Care and Advocacy** - College life can be confusing and overwhelming, and sometimes you just need someone to help you sort things out. Student Care and Advocacy is committed to helping students facing unforeseen challenges navigate Penn State's structure in close and careful collaboration with campus and community partners. Their case managers welcome any opportunity to provide consultation and direct you to the resource best equipped to meet your needs.

**University Health Services (UHS)** - is your comprehensive on-campus health care resource. They specialize in outpatient student health including the treatment of medically urgent problems and ongoing health concerns. They provide preventative care, education, and resources to help students live a healthy lifestyle.

**Community and Belonging** - Penn State can feel like a large place, but there are many communities to help you connect and thrive. Penn State offers many spaces where students with different racial and ethnic backgrounds, genders, sexual orientations, religions, socioeconomic circumstances, and physical abilities come together to find support and community.

**Lions Pantry** - The Lion's Pantry serves as the official on-campus student food pantry at Penn State's University Park campus.

The graduate catalog **GRADUATE DEGREE PROGRAMS BULLETIN** is the best source of information on the procedures and regulations of the Graduate School. The Graduate Degree Program Bulletin can be found on the web at <https://bulletins.psu.edu/graduate/> . A student is expected to assume responsibility for knowing the regulations and procedures.

The Registrar's Office (863-6357), 112 Shields Building, is responsible for student course registration, commencement exercises, and the processing of student transcripts.

**THESIS AND DISSERTATION INFORMATION**, prepared by the Thesis Office, 115 Kern Building, contains technical information and Graduate School format requirements for writing and submitting a

thesis. Information can be found at <https://gradschool.psu.edu/completing-your-degree/thesis-and-dissertation-information/> The Thesis and Publications Office located in 115 Kern Building is also available for consulting on specific problems you may encounter in presenting your work.

### Code of Conduct/Climate Issues

The Office of Student Conduct on campus handles a variety of issues concerning code of conduct. For more information regarding this very important and sometimes sensitive issue, please go to their website: <https://studentaffairs.psu.edu/conduct>

**Registrar's Office:** <http://registrar.psu.edu/>

**Bursars Office:** <https://bursar.psu.edu/>

**ISSA:** <https://global.psu.edu/article/contact-dissa>

**Penn State Graduate School:** <http://gradschool.psu.edu/>

## Fox Graduate School and University Standards

### Satisfactory Scholarship

- Students enrolled in a graduate degree program must maintain a minimum grade-point average of 3.00 to remain in good academic standing.
- [GCAC-404 - Satisfactory Scholarship](#)

### Scholarship and Research Integrity

- At least one CITI training course (RCR recommended)
- A minimum of 5 hours of in-person discussion-based education
- [SARI requirements](#)

### Graduate Council Graduation Publication Requirements

- PhD
  - The dissertation must be made available to the public through inclusion in the University Libraries.
  - [GCAC-607 - Dissertation - Research Doctorate](#)
- Research Master's Degrees (MA, MS)
  - The thesis must be made available to the public as an official University record through inclusion in the University Libraries.

- [GCAC-642 - Culminating Experience - Research Master's](#)

## Graduate Council defined time limits

- A Ph.D. student is required to complete the program, including acceptance of the doctoral dissertation, within eight years after the date of successful completion of the qualifying examination, not including approved leaves of absence as outlined in GSAD-906.
  - [GCAC-610 - Time Limitation - Research Doctorate](#)
- All requirements for a research master's degree, including acceptance of the culminating experience, must be met within eight years of the beginning of the first semester of enrollment to the graduate degree program.
  - [GCAC-632 Time Limitation - Research Master's](#)

## Graduation deadlines

- See [Academic Dates and Deadlines](#)

## College of Earth and Mineral Sciences Resources for Graduate Students

- Diversity, equity, and inclusive excellence play a central role in our college's core mission to prepare our students to live, work, and lead in a global environment. The College of Earth and Mineral Sciences' broad and multifaceted diversity efforts are inclusive of nationality, ethnicity, race, gender, sexual orientation, gender identity, age, ability, veteran status, socio economic status, first generation to college status, religion and more and apply to students, faculty, staff, and leadership.
  - [Belonging Resources for Graduate Students](#)
- The Fletcher L. Byrom Earth and Mineral Sciences Library serves the community of the College of Earth and Mineral Sciences. The library is housed in 105 Deike Building, which is located near the corner of Pollock Road and Burrowes Road. The library is one floor above the ground floor entrance. To visit the library, it is necessary to use the elevator or the stairs.
  - [Fletcher L. Byrom Earth and Mineral Sciences Library](#)

- Graduate Organizations available to Materials Science and Engineering Students
  - [Graduate Organizations](#)

## Links to Fox Graduate School and University resources

### General

- [Graduate student resource library](#)
- [University Libraries](#)
- [Office of the Vice Provost for Graduate Education and Dean of the Fox Graduate School](#)

### Academic Resources

- [Fox Graduate School Academic resources](#)
- [Master's Thesis and Doctoral Dissertation Requirements](#)
- [Graduate Writing Center](#)
- [Fox Graduate School Ombudsperson Office](#)
- [Avenues for addressing graduate student concerns.](#)

### Career and Professional Development

- [Graduate Exhibition](#)
- [Three Minute Thesis](#)

### Funding

- [Financial aid including Office of Student Aid](#)
- Research and Conference Travel Funding Opportunities
  - [International Travel Grants](#)

### Health and Well-being

- [Health Insurance / SHIP](#)
- [Graduate Student Parental Leave](#)
- [Mental health support](#)

- [Child Care at Penn State](#)
- [Students in crisis](#)

## Special Populations

- [Adult Learner Programs & Services](#)
- [Student Disability Services](#)
- International Students
  - [Penn State Global ISSA](#)
  - [English for Professional Purposes Intercultural Center \(EPPIC\)](#) - *support for language skills*
- [Military students](#)

## Clubs and Organizations

- [Graduate and Professional Student Association](#)
- [Discover](#) – for finding graduate student organizations