

**GRADUATE STUDENT INFORMATION MANUAL**

**I. INTRODUCTION**

New graduate students have two immediate sources of information about Graduate studies in Materials Engineering: the Graduate Office (currently run by Dr. Morgan) in ARMS 2201A, 494-4103, and the Chair of the Graduate Admissions Committee (currently Prof. Zhang), who acts as the temporary academic advisor until the student has a major professor (see IV A).

The following information is provided to supplement **The Graduate School Bulletin** and the **Policies and Procedures Manual for Administering Graduate Programs** of the Graduate School. These may be found under information for *Current Students > Graduate School Publications*, at the Graduate School website: <http://www.purdue.edu/gradschool>

**II. ADMINISTRATIVE INFORMATION**

- A. GENERAL INFORMATION about your graduate program is available through the Graduate Office in ARMS 2201A and the School website (<https://engineering.purdue.edu/MSE>), including the MSE Graduate Student Association (MSEGSAs) page.
- B. Most communications are by email or through websites; surface mail is received in ARMS 2300. Purchased items for research are held in the mail area, individual items are placed in your mailbox.

The current MSE Departmental mailing address for all purposes is:

School of Materials Engineering  
Purdue University  
Neil Armstrong Hall of Engineering  
701 West Stadium Avenue  
West Lafayette, IN 47907-2045

- C. PHONE CALLS for business should be directed to the main office, if needed. Messages received through the Main Office number, 765-494-4100, (internal extension 4-4100) will be put in your mailbox or otherwise transmitted. Personal calls should be taken on your personal phone.
- D. BUSINESS OFFICE services are primarily provided through the One Campus online site: <https://one.purdue.edu/>. There you will find forms to request approval to travel on business, to be reimbursed for business travel expenses, to be absent from campus (e.g., vacation) as well as other benefits, and to make purchase orders for research supplies.

- E. KEYS for the buildings, offices, laboratories and research space necessary for your work will need to be authorized by your major professor. Most laboratories have restricted access, but may be unlocked by a passcode or ID card swipe once you are approved for that room. Access to all Materials Engineering laboratories, in ARMS or elsewhere, requires formal safety training and certification. The Chair of the Safety Committee will supply details about the training schedule and the requirements for certification during orientation week.
- F. DESK assignments are limited, and made at the beginning of the fall semester. Sharing of desk space or 'hot desking' is often necessary. Advisors whose research is primarily conducted outside of Armstrong Hall (ARMS) will usually assign nearby space to each of their researchers.
- G. LEAVE FROM CAMPUS FORMS (available on OnePurdue) must be completed and approved by your advisor **before** temporary departure from campus, such as for attendance at an out-of-town seminar or conference, research duties at any remote location, vacation, or other authorized activity. In case of emergency requiring absence from campus, students should inform their advisor and the main office as soon as possible.
- H. VACATION POLICY is set and approved by the major professor, consistent with applicable laws and University regulations. Vacation forms are available on OnePurdue.

### III. APPOINTMENT INFORMATION

University appointment for graduate students in the School of Materials Engineering is subject to the following rules:

Appointments are based on a variety of factors, including registration for courses, research funds, and the recommendation of the major professor. Financial appointments will be given only to those students maintaining satisfactory academic progress. Students normally will be offered 1/2-time Graduate Research Assistant (RA) appointments, which consists of salary, tuition, the majority of fees and health insurance supplement. Students admitted as "self-supported", such as industrially or government sponsored students, are not guaranteed an appointment should their sponsor withdraw funding. Summer appointments should be expected for students who satisfactorily complete their first academic year of graduate study.

In addition to any financial appointment, students will be registered in each semester for **MSE 69900** (Research PhD Thesis) or **MSE 69800** (Research MS thesis). Research Credit requirements are 12 during Fall and Spring semesters, 9 during Summer. Students will be evaluated on their progress towards thesis objectives (see IV F) by the grade they receive for this course from their advisor(s).

### IV. GENERAL PROGRAM REQUIREMENTS

- A. MAJOR PROFESSOR(S) AND ADVISORY COMMITTEE – The student shall, before the end of the first full semester, select a major professor or professors (co-advisors) on a mutually acceptable basis. A co-advisor from MSE is required if the other primary advisor is not from Purdue MSE. This process begins during orientation week and typically culminates by October 1. The PhD Advisory Committee, consisting of the major professor as chair and at least three other faculty members (two for an MS), selected by the student and major professor, will assist the student in the program.
- B. LANGUAGE REQUIREMENT – Non-native English-speaking students must be certified for oral English proficiency before they can serve as a graduate instructor (Section IV. F). A student may be certified in oral English proficiency by any one of the following:
- A score of 8.0 on the IELTS
  - A score of at least 27 on the speaking portion of the TOEFL IBT
  - A score of 50 or above on Purdue’s Oral English Proficiency Test (OEPT)
  - Successful completion of ENGL 620

Incoming students who are not certified in oral English proficiency are required to begin working immediately to satisfy this requirement.

- C. PLAN OF STUDY – The student, in consultation with the major professor(s) and Advisory Committee, shall prepare a Plan of Study for approval by the Graduate School. The Plan of Study should be appropriate to meet the needs of the student’s field, as determined by the Advisory Committee. Coursework requirements for the specific degree programs are listed below for each degree objective. Current lists of MSE courses are maintained on the School website. The plan of study is prepared and submitted electronically to the Graduate School for approval. The plan of study must be approved, at the latest, in the second semester of study, before the student will be allowed to register for the third semester.
- D. ETHICAL CONDUCT (OF RESEARCH) – MSE graduate students should be familiar with and adhere to the Purdue University Statement of Integrity and Code of Conduct available at: [http://www.purdue.edu/purdue/about/integrity\\_statement.html](http://www.purdue.edu/purdue/about/integrity_statement.html). First-year MSE graduate students must complete an online training module, “Responsible Conduct of Research for Physical Sciences” from the Collaborative Institutional Training Initiative (CITI), currently available through Brightspace DL2. The MSE690 graduate seminar will provide further opportunities to explore specific topics in ethics in research. Students should actively engage in discussion of research ethics with their fellow students and research advisors.
- E. QUALIFYING EXAMINATIONS – Ph.D. students must first pass the MSE General Exam, which is a comprehensive written exam administered as the Final Exam of **MSE 60000 Fundamentals of Materials Engineering** offered each fall semester. (Although this course is not required, it is strongly recommended for all MSE graduate students.) Students are then required to take the Ph.D. Preliminary Exam, as detailed in Section VI. The Ph.D. Preliminary Exam takes place by the end of the Fall semester of the second year (or equivalent: by the end of fourth semester, counting summer). Eligibility for the Ph.D. Preliminary Exam requires first passing the General Exam. A second failure along this examination sequence will be cause for removal from the Ph.D. program.

- F. ANNUAL PROGRESS REVIEWS – Early in each calendar year all students are expected to file a report of their progress in the previous calendar year on a form developed by the School. The student and advisor(s) then meet to discuss the student’s self-assessment, the advisor’s evaluation and feedback, and plans for the student’s research, coursework and possibly teaching in the coming year. First-year students should also use this meeting to discuss their plan of study (coursework plan and advisory committee selection). Two consecutive Unsatisfactory (U) grades in failure to meet progress objectives will be cause for removal from the program.
- G. MATERIALS ENGINEERING TEACHING EXPERIENCE (METE) – Developing teaching ability is a valuable part of graduate education, regardless of career path. To this end, all Ph.D. students will serve at least one semester as a graduate instructor under faculty direction as part of their degree program. During the semester that a student serves as a graduate instructor they will also be enrolled in MSE 697 METE, which meets variably throughout the semester to augment the teaching practice with lectures, seminars and discussions of general teaching methods, as well as aspects specific to MSE. Students should discuss possible assignments with their advisor(s), and a request may be made for a particular assignment based on their individual goals and/or preferences for the teaching experience. During the semester when teaching, appointments will be adjusted to include a ¼-time Teaching Assistantship (with the exception of students supported on a fellowship), with a corresponding reduction (typically to ¼-time) in any Research Assistantship. Some opportunities for additional teaching experience on a voluntary basis may be available.
- H. THESIS PREPARATION – General information on thesis preparation, including format specifications, is available from the Graduate School. **A Manual for the Preparation of Graduate Theses** can be found under information for *Current Students > Graduate School Publications*, at the website: <http://www.purdue.edu/gradschool>. All arrangements for preparation of the thesis are the responsibility of the student. A copy of the thesis should be delivered to each Advisory Committee member at least 10 working days (typically two weeks) prior to the date of the final examination (defense). A copy should simultaneously be submitted to the Graduate Office for preliminary format review.
- I. THESIS FINAL EXAMINATION (DEFENSE) – The final examination schedule is arranged by the student and processed through the Graduate Office, ARMS 2201A. The Graduate School *requires* final examinations to be **SCHEDULED** at least 10 working days prior to the examination date. Specific final examination and filing date deadlines exist within the University for each academic term; May, August or December graduation dates are the possibilities. Deadlines for the Graduate School requirements can be located at: <https://www.purdue.edu/gradschool/research/thesis/index.html>, as well as on the School of Materials Engineering website.

At least three weeks before the final examination, the candidate must provide the Materials Engineering Graduate Office with the information necessary to complete the Graduate School Form 8 (Request for Appointment of Examining Committee), including the date and time of their defense (as already arranged with their committee), and the names of the members of the Examining Committee (normally the Advisory Committee). The candidate must also provide an abstract of the seminar to the Graduate Secretary. The particular format and procedure for the M.S. and Ph.D. final examination are detailed in Sections V and VI, respectively.

- J. THESIS SUBMISSION – Detailed guidelines on thesis submission, including tutorials and checklists, should be consulted at <https://www.purdue.edu/gradschool/research/thesis/index.html>. An outline of the process is found at this site for completion of the Electronic Thesis Acceptance Form (ETAF), which supersedes the previous process. Upon acceptance by the Thesis Office, you will be notified by a message to your Graduate School Plan of Study.

## V. MASTER'S DEGREE PROGRAMS

- A. OVERVIEW - The Master's programs are designed to guide the students to expand their knowledge base in the field through course work and self-study and to develop analytical and/or experimental skills through a research/design experience. Options of thesis or non-thesis are open, depending on the student's professional goals. The Engineering Professional Education (distance education) division of Purdue University also offers an Interdisciplinary M.S. degree option with a concentration in Materials Engineering.
- B. M.S. THESIS OPTION - The thesis option requires a minimum of 18 credits of coursework (typically 6 courses), 30 credits total of coursework and research (as **MSE 69800 Research MS Thesis**), and an acceptable thesis based on independent research under the guidance of a major professor. The student is aided by an advisory committee of three faculty members, including the advisor(s), in formulating a plan of study. The thesis is expected to meet the high standards of a technical publication and the format requirements of the University. At the end of the program, the thesis is defended by the student in an oral examination and must be acceptable to the examining committee with regard to both its technical format and contents.

The Master's thesis final examination in the School of Materials Engineering normally shall consist of two parts occurring consecutively. The first part shall be a public presentation and defense of the thesis work of twenty to thirty minutes, followed by open question time. The general format shall follow that of the School seminar. The second part shall consist of an oral examination of the candidate by the Examining Committee and will be attended only by the Committee and the candidate. Based upon their opinions formed at the end of this examination, the Committee will recommend (or not recommend) the candidate for the Master's degree and may also recommend (or not recommend) him or her for continued study toward the Ph.D. Recommendation for the degree may be contingent upon further work and/or modification of the thesis document. See Section IV for details of thesis preparation, final examination, and submission procedures.

- C. NON-THESIS M.S. OPTION - The non-thesis option requires 30 credits of coursework, 6 of which may be earned through a project-oriented study (**MSE 59700**) under the guidance of a professor acting as advisor. The project is limited in scope and may be related to specific problems dealing with material selection, processing, design or performance in engineering applications. At the end of the project, the student prepares a technical report, for which the format and general requirements are specified by the advisor. A copy of the approved report should be filed with the Graduate Office.

The non-thesis option would be especially appropriate to industrial personnel who seek an M.S. degree on a part-time basis.

- D. **PROFESSIONAL MASTER'S PROGRAM** - The Professional Master's option requires 30 credits of coursework, including MSE 60000 and two enrollments in zero-credit MSE 691 (or by petition another acceptable Seminar course, such as Engineering Management). A minimum of 6 credits must be Industrial Practice Electives, and up to 12 credits may be Professional Breadth Electives. The remaining courses are expected to be 500 and 600 level courses from the MSE course catalog or from science or engineering disciplines. At least 9 credits of courses with a topical emphasis determined by the student in consultation with their faculty advisor (i.e. materials processing, materials characterization, physical metallurgy, computational materials, etc.). If students elect to take Independent Study projects, these will need to be related to the topical emphasis. A minimum of 18 credits must be in MSE courses. A list of acceptable courses for each of the above categories will be maintained by the MSE graduate committee, published online, and reviewed on an annual basis.

The Professional Master's concentration will not have a thesis/research component and will not have direct articulation to the PhD program. Students who wish to apply to the PhD program may do so at the completion of the Professional Master's and will be required to submit a separate graduate application.

- E. **M.S. PROGRAM DURATION** - No minimum registration time requirement exists for the M.S. program. *No student will be permitted to register for the Master's beyond two years without the prior review and approval of the Graduate Committee.*
- F. **M.S. BYPASS** - Students in the M.S. program, with approval of their advisor(s), may petition the Graduate Committee to bypass the M.S. Degree and pursue a Ph.D. directly before the end of their third semester (including summer). The student should supply a letter to the Graduate Committee Chair with a clear indication of the request to "Petition to Bypass the M.S. Degree" subject to all conditions of the Ph.D. program. A short description of the proposed doctoral project should be included and the student's major professor should also sign the letter. If approved by the Graduate Committee, the student should file a Ph.D. plan of study and will be on a normal course for Ph.D. studies.

## **VI. DOCTOR OF PHILOSOPHY PROGRAM**

- A. **GUIDELINES FOR Ph.D. PLAN OF STUDY** - There are no formal course requirements or any minimum number of required course credit hours, although a Ph.D. plan of study will typically include about 30 credit hours of course work. At least 90 credit hours total is required for the Ph.D., with the balance of any credit hours being research (**MSE 69900**). The plan of study for the Ph.D. may incorporate course work taken previously for an M.S. degree; up to 18 credit hours of coursework that is directly applicable to the Ph.D. plan of study, as determined by the student's advisor, can be included. A total of 30 credit hours, including research credit hours, from an earned M.S. degree can be applied toward the Ph.D. All Ph.D. students must be prepared to demonstrate competence by course credits, self-study, examinations, etc., in mathematics and basic sciences, in materials processing, materials structure and materials properties, as well as in undergraduate course prerequisites to the advanced and graduate level courses in the primary area of the plan of study. The primary

area of the plan of study must provide an appropriate balance of breadth and depth of advanced course study in the major area of Materials Engineering, which includes the area of thesis research. Courses in related areas or “minors” often will be selected from other branches of science or engineering related to the research objective.

The Preliminary Examination may include questions based on this plan and on any part of the course work background of the student.

B. **ADMISSION TO CANDIDACY FOR THE Ph.D. DEGREE** - is based on satisfactory completion of the Ph.D. Preliminary Examination taken by the student. Two failures at attempts to pass the Preliminary Examination and / or General Examination will result in removal from the doctoral program.

C. **PRELIMINARY EXAMINATION PROCEDURES**

1. **Objective** - The objective of the Ph.D. preliminary examination is to determine whether or not the student qualifies for admission to candidacy for the Ph.D. degree. This suitability is determined by demonstrating the following abilities:

- Knowledge – ability to show general Materials Engineering knowledge and deep knowledge of their chosen topic.
- Analysis – ability to understand and analyze scientific and engineering concepts and data, to place them in context, and to show how MSE knowledge and classwork relates to their topic.
- Communication – ability to develop written and oral presentations of high scientific quality.
- Creativity – ability to synthesize new ideas to develop and test hypotheses, identify and probe deficiencies, and determine and propose new pathways of research.
- Reasoning – ability to reason through problems using knowledge, analysis, and creativity.
- Research – ability to conceptualize, plan, and perform original independent research.

2. **Prerequisite** – Students must pass the MSE General (qualifying) Exam before they are allowed to take the Ph.D. Preliminary Examination. Students not passing the General Exam in their first attempt may be allowed to retake the General Exam in the following summer; no more than two attempts are allowed. The MSE General Exam is a comprehensive exam at the level of a general undergraduate MSE textbook (e.g., Callister). It is administered as the Final Exam of **MSE 60000 Fundamentals of Materials Engineering** (each student is strongly encouraged to take this course). After passing the MSE General Exam, the Preliminary Exam should be performed as soon as the student is ready, but no later than the following Fall semester.

3. **Critical Review and Seminar** - In consultation with their Dissertation Advisor and Advisory Committee, the Ph.D. intended candidate selects a subject area for an original critical review paper and seminar. The topic must be related subfield of the dissertation research, and the student is expected to know and understand the topic background, seminal works and/or current hypotheses on the topic at a high level. The paper must

not simply review the literature, but clearly demonstrate the abilities described in the Objectives section (C 1) above.

The student is to prepare a technical write-up (maximum 4000 words\*) that presents an original critical review of background, seminal works and/or hypotheses one or more aspects of the topic. It must be specifically in-depth, not simply an overview. The document should include an additional, separate one page or less of preliminary results (if any) and an additional, separate one page of future plans for dissertation research.

\*The 4000 word limit applies to the text body, and does not include the Abstract, captions, References, or the two additional one-page addenda.

The topic, focus and format of the critical review should be discussed with the advisor, and the document must be seen by the advisor, as acknowledged in writing on the cover sheet, before submission for plagiarism review and to the Examination Committee. A citation method common to the student's field should be used, but must include all authors, title, source, year, and page numbers. Figures should also be individually cited if based on literature or if the figure is reproduced from literature.

The Ph.D. Preliminary Examination (Evaluation) Committee will consist of four members of the student's Dissertation Advisory Committee and be chaired by a member other than the dissertation advisor(s). If the Dissertation Advisory Committee has more than four members, then the most appropriate four will be chosen for the Exam Committee.

By November 15 (April 15 for students starting in the spring semester) of the second year of Ph.D. studies, copies of the Preliminary Examination document are to be submitted by the student to the designated plagiarism check faculty, the Examination Committee, and the Graduate Committee secretary. The document package must include an abstract suitable for publicizing the seminar and the standard coversheet signed by the advisor. Failure to meet this time limit will constitute a failure of the Preliminary Examination.

The designated plagiarism faculty will check the document for plagiarism, and if such is found, will be forwarded to the Examination Committee and will constitute a failure of the Preliminary Exam.

Once the document is approved, no further changes can be made to it and the student can proceed to formally schedule the Preliminary Examination with the Graduate School through the Materials Engineering Graduate Office. The Graduate School requires at least 10 working days prior notice before a Preliminary Exam. The seminar and exam are ideally scheduled on the same day in near-consecutive time (with a 30 minute gap). However, if consecutive slots are not available with the committee, non-consecutive times are allowed. If the Finals week deadline cannot be met due to Examination Committee scheduling conflicts, the student should schedule the Preliminary Examination as soon as possible. Earlier completion is allowed and encouraged. Any Examination Committee member may require postponement if the document is provided less than 2 weeks before the scheduled exam.



The student is responsible for arranging the time of the seminar and oral examination with their Advisory (Evaluation) Committee. The date, time, location and an abstract for the seminar will be publicized by the MSE Graduate Office. Students should make all efforts to establish the day and time as early as possible to ensure room availability.

The student presents the open technical seminar based on the submitted document. The student is expected to answer questions from attendees. The duration for the seminar, including questions and answers, cannot exceed 50 minutes, so the seminar presentation should last 30-35 minutes.

4. **Subject Area (Oral) Examination** - Oral examination by the Evaluation Committee (beginning with a 30 minute review period) normally takes place immediately following the seminar, and as such the student and committee should plan on 3½ hours – 1 hour for seminar and 2 hours for oral exam; again, non-consecutive slots are allowed as Committee schedules dictate. The exam is to explore the student's understanding of basic concepts and principles in several areas of Materials Science and Engineering as they relate to the preliminary exam topic, including the seminar presentation, critical review paper, and the coursework background related to the preliminary exam topic. The Evaluation Committee seeks to assess the student's technical communication, and ability to integrate factual knowledge learned through course work and self-study.

Immediately before the start of the oral examination, the student will receive the initial written examination questions and have 30 minutes before joining with committee members to administer the exam. During this preparation time, the student can use any textbook or notes they possess (electronic or print), but are expected not to access any other on-line content. In the oral exam itself, each examiner will have 15 minutes to administer their own question, without interruption by other members. After all four members have given their questions, each member will be offered an additional 5 minutes to ask follow-up questions about their own or other questions, or any other relevant topic.

5. **Results of the Preliminary Examination** - On the basis of the critical review paper, presentation and oral examination, the Evaluation Committee will recommend to the Graduate School one of three options:
  - i. Admission to Ph.D. candidacy.
  - ii. Re-examination no later than within the following semester.
  - iii. Withdrawal from the Ph.D. program.

If the report is favorable, the student will be considered by the Graduate School as a Candidate for the degree of Doctor of Philosophy. Along with recommendation for candidacy, the Evaluation Committee can specify any possible areas of weakness that need further development with regards to classwork, teaching or self-study.

It should be noted that there is not an automatic progression as a PhD student to the PhD Final Defense – PhD candidates must maintain satisfactory research progress, minimum

GPA, and all rules and conditions that normally apply. As always, two consecutive Unsatisfactory (U) grades in research may be cause for removal from the program.

6. **Time Schedule** – The table below provides an outline of the Preliminary Exam process and associated deadlines.

Timeline to PhD

<i>Semester</i>	<i>Fall start</i>	<i>Spring start</i>
Fall	enter, select Advisor, Qualifying Exam	
Spring	Select Advisory Committee Submit Plan of Study	enter, select Advisor
Summer		
Fall	Prelim Exam (doc. Due 15 Nov.)	Select Advisory, Committee Submit Plan of Study Qualifying Exam
Spring		Prelim Exam, (doc. Due 15 April.)
Summer		
Fall		
Spring		
Summer	Thesis Proposal	
Fall		Thesis Proposal
Spring	earliest defense date	
Summer		earliest defense date

\*Failure to meet the Preliminary Examination deadlines (November 15, 5:00 PM for Fall start) will result in automatic failure of the candidacy exam attempt. Failure to meet other deadlines may also result in the student receiving an Unsatisfactory (U) grade for **MSE 69900**. Two consecutive unsatisfactory grades will result in an automatic review by the Graduate School and possible withdrawal of the student from the Ph.D. program.

- D. **DOCTORAL THESIS PROPOSAL** – During or before their ninth semester, counting Summer semesters, and at least two full semesters before the final defense, the student shall meet with their Advisory Committee to assess progress in the Ph.D. thesis research. The student is responsible for arranging the date and time of the review with their Advisory Committee and scheduling it through the Materials Engineering Graduate Office. The student

should present any critical preliminary work and give a detailed discussion of their current plan for completion of the dissertation research. For students close to completion of their dissertation, a detailed plan of specific work, results, and publications would be appropriate. The materials are distributed to the Advisory Committee at least a week prior to the oral review. The student should also provide to the Committee copies of their publications and drafts of manuscripts in preparation related to the project.

The student should look upon this meeting as an opportunity for an in-depth discussion of the progress of the thesis research, to be able to demonstrate the current state of knowledge in their research area, and allow the committee to provide feedback and raise concerns about issues related to the proposal. The exact format, content and length are chosen in conjunction with the dissertation advisor(s) but typically the student presents for about 45 minutes and the meeting overall is about 90 minutes and is limited to no more than 2 hours. This meeting will fulfill the requirements for MSE 697 (to become MSE 691) which must be taken no later than the ninth semester.

- E. **PhD FINAL EXAMINATION** - The Ph.D. Final Examination in the School of Materials Engineering normally shall consist of two parts occurring consecutively. The first part shall be a public seminar presentation and defense of the thesis work of thirty to forty minutes, followed by open question time, in which the candidate demonstrates to the Advisory Committee the capabilities for which the Ph.D. is awarded. The general format shall follow that of the School seminar. The second part shall consist of an oral examination of the candidate by the Committee and will be attended only by the Committee and the candidate. Based upon their opinions formed at the end of this examination, the Committee will recommend (or not recommend) the candidate for the Ph.D. degree. Recommendation for the degree may be contingent upon further work and/or (most commonly) modification of the thesis document.

The Graduate School requires a finished thesis document to be supplied to the Committee at least 10 working days before the Final Examination. Any member of the Committee can require the examination to be rescheduled if the document, or any changes to the document, are delivered later than this deadline.