PURDUE UNIVERSITY

February 2026

SCHOOL OF MATERIALS ENGINEERING

GRADUATE STUDENT INFORMATION MANUAL

I. INTRODUCTION

This manual is a primary source of programmatic information for graduate students in the School of Materials Engineering. Graduate School policies and procedures are detailed on the website of the Office of the Vice Provost for Graduate and Postdoctoral Scholars (OGSPS).

The School of Materials Engineering is based in Armstrong Hall (ARMS), but operates labs in several other buildings on and off campus, including in FLEX Lab, Discovery and Learning Research Center (DLR), Purdue Research Labs at Kepner, and Manufacturing and Materials Research Laboratories (MMRL). Regardless of your research lab location, all graduate students have an opportunity to get together most weeks during the academic year for *MSE 69000 Seminar in Materials Engineering* in ARMS 1010.

Your main point of contact is Dr. Karen Morgan, who runs the Graduate Office in ARMS 2201A. Most information is maintained on the School website (https://engineering.purdue.edu/MSE), including the MSE Graduate Student Association (MSEGSA) page. Professor Jeffery Youngblood currently chairs the Graduate Committee, which oversee the MSE graduate programs.

II. ADMINISTRATIVE INFORMATION

A. The MAIN OFFICE for the School is ARMS 2300, phone 765-494-4100, (internal extension 4-4100). In case of emergency requiring absence from campus, students should inform their advisor and the Main Office as soon as possible. All students can request a business mailbox in ARMS 2300. Purchased items for research are held in the mail area and need to be signed out when picked up. The departmental mailing address is:

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

Students working in other buildings may find it more convenient to receive business mail and packages in their building.

B. 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, ID card or phone swipe once you are approved for that room. Access to all Materials Engineering laboratories, in ARMS or elsewhere, requires formal safety training and certification. Details about the training schedule and requirements for certification will be provided during orientation week.

C. DESK assignments may be limited. Sharing of desk space or 'hot desking' is often necessary. Advisors whose research is primarily conducted outside of ARMS will usually assign nearby space to their research students.

D. BUSINESS OFFICE services are primarily provided through the *OneCampus* online site: https://one.purdue.edu/. There you will find portals for requesting approval to travel, accessing healthcare and other benefits, reserving research equipment (iLab), and making purchase orders for research supplies.

E. LEAVE requests for research students are made through *OneCampus>Employee Launchpad* and must be approved by the advisor **before** temporary departure from campus, such as for attendance at an out-of-town seminar, conference, or sponsor visit, research duties at any remote location, or vacation, etc. Vacation policy is set by the advisor, consistent with applicable laws and University regulations. In case of emergency requiring absence from campus, students should inform their advisor and the Main Office as soon as possible.

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 ½-time Graduate Research Assistant (RA) appointments, which consists of salary, tuition, most fees and health insurance supplement. Students admitted as "self-supported", such as industry- 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 Ph.D. Thesis* or *MSE 69800 Research M.S. Thesis*. Research credit requirements are 12 during Fall and Spring semesters, 9 during Summer. Students will be evaluated on their progress towards thesis objectives by the grade they receive for this course from their advisor(s) each semester (Section IV.E).

IV. GENERAL PROGRAM REQUIREMENTS

A. MAJOR PROFESSOR(S) AND ADVISORY COMMITTEE – Research students shall, before the end of the first full semester, select a major professor or professors (co-advisors) on a mutually acceptable basis. This process begins during orientation week and typically culminates by October 1. Each student, with help from their advisor(s), shall form an advisory committee before the end of their second semester. The advisory committee consists of at least four faculty members for Ph.D. (three for M.S.), including the advisor(s). Faculty members from other departments at Purdue can serve on MSE advisory committees, provided more than half the committee members have regular graduate faculty certification and at least one is a regular MSE faculty member.

B. LANGUAGE REQUIREMENT – Incoming international students who are not certified in oral English proficiency are required to begin working immediately to satisfy this requirement, which may be achieved 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

C. MSE FUNDAMENTALS COURSE – Entering graduate students enroll in *MSE 60000 Fundamentals of Materials Engineering*, which is offered each Fall semester. This course is based on the well-established undergraduate introductory MSE course, but is more comprehensive. It covers the foundational topics of MSE to prepare students for advanced study in the field. Students must earn a B or better grade in this course to qualify for the Ph.D. Preliminary Exam (Section VI.B).

D. PLAN OF STUDY – The student, in consultation with their advisor(s), shall prepare a plan of study, including the coursework plan and selection of the advisory committee. The plan of study should be appropriate to meet the needs of the student's field. Coursework requirements for the specific degree programs are listed below. The plan of study is prepared and submitted electronically to the Graduate School, after approval by the advisory committee and the Graduate Committee Chair. A complete draft of the plan of study must be submitted in the second semester of study, before registering for the third semester.

E. THESIS RESEARCH – Thesis M.S. and Ph.D. students must register each semester for *MSE 69800 and MSE 69900 Thesis Research*, respectively. Approximately 60 credit hours of Thesis Research are required for the Ph.D. (at least 12 for the M.S.), but research credits do not appear on the plan of study. Students will be evaluated on their progress towards thesis objectives by the grade they receive for this course, Satisfactory (S) or Unsatisfactory (U), from their advisor(s) each semester. Per university rules, before the beginning of each semester, thesis research students should communicate with their advisor(s) with written documentation on the minimum expectations for deliverables (e.g., modeling run, apparatus build, data set collection, draft of paper, conference presentation, etc.) commensurate with the *MSE 69800/69900 Thesis Research* credit hours for that semester.

Receiving a U grade for research requires the student to prepare a plan, approved by their advisor(s), for addressing the deficiencies. The plan, along with the agreed upon deliverables for the next semester, must be filed with the MSE Graduate Office before the first day of classes in the following semester. Two consecutive U grades in failure to meet progress objectives will be cause for removal from the program.

F. ETHICAL CONDUCT (OF RESEARCH) – MSE graduate students should be familiar with and adhere to the **Purdue University Statement of Integrity and Code of Conduct**. 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), before arrival on campus, and attend a 2-hour workshop on RCR: Discipline-Specific Training by the Office of the Provost for Graduate Students and Postdoctoral Scholars (OGSPS). Students should actively engage in discussion of research ethics with their fellow students and research advisors.

G. MSE 69000 GRADUATE SEMINAR – All graduate students are required to enroll in the zero-credit graduate seminar course *MSE 69000 Seminar in Materials Engineering* each Fall and Spring semester. These Monday/Friday afternoon seminars feature mostly outside speakers on a wide variety of Materials topics. Satisfactory/Unsatisfactory grading is based on attending and filing brief reports on a minimum number of these or other Materials-related seminars.

H. ANNUAL PROGRESS REVIEWS – Early in the Spring semester each year all research 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 research, coursework, and possibly teaching in the coming year. First-year students should also use this meeting to complete their plan of study (coursework plan and advisory committee selection).

I. TEACHING – A limited number of teaching assistantships are available for graduate students in the School of Materials Engineering. Depending on departmental needs and availability, and at the discretion of the advisor(s), most Ph.D. students serve at least one semester as a teaching assistant (TA) during their program. During the semester when teaching, appointments will be adjusted typically to include a ¼-time TA, with a corresponding reduction to ¼-time RA. Additional TA appointments may be desirable or necessary but students should not expect extended TA support for their thesis research.

J. THESIS PREPARATION – General information on thesis preparation, including format specifications, is available in A Manual for the Preparation of Graduate Theses on the OGSPS website. All arrangements for preparation of the thesis are the responsibility of the student. A first draft of the thesis should be in the hands of the major professor(s) at least six weeks before the end of the session in which conferral of the degree is expected. A complete copy of the thesis should be delivered to each advisory committee member at least 10 working days prior to the date of the final examination (defense). A copy should be submitted simultaneously to the OGSPS Thesis Office for preliminary format review by the deadline set by the OGSPS.

K. THESIS FINAL EXAMINATION (DEFENSE) – The final examination schedule is arranged by the student and processed through the MSE Graduate Office. The OGSPS (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 for each session; May, August or December graduation dates are the possibilities. These deadlines are published by OGSPS, as well as the School of Materials Engineering.

At least three weeks before the final examination, the candidate must submit a ***Final Exam Scheduling Request Form*** with the MSE Graduate Office, 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. The format and procedure for the M.S. and Ph.D. final examination are detailed in Sections V and VI, respectively.

L. THESIS SUBMISSION – Detailed guidelines on thesis submission, including tutorials and checklists, should be consulted at the OGSPS website. Upon acceptance by the Thesis Office, the student will receive a Deposit Receipt.

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 coursework and self-study and to develop analytical and/or experimental skills through a research/design experience. Options are available for Thesis, Nonthesis and Professional M.S. degrees, depending on the student's objectives.

B. THESIS M.S. OPTION – The Thesis M.S. option requires a minimum of 18 credits of coursework (typically 6 courses), 30 credits total of coursework and research (*MSE 69800 Research M.S. 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). The thesis is expected to meet the high standards of a technical publication and the format requirements of the University.

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 20 to 30 minutes, followed by open question time. 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. 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.

Students in the Thesis M.S. program, with approval of their advisor(s), may petition to bypass the M.S. and pursue a Ph.D. directly, subject to all conditions of the Ph.D. program. Before the end of their third semester (including Summer) the student should supply a letter to the Graduate Committee Chair indicating "Petition to Bypass the M.S. Degree." A short description of the proposed doctoral project should be included and the student's major professor should also sign the letter. If approved, the student files a Ph.D. plan of study and must complete the Ph.D. Preliminary Exam on the same schedule as if they had started in the Ph.D. program.

The Thesis M.S. option must be completed in no more than two years; registering beyond two years requires prior review and approval of the Graduate Committee.

C. NONTHESIS M.S. OPTION – The Nonthesis M.S. 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. Such projects are 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.

The Nonthesis 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 Program (PMP) is a self-funded or corporate-sponsored, 1- to 1.5-year residential program tailored for students pursuing industry careers. It delivers advanced technical education in material science and engineering applications, complimented by business-oriented professional skills. Program requirements include 30 credits of coursework comprised of at least 18 credits of Materials

Science and Engineering focused courses and up to 12 credits of Professional Breadth Electives, including courses offering skills development in the areas such as data analytics, product/process design, project management, engineering leadership, as well as business electives (in partnership with the Mitch Daniels School of Business). The following courses are required for students without prior Materials Science and Engineering background: *MSE 60000 Fundamentals of Materials Engineering* and *MSE 53000 Material Processing in Manufacturing*. Enrollment in zero-credit *MSE 69000 Seminar in Materials Engineering* (or by petition another acceptable seminar course, such as Engineering Management) is required for all students every Fall and Spring semester. All courses must be 500- or 600-level courses from the MSE course catalog or from science or engineering disciplines, with the exception of one 400-level course for the elective offerings (requires approval from the PMP Program Director). If students elect to take Independent Study projects (as *MSE 59700*), these will need to be aligned with the industry applications of Materials Science and Engineering.

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

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 in MSE will typically include about 30 credit hours of coursework and must provide an appropriate balance of breadth and depth of advanced course study. The student should work closely with their advisor(s) to develop a coursework plan tailored specifically to their research area. In addition to MSE courses, courses in other engineering disciplines, sciences, mathematics, and computing may be appropriate. Most advisors will have specific recommendations or requirements for coursework considering balancing the demands on time for research. Planning is required as some courses are offered every other year. Coursework needs may change as the research evolves, and the plan can be adjusted accordingly. The plan of study should be viewed as a tool and not a contract.

The Ph.D. plan of study may incorporate coursework taken previously for an M.S. degree, provided it is directly applicable to the topic of the Ph.D. research, as approved by the student's advisor and the Graduate Committee Chair, and subject to other restrictions. Detailed guidelines are provided by the MSE Graduate Office.

The other main requirement of the plan of study is to designate the advisory committee, which consists of at least four faculty members, including the advisors (Section IV.A). Committee members should be chosen primarily for their expertise in the research area. The advisor(s) will help with recommendations of prospective committee members but the student needs to "recruit" their committee members.

A complete draft of the plan of study, must be submitted online no later than in the second semester, and before registration for the third semester is allowed. Plans must be officially approved by OGSPS before a preliminary exam can be scheduled.

B. Ph.D. PRELIMINARY EXAMINATION

1. **Objective** – The objective of the Ph.D. Preliminary Examination is to determine whether 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. **Eligibility and Timing** – Students must earn a B or better grade in *MSE 60000 Fundamentals of Materials Engineering* to qualify for the Ph.D. Preliminary Exam.* The plan of study must also be fully approved by the Graduate School before the exam can be scheduled and the coursework on the plan should be substantially completed.

   The Ph.D. Preliminary Exam should be taken no later than in the fourth semester, including Summer, i.e., by the end of Fall semester of the second year for students who started in Fall.

   *Students failing to qualify for the Ph.D. Preliminary Exam by grade in *MSE 60000*, with approval of their advisor(s), can have a single chance to qualify by taking a written makeup exam, equivalent to a comprehensive MSE 60000 final, administered by the Graduate Committee.

3. **Format and Procedures** – The Ph.D. Preliminary Examination occurs in three parts, as detailed below. The student writes an original critical review on a topic related to their research and presents a public seminar based on the review. The paper and presentation also include brief updates on research progress and plans. The seminar is followed directly by an oral exam with the advisory committee, covering the critical review paper and seminar, and related MSE knowledge.

   Critical Review and Seminar - In consultation with their advisor(s) and advisory committee, the eligible student selects a subject area for an original critical review paper and seminar. The topic must be a related subfield of the dissertation research, and the student is expected to understand the topic at a high level, demonstrating the abilities described in the Objective section above. More detailed guidelines for choosing a topic are published on the School website.

   The student prepares a technical write-up (maximum 4000 words*) that presents an original critical review of background, seminal works and/or hypotheses on 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 summary of their thesis research results and an additional one-page plan for continuing the research.

*The 4000-word limit applies to the text body, and does not include the abstract, figure captions, and references, or the two additional one-page research addenda.

A citation method common to the student's field should be used, but must include all authors, title, source, year, and page numbers. An unlimited number of figures can be used and, if not original, should be individually cited to the literature source from which they were taken. Detailed instructions for the document preparation and submission, as well as the exam evaluation rubric, are available on the School website.

By November 15 (April 15 for students starting in the Spring semester) of the second year of Ph.D. studies, copies of the critical review document are to be submitted by the student to each member of their committee and to the MSE Graduate Office (Dr. Morgan in 2201A). The document package must include an abstract suitable for publicizing the seminar and the standard coversheet/checklist signed by the advisor. Failure to meet this time limit will constitute a failure of the preliminary examination.

The advisor(s) will designate an exam chair of the committee, who must be a regular MSE faculty member who is not an advisor. If the committee does not include a regular MSE faculty member who is not an advisor then the Graduate Committee Chair will assign an exam chair who will be a fifth, non-examining, non-voting member. The exam chair will check the document for plagiarism, which, if found, will constitute failure of the preliminary examination.

Once the document is submitted, no further changes can be made, and the student can proceed to formally schedule the seminar and oral exam. The student is responsible for arranging the time of the seminar and oral exam with their committee and must submit a ***Request for Scheduling a Preliminary Exam Form*** with the MSE Graduate Office. The seminar and oral exam should take place at the latest during the semester final exam period. The Graduate School requires at least 10 working days prior notice before a preliminary exam can be scheduled. Students should make all efforts to establish the day and time as early as possible to ensure room availability.

The seminar and oral exam are ideally scheduled on the same day in consecutive time blocks, a 50-minute regular class period followed by a 120-minute block. If consecutive slots are not available with the committee, however, non-consecutive times are allowed. If the deadline of the week of final exams cannot be met due to committee scheduling conflicts, the student should schedule as soon as possible thereafter. Earlier completion is allowed and encouraged.

The student presents the open technical seminar based on the submitted document and is expected to answer questions from attendees. The seminar is chaired by the advisor(s), the presentation should last 30-35 minutes without interruption, and the total time of the seminar, including questions and answers, cannot exceed 50 minutes.

Subject Area Oral Examination - Oral examination by the committee normally takes place directly following the seminar. 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 examination topic, including the seminar presentation, critical review paper, and the coursework background.

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 is 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 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 committee can specify any possible areas that need further development. It should be noted that there is not an automatic progression from candidacy to the Ph.D. Final Defense, i.e., candidates must maintain satisfactory research progress and follow all rules and conditions that normally apply.

C. DOCTORAL THESIS PROPOSAL – During or before their ninth semester (by end of third year), 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 meeting with their committee and submitting the partially filled out a ***Request for Thesis Proposal Meeting Form*** to the MSE Graduate Office. The student should present their work to date 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 committee at least a week prior to the oral review meeting. 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, and to allow the committee to provide feedback on 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. The student completes the ***Thesis Proposal Form*** with the comments and suggestions from the committee and submits it by email to each committee member and the MSE Graduate Office for approval.

D. PH.D. FINAL EXAMINATION – The Ph.D. Final Examination (or Defense) 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 30 to 40 minutes, followed by open question time. 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 modification

of the thesis document.

Final exams must take place by the deadline set by OGSPS. A ***Form 8, Request for Appointment of Examining Committee*** is filed through the MSE Graduate Office. 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.

E. PROGRAM SCHEDULE – Milestones and deadlines for the Ph.D. program are shown on the timeline below. Deviation from the schedule deadlines for the preliminary examination and the thesis proposal meeting will be allowed only under extenuating circumstances and must be approved in advance from a written request to the MSE Graduate Committee Chair with valid justification and endorsement of the advisor.