

# Materials Science & Engineering PhD Student Guide

Fall 2026 – Summer 2027

Northwestern University reserves the right to change, without notice, any statement in this publication concerning, but not limited to, rules, policies, tuition, fees, curricula, and courses.

The MSE Department will vote on this new PhD Handbook at the Oct. 2026 Faculty meeting.

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# Introduction and Purpose

## Welcome Note from Department Chair

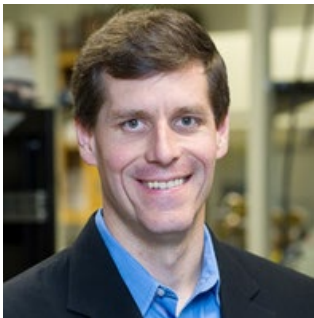
August 1, 2026

DEAR INCOMING GRADUATE STUDENTS,

Welcome to our Department!

This handbook will guide you in your educational and research endeavors in the Materials Science and Engineering Department at Northwestern University. Please read it carefully and refer to it regularly so you are aware of the policies, requirements, and responsibilities herein. As compared to the information provided by The Graduate School, the content of this handbook is more specific to our department. You should also familiarize yourself with the academic policies and procedures of The Graduate School.

We hope your time in the program will be enjoyable, enriching, and rewarding. I look forward to getting to know you and working with you. I am always available to help and support you during your time at Northwestern. Feel free to reach out to me about anything.



**Mark C. Hersam**

*Chair and Professor of Materials Science and Engineering*

## Program Contacts

This section provides a general description of who has responsibility for curricular, admission, financial, and other matters in the program. The most up-to-date list of personnel can be found on the [Materials Science and Engineering website](#).

**Director of Graduate Studies (DGS):** Pr. Ken Shull ([k-shull@northwestern.edu](mailto:k-shull@northwestern.edu))

The DGS oversees the graduate program, advising students on academic matters and assisting with advisor selection and changes. The DGS also monitors academic progress and participates in decisions concerning academic probation and exclusion.

**Assistant Director of Graduate Studies (ADGS):** Pr. Jon Emery ([jonathan.emery@northwestern.edu](mailto:jonathan.emery@northwestern.edu))

The ADGS assists the DGS with oversight of the graduate program, advising students on academic matters and assisting with advisor selection and changes. The ADGS also monitors academic progress and participates in decisions concerning academic probation and exclusion.

**Department Chair (DC):** Pr. Mark Hersam ([m-hersam@northwestern.edu](mailto:m-hersam@northwestern.edu))

The DC is responsible for providing academic leadership, managing faculty affairs, overseeing curriculum and instruction, supporting student success along with the DGS, handling budgeting and resource allocation, coordinating departmental operations, and representing the department externally.

**Assistant Department Chair (ADC):** Pr. Kathleen Stair ([kstair@northwestern.edu](mailto:kstair@northwestern.edu))

The ADC assists the DC with department leadership and also assigns teaching assistant duties.

**Business Administrator (BA):** Marilyn Hall ([mhall@northwestern.edu](mailto:mhall@northwestern.edu))

The BA oversees department financial management, budgeting, human resources, research administration, and overall business operations.

**Program Coordinator (PC):** Thom Bateman ([thomas.bateman@northwestern.edu](mailto:thomas.bateman@northwestern.edu))

The PC coordinates graduate student admissions and onboarding, program logistics, and supervises the program assistants.

**Program Assistants (PA):** Leah Lunstrum ([leah.lunstrum@northwestern.edu](mailto:leah.lunstrum@northwestern.edu)) and Willie James ([wjames@northwestern.edu](mailto:wjames@northwestern.edu))

The PAs aid with administrative aspects of the program, including procedures, paperwork for milestones, registration issues, and other day-to-day operations.

**Financial Assistant / Coordinator (FA):** Laura Olson ([olsonlaura@northwestern.edu](mailto:olsonlaura@northwestern.edu))

The FA handles financial aspects such as stipends and tuition payments.

# Learning Outcomes

**Our Mission** is to lead in the discovery, development, and dissemination of material solutions for society's most pressing challenges.

**Our Vision** is to define the forefront of materials science and engineering by educating and growing an interdisciplinary community of bold, collaborative innovators who provide society with the advanced materials required to improve and sustain human well-being.

Accomplishing our mission and reaching our vision is deeply rooted in our culture, reflected in our three **Core Values**:

**Cultivate Visionary Leaders and Trailblazers** by providing robust foundations in fundamental research experiences and interdisciplinary education that empowers students to collaborate, break boundaries, and take bold risks.

**Enable Scientific Discovery** through investments that strengthen fundamental understanding and expand the frontiers of materials knowledge.

**Accelerate Engineering Innovation** by building convergent interactions and capacity that eliminate barriers between disciplines and incentivize technology transfer.

The Program has defined **Learning Outcomes** to help achieve the objectives outlined in our Program Mission and Vision. Through coursework, research, service and broad engagement with the MSE community, we aspire that each student:

- Demonstrate advanced proficiency in the science and engineering of materials.
- Demonstrate the ability to identify and solve unique and important scientific and engineering problems through research, applying experimentation, theory, modeling, and/or simulation.
- Manage research projects and function on multidisciplinary teams.
- Communicate effectively with both technical and non-technical audiences, including effective networking and self-promotion.
- Show awareness of professional and ethical responsibilities, safety in experimental research, and non-scientific career goals.

The program faculty assesses these outcomes through coursework and research milestones: preliminary examination, qualifiers, annual reviews, and dissertation.

# Program-specific Academic Requirements & Policies

## Coursework Requirements

The Graduate School requires PhD students to successfully complete at least nine quality letter-graded course units (ABC, not P/NP or S/U) authorized for graduate credit. Students must maintain at least a 3.0 cumulative GPA. The full policy is available through [The Graduate School's website](#):

Department course requirements are different for those entering with a BS/BA and those entering with an MS. Regardless, all students start with a requirement of **12 quality letter grade courses** (i.e., 300- or 400-level courses with letter grades). Reduced course loads due to MS degrees and alternative schedules due to waivers are discussed below.

Department course offerings are listed here: [Courses | Academics | Materials Science & Engineering | Northwestern Engineering](#). All courses are also listed on Caesar. While we provide information and reminders about academic deadlines, responsibility for meeting deadlines and degree requirements rest with the student. Academic registration deadlines are also available from the Northwestern University Academic Calendar: [University Academic Calendar: Northwestern Events Calendar](#)

First year fall enrollment will take place during orientation week. In the following quarters, students should discuss their course selections with their advisor and receive approval.

**Please note that each quarter, all students must register for four units of credit.** In the first year, this typically means 1-3 quality letter grade courses, with the balance (for a total of four units) filled by MAT\_SCI 590. So, for example, if a student takes MAT\_SCI 401, 402, and 451 in the Fall quarter in their first year, the student must register for one unit of MAT\_SCI 590. If instead the student only took MAT\_SCI 401 and 402 (it is rare to only take two courses in the Fall term of the first year) they would need to register for two units of MAT\_SCI 590. After completing courses, students must still register for four units of TGS 500 every term until graduation. It's important that students register correctly for classes, or they may lose their full-time student status.

### Course Requirements for Students with MS Degrees:

Students entering with an MS degree from outside Northwestern can count a maximum of five courses towards the 12-course requirement outlined above. To apply a course to the 12-course requirement, a student must:

- Have had the course applied to the MS degree requirements at their previous institution.
- Have received a grade of "B" or better in the course. Pass/fail classes are not allowed.
- Have identified an equivalent course at Northwestern University – one that closely matches in terms of content and credit hours – and attained approval from the ADGS regarding this equivalency. The ADGS will assist individual students in identifying Northwestern courses that

are “equivalent” to their MS coursework. After approval from the ADGS these courses will be added to the study plan in GSP by the PAs.

While students can use 5 courses from their MS to satisfy their MSE requirements, TGS still requires completion of nine units of coursework. As such, we allow students with MS degrees to apply a maximum of two units of MAT\_SCI 499 (Independent Research Project) to reach TGS requirements. Examples are provided during orientation week and one-on-one consulting sessions with the ADGS.

### *Core/Required Courses – Six Units*

These are typically completed in the first year. Special permission from the DGS is required to take Core classes outside of the first year.

- Fall: MAT\_SCI 401, MAT\_SCI 402
- Winter: MAT\_SCI 404, MAT\_SCI 405
- Spring: MAT\_SCI 406, MAT\_SCI 408

### *Elective Courses – Six Units*

Electives are typically completed in the first and second years. Of the six units of elective courses:

- Two must be 400-level MSE courses.
- One must be a 400-level engineering/math/science course in any discipline. This course may be an MSE course.
- The remaining three courses can be engineering/science/math courses of any discipline, either at the 300- or 400-level.

#### Notes:

- Students entering *without* an MS cannot apply 499 to any of the elective requirements above.
- Some 300-level courses are not normally appropriate for PhD students. These include the undergraduate core sequence and some electives (MAT\_SCI 301, 314, 315, 318, 316-1, 316-2, 331, 332, 351, 351-2, 390-1, and 390-2). However, in special circumstances, some of these courses may be appropriate for a individual. If a student is interested in one of these courses, they should contact the ADGS and course instructor for special permission to enroll.
- For the elective courses to apply to the PhD requirements, the content should be new to the student. It should not be a repetition of the coursework completed during a student's BA/BS or MS.
- We encourage students to take 500-level skill-building courses (e.g., SCIMEDIA courses). However, those courses do not satisfy any of the requirements above and would be in excess of the required MSE coursework. Students should consult with their advisors for permission if they are interested in taking these courses.
- Students can reach out to the ADGS with questions about the eligibility of any course for the elective requirements.

## Minimum Course Grade & Average GPA Requirements

For all graded courses, students must obtain at least a C- for the course to count towards the Department's curriculum requirements. The Department also expects students to achieve an average minimum GPA of 3.2 in the six Core courses. While a student with a Core GPA of less than 3.2 will not be excluded from continuing in the program on those grounds alone, their case will be explicitly reviewed by faculty during the Preliminary Evaluation.

## Course Waiver Policy

Any student may appeal to waive a Core course (i.e., MAT\_SCI 401, 402, 404, 405, 406, or 408) if they have previously taken similar coursework and have sufficient documentation proving mastery of the coursework. To receive a waiver, a student must consult with the Core course instructor and obtain their approval for the waiver. Core course instructors have complete discretion in approving these waivers. An instructor may ask for documentation, e.g., text used, course outlines, exam results, problem sets, or they may ask the student to sit for an oral or written examination.

The instructor must approve the course waiver by email with the ADGS cc'd. The course waiver will then be recorded to the student's GSP profile.

Importantly, for students *without* MS degrees, waiving a course does not decrease the total number of courses required — it only excuses the student from the course requested. The course must be replaced with a 400-level science/engineering/mathematics elective.

## Teaching Requirement

Teaching Assistantships (TA) support the teaching mission of the Department as well as provide students with valuable instructional and mentoring experience. All MSE PhD students are required to complete a total of 2 units of teaching assistantship (TA). Each unit is approximately a 10-hr/week time commitment, on average, over a quarter. These units may be split between multiple classes. **Most students complete their TA responsibilities over two quarters, with one unit serving to support one course.** Some students may split that TA effort between multiple courses in a single quarter. Details depend on the course demands and student circumstance.

The ADC assigns graduate students to assist in MSE classes or laboratory sessions. Assignments may vary in the number of units or the tasks required (grading, office hours, assisting in lectures, etc.). TAs may have appointments of 0.5, 1.0, or 2.0 units per quarter.

**TA duties must be performed for courses offered by the MSE Department to count towards the Department's requirements.**

Prospective TAs are strongly encouraged to attend the training sessions offered by the Searle Center for Advancing Learning and Teaching. Students who are particularly interested in teaching may consider enrolling in Searle's Teaching Certificate Program or other Searle teaching programs.

Each quarter, the ADC releases a list of courses in need of TA support and solicits volunteers. Students submit their preferences to the ADC, who makes assignments based on the preferences and needs of students and instructors. Students will not necessarily assist in courses taught by their advisor. Because the time commitment can vary from week-to-week and course-to-course, the Department and cognizant faculty will establish the responsibilities associated with a given course at the time the assignments are being made. To assist in this effort, TAs are required to consult with the course instructor and complete a TA Responsibility Form (distributed by the ADC) prior to the beginning of the course. This form requires instructors to communicate estimated time commitments commensurate with the TA assignment of 10 hr/week per TA unit.

It is the student's responsibility to be aware of the Department's TA requirement and to plan appropriately. While the Department does their best to accommodate TA requests, it can be difficult to find TA assignments for students who leave this duty until the end of their time in the program. Students should contact the ADC (Pr. Stair) if they are within four quarters of graduation to formulate a plan if they not yet served as TA by this time.

At the end of the course, TAs receive CTECs (Course and Teacher Evaluation Council) – student evaluation and feedback on their teaching. Students should review these CTECs and save them for future reference and use.

## Other Coursework and Activities

### *Professional Skills Development*

**Professional Development Seminar:** Students must complete the mandatory Professional Development Seminar series in their third year. This four-part course is offered each Winter. If a student is unable to complete the course in the Winter, they can solicit the ADGS to postpone the course for one year.

## MSE PhD Milestones

An outline of the program's milestones, listed by year, is below. **Importantly**, while TGS and the Department establish baseline requirements for milestones, specific expectations, and subsequent evaluation of academic progress, are the responsibility of the advisor and the Thesis Committee. These are the individuals who guide the student's work and have the expertise to evaluate it. As such, the evaluation of scientific feasibility (qualifier) and merit (MS/PhD) is left to the discretion of the primary research advisor and the Thesis Committee.

| Year in program             | Submitted in GSP                                                                      |
|-----------------------------|---------------------------------------------------------------------------------------|
| Year #1                     | Advisor Placement<br>+ Preliminary evaluation (milestone)<br>+ Annual Progress Report |
| Year #2                     | Annual Progress Report                                                                |
| Year #3                     | Qualifier Exam (milestone)<br>+ Annual Progress Report                                |
| Year #4 until terminal year | Annual Progress Report                                                                |
| Terminal Year               | Thesis and Defense (milestone)                                                        |

## Program-specific Milestone Policies

### *Advisor Selection*

One of the most important tasks for the student after joining the Department will be to meet with potential thesis advisors and decide which may be good matches. It is important for the student to be open-minded and communicate clearly during this process. This helps all parties understand each other's perspectives.

We strive to make the advisor selection process fair and equitable, and we endeavor to find satisfactory placement for each student. **However, we highlight that students need to be flexible when considering what types of research would be suitable and acceptable to them, and students need to be aware that research projects can be unpredictable and dynamic.** The availability of any particular project depends on a multitude of factors that can change over weeks or years.

In some instances, a student may seek a change in advisor. The DGS handles such changes on an individual basis.

Most of the advisor selection process happens in Fall. The schedule and official policies are outlined below. Precise dates for each step in the process will be available on your class's *Canvas* first-year orientation site.

### Advisor Selection – Timeline

- **Pre-matriculation:** Students can reach out to faculty to initiate conversations about group placement.
- **Mid-Sept.:** Student attend faculty research talks during New Student Orientation. Students meet with faculty members, graduate students, and other researchers to discuss group placement.

- **Late Sept./Early-Oct.:** Students submit a non-binding Straw Poll indicating their top-choice for an advisor. All students and faculty are provided with anonymized results of the Straw Poll.
- **Early/Mid-Oct.:** Students submit Advisor Selection Forms listing their top-choice advisor via Canvas. Advisors decide whether to accept the student into their group. Students are informed of their placements. If not placed in this first round, students enter the second round.
- **Nov. 1:** Students who have matched are officially placed in their groups.
- Any student who is not placed in the first round enters the second round. These students will consult directly with the DGS and ADGS to find placement.

Students arriving in Fall Quarter have the opportunity to meet all research-active faculty members prior to selecting an advisor. Most faculty who are accepting new members into their research groups will give 10–15-minute presentations on opportunities in their groups during New Student Orientation. Faculty members who present their work will encourage interested students to contact them for follow-up meetings or invite them to attend group meetings. One-on-one student/faculty meetings are *required* for placement. Students must document all student-faculty meetings on the Advisor Selection Form and submit the form when they make their final selection.

While a student and advisor may verbally agree to placement at any time, **no binding agreements can be made prior to the Department’s official group assignment date.**

Department policy is that PhD students are expected to seek an advisor who is an MSE-affiliated faculty member (i.e., core or affiliated faculty members listed on the [Department website](#)). Students may solicit the DGS for an exception to this policy. The DGS will evaluate the student’s appeal and grant the request, if appropriate.

### **Advisor Selection Tasks and Documentation**

- **Advisor Selection Straw Poll:** Shortly after orientation week, all students are required to list their current top choice for advisor in the “Straw Poll” assignment on *Canvas*. The only person with access to identifiable information in this poll is the ADGS. The ADGS will not share this identifiable information with any student or faculty member. The ADGS will then release anonymized results of the Straw Poll to both students and faculty.

This non-binding Straw Poll provides students and faculty with information regarding student demand for advisors and projects. It helps stimulate conversation about placement between students and advisors. The poll does *not* affect placement in any group; its sole purpose is to provide both students and faculty members with a better understanding of the level of interest in a group prior to the selection date.

- **Advisor Selection Form:** Shortly after the Straw Poll results are released, each student will submit the Advisor Selection Form through *Canvas*. This form informs the DGS of the student’s first choice of research advisor and research topic. The DGS then informs the faculty

of the students who have chosen them, and the faculty makes their selections. Students may be co-advised, in which case there is an agreement between two faculty to share advising roles and funding responsibilities. In most co-advising situations, one advisor plays a more active role in mentorship.

- Adding the Advisor in GSP: After group placement is confirmed, you will need to add your advisor in GSP (Graduate Student Progress system) so they can provide feedback and track your degree progress. Placement is not official if the student has not been accepted by the advisor in GSP.

If no agreement for placement is found in the first round, students enter a second round of selection. This situation is not uncommon — the second round occurs every year. Students that enter the second round of selection work directly with the DGS to match with an advisor.

### **Securing a Primary Research Advisor in the First Year**

Satisfactory academic progress cannot be made without a Primary Academic Advisor and all students must match with an advisor in the first year.

The Department has the following expectations and requirements:

- Students are expected to be accepted into a research group by the end of their first quarter (i.e., the end of Fall quarter).
- Unplaced students are expected to actively engage with the DGS, ADGS, and other faculty to find an advisor in the Fall and Winter quarter. Failure to find an advisor by the end of the second quarter (Winter) will result in a warning of unsatisfactory progress in GSP.
- Failure to find an advisor by the end of the third quarter (Spring) will result in a “re-evaluate” recommendation on the Preliminary Evaluation.
- Failure to find an advisor by the end of the fourth quarter (Summer) will result in a “fail” outcome on the preliminary evaluation (see below).

### **NOTES:**

On occasion, faculty members may agree to advise a student prior to the commitment date of April 15<sup>th</sup>. These placements are called “pre-selects.” These student-advisor pairings are official when the student accepts the offer of admission. These students do not participate in the advisor selection process. All “pre-select” pairings must be approved by the DGS and Chair.

Research Commitment: Once placed in a lab, students are expected to be fully involved in laboratory research under the supervision of their advisor. It is the responsibility of the student to communicate with their advisor regarding the effort required to satisfy research expectations and milestone requirements. It is the responsibility of the advisor to provide continuing and regular feedback to students regarding their progress during their enrollment in the program. This progress is

communicated directly to the student in various ways (orally, email, milestones, annual report), as well as to the DGS through GSP or direct communication.

## Academic Milestones

Academic milestones include the Preliminary Evaluation (Year #1), Qualifier (before the end of the 12th quarter), and Dissertation Thesis and Defense. Each year students must also demonstrate satisfactory academic progress through the Annual Progress Report.

### **The Annual Academic Progress Report**

Students must complete an annual self-evaluation through GSP, as well as update their GSP profile with their accomplishments in that academic year. This Annual Report is due in early Summer Quarter.

Students should fill out the Annual Academic Progress Report through GSP. This includes:

- A one-sentence title summarizing your research topic.
- A numerical self-evaluation rating of the student's academic progress in that academic year. The ratings span from Exceptional (5) to Unsatisfactory (1).
- A narrative statement on progress summarizing the student's academic work in the last year. The details should align with your advisor's expectations and should be between one paragraph and one page.
- A brief summary statement regarding the student's goals for academic/research progress in the coming year.
- A list of teaching assistant activities.
- A list of published books, journal articles, or other publications.
- A list of awards and honors received.
- A list of relevant professional meetings, presentations, and seminars the student attended.
- Any other relevant comments the students would like to be documented.

After the student submits the Annual Report, the advisor will evaluate your progress on the same scale ("Exceptional" to "Unsatisfactory"). If your advisor rates your progress as "Needs Improvement" or "Unsatisfactory", the DGS will initiate communication with both student and advisor. Students evaluated as "Needs Improvement" (2) or "Unsatisfactory" (1) may be placed on program academic probation.

## **The Preliminary Evaluation — Year #1**

Near the end of the 3<sup>rd</sup> quarter (i.e. Spring term, first year) students undergo a Preliminary Evaluation, which is reviewed by the faculty in the June Faculty Meeting. The Preliminary Evaluation considers:

- Placement in a research group, which is required to pass the Preliminary Evaluation.
- Performance in research, as presented in the Preliminary Research Report (see below).
- Advisor evaluation of student progress in the first year.
- Academic performance in the Core courses. The academic progress of students receiving less than a 3.2 GPA in Core courses will be discussed explicitly during the faculty evaluation process.
- The faculty can also consider other factors influencing student progress, including educational background or extenuating circumstances.

The **Preliminary Research Report** is a one-page (not including figures, references, or advisor comments) report and prospectus of the research progress to date. It is not a literature review. This report should be submitted through the New Student Orientation site on *Canvas* by the due date in Spring quarter. The Department will send out reminders during the months leading up to this milestone. The exact format of the Research Report is provided in the *Canvas* assignment.

The student must solicit the advisor for a short (1-3 sentence) statement summarizing their progress and making a recommendation for the outcome of the Preliminary Evaluation. We encourage faculty to provide this statement directly to the student to stimulate discussion of the student's progress, but faculty may also elect to send their statement directly to the ADGS. If the student is provided with the comments directly, they must append the advisor's statement to the Preliminary Research Report in their submission.

There are three possible outcomes from the Preliminary Evaluation:

- **Pass:** The student may continue with coursework and research.
- **Re-evaluate:** The student will be re-evaluated at a time specified by the DGS and faculty advisor. This is typically at the end of the Summer quarter. At this time, the student will either pass, be discontinued, or work with the DGS to explore opportunities in other research groups.
- **Fail:** The student cannot continue to pursue the PhD in their current group. The student may:
  - Consult with the DGS to find another group to join.
  - Apply to transfer their degree path to an MS degree.
  - Be excluded from the program.

The Department will inform students of the outcomes of the preliminary examination either through GSP or email notification from the PAs or DGS.

## *Committee*

Students are responsible for assembling their own Thesis Committee before the Qualifier. Students should reach out directly to potential committee members to ask them to serve. Frequently, the members that serve on the committee for the Qualifying Examination are the same as those that serve on the Thesis Defense. This committee is responsible for evaluating the student's completed and proposed research during the Qualifying Examination.

The committee consists of four faculty members. This includes two or more core faculty members of the MSE Department and at least one faculty member from another department, or a suitable expert in the field of the candidate's thesis from outside the University (external member).

All committee members must hold doctoral degrees, and at least two committee members must be listed as members of the graduate faculty of the University. Faculty members with joint or courtesy appointments can be considered as either internal or external members of the committee, provided that the committee has at least two core MSE faculty members

## *Qualifying Exam / Candidacy*

### **The Qualifying Examination — Typically Year #3**

Admission to the graduate program does not mean that a student is a candidate for the PhD degree. TGS stipulates that students must successfully complete a comprehensive Qualifying Examination to be granted candidacy. Upon completion, the department will recommend to TGS that the student be admitted to candidacy. Upon approval, the student becomes a PhD Candidate.

The Qualifying Examination is an opportunity for the advisor and other domain experts on the Thesis Committee to assess both the student's knowledge in their field, their capability to identify unresolved problems or challenges, and propose viable solutions or lines of inquiry. In addition, it provides an opportunity for formative assessment of a student's writing and oral communication skills.

To maintain good academic standing with TGS, students must pass their Qualifying Examination no later than the end of their 12<sup>th</sup> quarter — typically the Summer quarter of their 3rd year. Failure to complete the qualifier by this time will lead to probation and, if not remedied, dismissal. **It is important to discuss your plans for qualification with your advisor at the beginning of your 3rd year or earlier.**

## Qualifier Requirements and Format

The Qualifying Examination is comprised of two deliverables:

1. A **written research proposal**, and
2. An **oral research proposal presentation**,

both presented to the Thesis Committee (discussed below). These deliverables should persuade the Thesis Committee of the scientific merit and feasibility of the research project. Students use these deliverables to educate and persuade the Thesis Committee that the proposed work is novel and that the student's approach is practical and appropriate. In persuasive proposal writing, the writer must demonstrate the merit of their ideas by demonstrating logic and reason in their approach to investigating the questions of interest.

The **written research proposal** should be a complete but concise report of approximately **7,500 words** of text (not including references or figure captions). This proposal should include:

- **The objectives of the research:** What is to be accomplished?
- **The significance of the research:** What impact the accomplished objectives would have, assuming the research progresses as planned?
- **The literature background:** What's been done by others? This background should provide enough description of prior knowledge for readers to understand what progress is to be made and what makes the proposed work important and useful.
- **A logical action plan:** How will the research be completed? This portion should identify and describe foreseen difficulties as well as plans to overcome the challenges. A brief description of the procedure, which could be theoretical, analytical, computational, or experimental.
- **The student's work to-date:** A presentation of the work completed (i.e. results) by the student to date that demonstrates progress on the thesis research project.

Students are encouraged to base the structure of their written thesis proposal on past outstanding examples of successful proposals as evaluated by the thesis advisor.

The **oral research proposal presentation** is presented to the Thesis Committee and should highlight the most important parts of the research proposal text. These presentations are typically ~30 minutes long with the remaining time (~90 min) reserved for questions, but students should confer with their advisor regarding expectations for this presentation, as these differ advisor-to-advisor.

### Students have the responsibility to:

- Personally contact each prospective member of the committee asking if they are willing to serve.
- Find a date and hour for the research talk that is satisfactory for each member of the committee. The student should reserve a conference room for at least 2 hours. The Qualifying

Examination must be synchronous, and special permission from the DGS is required for committee members to attend remotely.

- Provide the written qualifier document to each committee member at least **ten** business days before the scheduled Qualifying Exam.
- Update GSP and inform the Department staff appropriately:
  - Ensure committee information is entered and up-to-date under the "Committee" tab in the GSP profile.
  - Check to see if their TA milestone (see TA requirements, below) is incomplete or complete (click "Show Profile" then "Milestones"). If it is incomplete but they believe it should be marked complete, contact the PAs with this information.
  - Complete the PhD Qualifying Exam form and the PhD Prospectus forms. The dates will be the same for both forms.

Please reach out to the PAs if you have any questions regarding the tasks listed above.

**Qualifier Outcomes** – The committee will evaluate the Qualifying Examination with one of three possible outcomes.

- **Pass:** The student is now recognized by The Graduate School as a candidate for the PhD degree.
- **Conditional Pass:** The Committee has evaluated the student has passed, with conditions. These can include, for example, revisions to the qualifying document or satisfactory English proficiency. These conditions must be satisfied within specified time limits as defined by the Committee. Once these conditions are met the student is recognized by TGS as a PhD Candidate.
- **Fail:** The student cannot continue work directly towards a PhD either with their current advisor or another advisor. A student who fails the Qualifying Examination will consult with their advisor and the DGS to determine the next course of action, which may include an MS defense.

## *Dissertation/Thesis/Defense*

### **Thesis Defense — Terminal Year**

Like the other milestones, expectations for the Dissertation and Defense are set by the advisor. However, the student must write a dissertation in accordance with the TGS requirements and advisor's expectations, as well as defend their thesis during a Final Examination based principally on work presented in the dissertation. This examination involves a mandatory *open* and *publicized* oral presentation and discussion during the first hour followed by a closed examination with only the committee during the second hour. A conference room should be reserved for three hours. A faculty committee, often but not necessarily the same composition as that of the Qualifying Examination, conducts the examination. The same members normally serve on both committees, but this may not be the case for various reasons (change of thesis focus, retirements, etc.).

## **Students must complete the following steps for their Final Defense:**

1. Contact committee members to set a date and time well at least a month (but preferably much more) in advance. **The Thesis Defense must be synchronous, and special permission from the DGS is required for committee members to attend remotely.**
2. Enter information regarding committee members, date, and title of thesis in GSP at least three weeks before the exam.
3. Contact the PAs or other MSE staff to reserve a space for the Final Examination.
4. Submit the [MSE Student Publication Fill-out Form](#).

*Note: Neither the Department nor TGS have a minimum required number of publications. However, the advisor may set expectations for the number and quality of publications needed to complete the PhD. Students should make sure to discuss these expectations with their advisors.*

5. Receive the advisor's approval that the dissertation is fully proofread and ready to be presented to the committee for review.
6. Present each examining committee member with a copy of the dissertation at least **10 business days** before the examination. The student should directly ask each committee member whether they prefer soft or hard copies of the dissertation. Hard copies can be printed and bound in the Department office.
7. Complete the **Application for Degree** in GSP.
8. Complete the **Request for Final Defense** form on GSP at least **10 business days** in advance of the Defense so that public notice of the presentation can be posted on the board outside the Department office.
9. The deadline for completing the final exam and submitting the dissertation to TGS varies each quarter. This timing affects participation in graduation ceremonies and the conferral of the degree. Consult the timetable on [the Academic Calendar](#) website for exact dates each year.
10. After final approval, submit your dissertation via [ProQuest](#) prior to the published due date for your graduation quarter.
11. Before final departure, return borrowed items (theses, library books, etc.), properly dispose of all research chemicals, and return keys.

## **Request for MS in Primary PhD**

PhD students have the option of completing a thesis-based MS degree (*not* course-based) by completing the requirements listed below prior to their dissertation defense. However, and importantly, the MS degree is a distinct accreditation from the PhD. If a student wishes to receive an MS in primary PhD, the work must be a scholarly work *distinct* from that of the PhD dissertation. In short, **the same original research cannot be included in both MS and PhD theses**. This means that

the Department does not allow duplication of MS content in a PhD dissertation. This aligns with our policy for those coming to Northwestern with an MS degree; those students also cannot duplicate their MS work in the PhD dissertation.

Effectively, the standards for inclusion of MS work within the PhD thesis are the same for MS project work done either at Northwestern or elsewhere. An exception (to be approved by the advisor) may be the inclusion of background and motivation sections from the MS work.

PhD students wishing to receive an MS degree must:

- Consult with their advisor to receive approval regarding their plans to defend an MS thesis.
- Write an MS thesis document in accordance with specifications laid out by the primary research advisor. The advisor will communicate their expectations for an acceptable thesis document. This may simply be a published paper (or a draft of a paper) to be submitted to a journal, or it may look more like a traditional MS thesis.
- Submit the MS thesis to the committee at least **10 business days** before the defense.
- Defend the MS thesis before a committee of at least three faculty members, with at least two being MSE faculty. This committee can be the same as the Qualifier or Thesis Committee. The MS degree must be approved by the entire committee.
- Work with the PAs to make sure that the necessary forms to complete the MS degree are submitted to TGS.

The MS defense may be coincident with the Qualifying Examination, if approved by the advisor. This may (for example) be organized such that the first part of the student presentation presents past work completed as part of the MS thesis, and the second portion is focused on future work proposed for the PhD. The qualifying exam cannot be used retroactively as an MS thesis defense.

### **Use of Generative Artificial Intelligence in Academic Milestone Deliverables:**

The use of Generative Artificial Intelligence (GAI) or AI-assisted technologies in a student's milestone deliverables must adhere to the principles of academic integrity and should be transparent and explicit in how they were used. Authors are accountable for the accuracy of the work and for ensuring that there is no plagiarism. They must also ensure that all sources are appropriately cited and should carefully review the work to guard against bias that may be introduced by AI.

If GAI is used in writing the document, a disclosure statement should be included at the end of the document, immediately before the references, entitled “Declaration of Generative AI and AI-assisted

Technologies in Authorship.” In this section, authors should document their use of AI, including the name of the AI tool used, the purpose of the use, and the extent of their oversight. Basic checks of grammar, spelling, and punctuation need no declaration. AI use in the research process should be declared and described in detail in the methods section, if relevant.

A minimal statement is: During the preparation of this work, the author(s) used [NAME OF TOOL / SERVICE] in order to [REASON]. After using this tool/service, the author(s) reviewed and edited the content as needed and take(s) full responsibility for the content of the published article.

Several tools and use taxonomies are being developed to help identify AI use and draft disclosure statements for a variety of use cases. You may choose one of these tools to prompt you about your usage or to help draft your statement:

- [GAIDeT Declaration Generator](#)
- [AID Disclosure Statement Builder](#)

## Other Information

### *Service Opportunities*

Graduate students engage in department outreach and service roles in various capacities. This includes inclusion in (e.g.) admissions, hiring, curriculum, and community/belonging committees. Student participation is solicited at various times throughout the year. Each committee defines protocols for student involvement. Selection for these roles may proceed through nomination and/or voting procedures managed by committees or centers themselves or mediated by MSSA.

**Listed below are the policies and procedures for involvement in Department service roles.**

- **Admission Committee:** The recruiting of new graduate students is a cooperative endeavor between faculty, students, and staff, overseen by the Chair of the Graduate Admissions Committee. Current graduate students are involved in the recruiting of new students through (1) participation in pre-admissions recruiting, (2) making welcome phone calls to just-admitted students, and (3) working with staff and the Admissions Chair to host the virtual and in-person visits.  
  
The Admissions Committee also invites one or two graduate student representatives to join the first committee meeting. At this meeting, the committee reviews the admissions rubric, updates it if necessary, and discusses the application of the rubric to ensure an equitable process. The student representatives provide feedback and suggestions during the meeting and are also asked to review the application instructions online to ensure that

the language we use is welcoming and inclusive. Finally, the student representatives report back to the general student body when called upon.

- **Hiring Committee:** The Department hires faculty through two modalities: open searches that are advertised broadly and opportunity searches that are not discussed to the MSE community. For open searches, we invite a select number of post-qualifying exam graduate students nominated by their research advisor (with approval of the time commitment and a record of demonstrated maturity and leadership) to participate in a range of activities as part of the department hiring committee, which may include, but is not limited to, the following:
  - Serving as non-voting members of the hiring committee
  - Reviewing and providing feedback on the faculty position description
  - Assisting in establishing an equitable timetable for the search process
  - Assisting in the recruitment of a diverse pool of candidates
  - Developing evaluation criteria and rubrics for evaluating candidates
  - Assisting in the standardization of the Zoom interview process
  - Observing Zoom interviews
  - Providing rubric-based feedback on Zoom-interview candidates
  - Reviewing finalists' cover letters and CVs (appropriately redacted)
  - Reviewing the summary statement of the search outcome for distribution to the MSE community

These select students also have opportunities to meet with candidates over lunch (without MSE faculty present) and provide written feedback based on their interactions and voluntary question and answer sessions. All graduate students can attend open seminar talks given by visiting faculty candidates and provide written feedback to the search committee chair.

- **Graduate Curriculum Committee:** The Graduate Curriculum Committee (GCC) is comprised of the DGS, ADGS, and the graduate core instructors. There are also three student representatives with voting privileges who are selected by their peers in a ranked voting procedure. Candidates can self-nominate or be nominated by their peers. All candidates supply a statement outlining their goals and qualifications that can be viewed by voters. The ADGS administers the election by online poll. Student members have responsibilities including:
  1. Contributing ideas to future directions for curriculum development.
  2. Voting on proposed curricular changes.
  3. Reporting to constituencies.
- **Committee for Community and Belonging:** The Committee for Community and Belonging (CCB) is comprised of a faculty chair (or co-chair), additional faculty representatives (1–3),

a staff representative, a researchers' representative (post-doc or research faculty/staff), and four student representatives (one undergraduate, one MS student, and two PhD students).

The mission of the CCB is to work to:

1. Broaden participation in the department at all levels.
2. Foster a culture that celebrates and supports all members of the department.
3. Support effective pedagogy and mentoring practices.
4. Improve transparency in department decision-making processes.

## *Fellowships*

### **Fellowships and Awards**

All doctoral students within their first five years of study have the opportunity to apply for fellowships to support research and dissertation writing during their academic career at Northwestern. MSE students have a variety of opportunities for awards. Students should apply for McCormick, TGS, and University-level graduate awards and scholarships, as well as external awards. A list of [internal and external awards is maintained by the university](#).

The MSE program also provides a number of awards, scholarships and fellowships:

- **Weertman Fellowship:** The Weertman Fellowship is a departmental fellowship endowed by Julia and Hans Weertman to recognize a student with outstanding scholarly achievement and research promise. This award includes tuition and stipend funding, as well as support for travel and research supplies.
- **Teaching Assistant Award:** The MSE department recognizes outstanding TAs for their service to the department and their students. The award winners will receive an honorarium and recognition for their accomplishments at the annual Hilliard Symposium.
- **Hilliard Honorees:** Senior students are invited to present their research at the annual Hilliard Symposium. Their presentations are evaluated by a panel to determine 1<sup>st</sup>, 2<sup>nd</sup>, and 3<sup>rd</sup> place awards, all of which receive an honorarium.