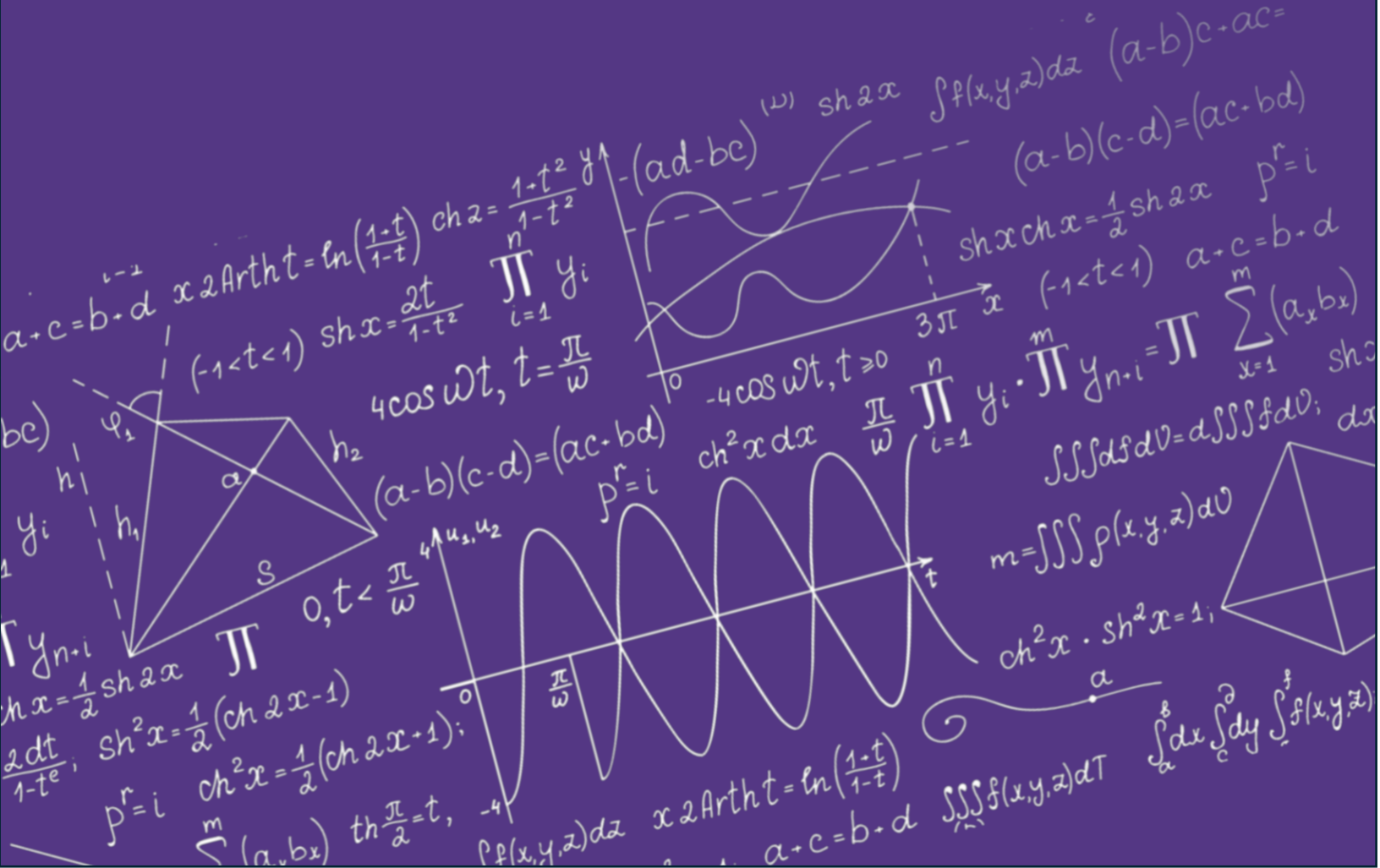
Northwestern | McCORMICK SCHOOL OF ENGINEERING

Engineering Sciences & Applied Mathematics

2025-2026 PhD Handbook



PROGRAM IN APPLIED MATHEMATICS

PhD Handbook

2025-26

January 7, 2026

Dear Graduate Students

Welcome to the PhD Program in Applied Mathematics, your home for the next five years or so. We hope it will be a successful, intellectually engaging, and fulfilling experience.

The policies described in this handbook and the policies of the University and The Graduate School (TGS) set the official guidelines for completion of milestones in this Program. In addition to reading and understanding this document, it is your responsibility to familiarize yourself with TGS and University policies that also apply. TGS maintains useful information on its New Student Orientation website.

A note on terminology before we go further: you are entering as a *pre-candidacy* graduate student in the *Program* of Applied Mathematics. Most of the faculty in the Program are members of the *Department* of Engineering Sciences and Applied Mathematics, which runs the courses and is a part of the McCormick School of Engineering and Applied Science (McCormick). However, your Program is administered by The Graduate School (TGS). Once you pass your oral qualifying exam, and only then, will you be a *PhD candidate*. Finally, after you pass your dissertation defense, you will get a *PhD degree* in Applied Mathematics.

As a PhD student, your position is covered by the Collective Bargaining Agreement between Northwestern University and United Electrical, Radio and Machine Workers of America (NUGW-UE). More information can be found here.

For any questions about the Program or TGS policies, never hesitate to ask your research advisor, the Department Chair, the Program Assistant, or the Director of Graduate Studies (DGS). Please familiarize yourself with the Department homepage, particularly to learn about the duties of the Department staff and how they can assist you.

We look forward to getting to know and helping you achieve your goals!

Hermann Riecke
Department Chair

Alvin Bayliss
Director of Graduate Studies

INFORMATION FOR GRADUATE STUDENTS

Welcome to the Engineering Sciences and Applied Mathematics Department. Please keep and refer to this booklet throughout your years as a graduate student. Every effort has been made to anticipate your questions from arrival on campus through final checkout. You are responsible for knowing this material!

Key Personnel

Throughout this handbook there are references to certain administrative people. Their names and contact information are below.

Title	Name	Email	Phone
Department Chair	Hermann Riecke	h-riecke@northwestern.edu	847-491-8316
Director of Graduate Studies	Alvin Bayliss	a-bayliss@northwestern.edu	847-491-7221
Business Administrator	Noor Kaur	noor.kaur@northwestern.edu	847-491-5586
Program Assistant	Anne Umbanhowar	anne.umbanhowar@northwestern.edu	847-491-3345
Accounting Specialist	Elisa Lindstrom	elisa.lindstrom@northwestern.edu	847-491-3904
Dept. Computing Manager	Daniel Lecoanet	daniel.lecoanet@northwestern.edu	847-491-0000
Safety Coordinator	Petia Vlahovska	petia.vlahovska@northwestern.edu	847-491-8782

Table of Contents

1 The PhD Program

1.1 Mission Statement

The PhD program is designed to provide graduate students with a broad skill set in mathematical modeling and analytical and computational solution methods that will enable them to do original research culminating in a thesis that contributes novel mathematical techniques and/or novel applications of mathematics to current problems of interest to the research community.

1.2 Key Milestones

The key learning objectives and program milestones are shown in the following two tables. While there is some flexibility on the timeline, it is incumbent upon every student to do their best to adhere to the planned schedule.

Quarter	Milestone	Objective	Assessment
By the 1st	For international students: Versant or SPEAK test	Demonstrate English proficiency (international students only)	**Strategy:** Administration of Versant and/or SPEAK test. **Criteria:** Receives a passing score sufficient to TA for an undergraduate discussion section.
2nd	Preliminary Exam (see 3.1)	Demonstrate mastery of core mathematical concepts	**Strategy:** Faculty design written exams to evaluate skills in advanced calculus, linear algebra, differential equations, and complex variables. **Criteria:** Receives a passing score on each exam topic.
By the 9th	Qualifying Exam (see 3.2)	Design an original research project.	**Strategy:** Oral presentation of a proposed thesis research topic to the student's thesis committee. **Criteria:** Research topic is consistent with the Program's mission. Demonstrates mastery of the scientific background of the chosen research topic as well as the mathematical approaches required to complete the proposed research.
11-12 **15-16**	Annual Review (see 3.3)	Demonstrate progress in the research project and the ability to communicate it	**Strategy:** Oral reporting on progress on thesis work. **Criteria:** Demonstrate adequate research progress.

	Fall	Winter	Spring	Summer
Year 1	ES_APPM 405-1 ES_APPM 420-1 ES_APPM 446-1 Research Rotations ES_APPM 498	**Preliminary Exam** ES_APPM 414 Elective Course Elective Course Research Rotations ES_APPM 498	**Select Advisor** Apply for Fellowships Make-up Prelims if required Elective Course Elective Course Elective Course Elective Course ES_APPM 498	Apply for Fellowships Full-time Research
Year 2	Elective Course Optional Courses Research	Optional Courses Research	Select Thesis committee Optional Courses Research	**Qualifying Exam** Research
Year 3	Research Conferences[1]	Research Publications[2]	Research	**Annual Review** Research
Year 4	Research	Research	Apply for Final-year Fellowship Research	**Annual Review** Prepare CV/resume Research
Year 5	Apply for jobs Research	Write Thesis Research	Write Thesis **Defend Thesis**	

1.3 Advisor Selection

One of the most important milestones of a student's first year is the selection of a thesis advisor. The advisor is responsible for helping a student develop an academic plan, identify a research project, and create a research plan. The advisor is also primarily responsible for funding a student's studies. The advisor will also play a significant role in helping a student find the best possible career options following completion of the degree.

The Research Rotations (see below) are a key component of the advisor selection process. In addition, to help students choose advisors wisely, the Program organizes a series of presentations by core and courtesy faculty who have projects to offer that year. In some years, members of other programs may be invited to give presentations as well. All students are required

[1] Start looking for, attending, and presenting at conferences.
[2] Depending on progress, start working on publications.

to attend the presentations. Core and courtesy faculty members are listed on the Department website. Some projects may be part of a larger center or structured as a co-advising relationship.

As students identify interesting research projects, **it is their responsibility to meet with the professor** (or professors), attend group meetings, and otherwise get to know the professor's research group, and to discuss advisor selection with their peers. Students are encouraged to look broadly at all projects on offer. Being actively engaged in the process will help them find a "good home" for the next five or so years and ensure that students are well-known to the professors when it comes time for advisor matching.

RESEARCH ROTATIONS

Each student will conduct independent research with at least two different faculty members before choosing a thesis advisor. This research complements the formal coursework taken during the first year and exposes students to various research areas within applied mathematics. Research Rotations also provide the advisors with an opportunity to evaluate the performance and research potential of the student. These evaluations will constitute a major factor - along with the student's performance in the classes and the prelims - in the Department's decision whether the student can continue in the PhD program after their first year.

To this end, all first-year students must enroll in the Research Rotation courses (ES_APPM 499) in Fall and Winter quarters. More details, as well as a timeline for the steps associated with the Research Rotations, are given in Section 6.1 Appendix Research Rotations. Every effort will be made to match students with their desired research groups for rotations. Still, given the time constraints and possible lack of available open positions in each research group, no guarantees can be made. Notice that students are not permitted to rotate in the same group twice. **Rotating in a research group is neither a guarantee nor an obligation to join that group**.

Students are expected to be fully engaged with their host research group during each rotation, but they are also highly encouraged to meet with and get to know other groups as well. At the end of the research Rotation, students will produce a short report which will be available to all prospective advisors. The faculty advising the Rotation will provide a written evaluation of the student's effort and aptitude for research and will assign a letter grade.

After Spring Break, the Director of Graduate Studies (DGS) will ask to be updated by each student on progress towards finding an advisor. The DGS will work with the students to make the advisor selection process as easy and transparent as possible.

By mid-May, students will be asked for a final ranked list of at least three (3) potential advisors or co-advisors. The DGS will compile the selections from all graduate students, and the Department faculty will match them to open positions in the research groups. Every effort will be made to assign students to their top choices. However, it is essential to note that this is contingent upon the agreement of the prospective advisor.

The Program aims to finalize advisor assignments by the end of May — but will continue to work with individual students to place them with an advisor before the start of the Summer quarter. Since choosing an advisor is so important, students will have the full support of the Department Chair and the DGS throughout this process.

NO COMMITMENT POLICY

It is the policy of the Program that professors will not formally commit to take on a student until the DGS makes final assignments. Likewise, students are not committed to joining any given professor's research group until final assignments are made. This policy is maintained regardless of any prior relationship between the professor and prospective advisee.

CO-ADVISING AND WORKING WITH PROFESSORS OUTSIDE THE PROGRAM

All core and courtesy members of the Department of Engineering Sciences and Applied Mathematics may advise PhD students without special arrangements. See the Department website for a current roster. In contrast, unaffiliated faculty should generally not be considered as prospective advisors unless approved by the Director of Graduate Studies (DGS).

Many students find co-advised projects to be of interest, and it is a strength at Northwestern. Most typically, a collaboration is already in place, but strong student interest in having a co-advisor can also lead to new collaborations. Co-advising between core and unaffiliated faculty members is also possible. When interested in co-advising, **make sure that all parties are aware and supportive of the proposed co-advising arrangement.**

FAILURE TO FIND AN ADVISOR

Finding an advisor is a key milestone. If a student is unable to match with a research advisor by the end of the Spring quarter of their first year, the student is deemed not to make ` satisfactory academic progress' and will be placed on Academic Probation. If a student still cannot find an advisor by the end of the following Fall quarter), the student may be Excluded[3] at the end of that quarter. If the student has completed the necessary course requirements and maintained an adequate GPA, they may be awarded a coursework-based MS degree at that time.

CHANGING ADVISORS

If a student should encounter a serious roadblock in their collaboration with their advisor, they are encouraged to discuss this issue first directly with their advisor. If this does not resolve the problem, they are advised to talk with the DGS or the Department Chair as soon as possible to identify possible remedies, including a change of advisor or exiting the Program. If a student wishes to change advisors they have one quarter – under extenuating circumstances two quarters – to find a new advisor.

[3] Exclusion is a situation defined by the TGS. See section 6.

2 Program Requirements

2.1 General PhD Degree Requirements

The Graduate School (TGS) sets the general PhD degree requirements as specified on the web site TGS PhD Degree Requirements.

2.2 The Graduate Student Tracking System (GSTS)

Students are expected to maintain their current information in the Graduate Student Tracking System. The GSTS allows students to track their progress and activity in one place. Students log in with their NetID and can use the tool to communicate with their Program about their plan of study, coursework, milestones, and annual progress.

All students must enter and update a course plan within GSTS so that the DGS can approve or further discuss course plans as needed. Under normal circumstances, a student should plan to complete 12 courses, including the two Research Rotations, in their first three quarters. Delaying more than one elective until the second year should not be done without explicit approval from the DGS. **Be aware that failing to register on time for any quarter may delay a student's paycheck. This includes summer quarters when students only register for research.** Guides to GSTS can be found here.

2.3 Course Requirements

Graduate students holding BS or BA degrees in applied mathematics or related fields must complete thirteen (13) full-credit courses according to the distribution below, including two (2) Research Rotations courses. In addition, several other requirements are managed through the Registrar (see below). Students entering with relevant prior graduate coursework, such as an MS in Applied Mathematics, should check some of the subsections below.

Most courses taken by PhD students will be graded, and no credit-carrying ES_APPM graduate courses are open to registration under the P/N (Pass-No Credit) option. A student will be placed on Probation at the close of any quarter if their overall grade point average is below 3.5, and failure to improve may lead to Exclusion by The Graduate School**.** GPAs are calculated according to the following scale:

A = 4.0	B+ = 3.3	B- = 2.7
A- = 3.7	B = 3.0	C+ = 2.3

and will appear on graduate student transcripts.

The PhD program in Applied Mathematics requires successful completion of the following coursework:

Four core ESAM courses
ES_APPM 405-1 Data Science and Statistics
ES_APPM 414 Differential Equations of Mathematical Physics[4]
ES_APPM 420-1 Asymptotic and Perturbation Methods in Applied Mathematics
ES_APPM 446-1 Numerical Solutions of Partial Differential Equation

Two Research Rotation courses
ES_APPM 499

Seven approved elective 3XX or 4XX courses
At least four (4) ESAM courses
At most three (3) other courses

STUDENTS WITH GRADUATE CREDITS & WAIVING COURSE REQUIREMENTS

Students entering with an MS degree in Applied Mathematics must complete at least eleven (11) graded academic courses at Northwestern. They can petition to have the courses they have taken during their MS study counted against the core courses or other subjects. These petitions are to be directed at the DGS and the Department Chair; their approval will be based on the presentated supporting documentation, e.g., text books used, course outlines, lecture notes, exams, etc. In some cases, students may be asked to take an exam to demonstrate they have mastered the course material.

If an exemption is granted, a signed waiver form should be returned to the program assistant to be placed in the student's file. Should a waiver be granted, the student must choose an approved replacement course.

Students entering with an MS degree from ESAM must take any core courses that were not taken when earning the MS degree. **Notice that all other requirements must be satisfied** (in particular, the completion of 13 full-credit courses including two research rotations)**.**

ELECTIVE COURSES

In addition to the four core ESAM courses listed above, students successfully complete seven (7) elective courses. Up to three of the elective courses can be in any department in engineering, mathematics, or the sciences designated as approved Graduate School courses, subject to the approval of the DGS. The remainder of the elective courses must be taken within the ESAM department unless a request to vary from this requirement is approved by the student's research advisor and by the DGS. It is recommended that students seek input from their prospective thesis

[4] During New Student Orientation week, students must meet with the DGS to determine whether they have a sufficiently strong background to enroll in ES_APPM 414 or whether they are required to enroll in ES_APPM 314 in the Fall.

advisors when choosing the elective courses. Any courses taken for the PhD must be an extension of the student's background rather than a repetition of work done as an undergraduate.

2.4 Additional Requirements and Situations

COLLOQUIUM

The weekly departmental colloquium is an integral part of the education provided by the PhD program; all students are therefore expected to make every effort to attend all offered colloquia throughout their graduate studies. In the Fall, Winter, and Spring quarter of their first-year, students must enroll in the 0-credit course ES_APPM 498 *Advances in Applied Mathematics Research* associated with the colloquia.

RESPONSIBLE CONDUCT OF RESEARCH

Responsible Conduct of Research (RCR) training is required by the Graduate School of all first-year graduate students and consists of two parts. The first part is GEN_ENG 519: Responsible Conduct of Research for Engineers. The second is a CITI online course. To be considered in good standing within the PhD program, both requirements must be completed by the deadlines indicated below.

Completion deadline	Course	Description
1st quarter	CITI Online Course	The CITI course comprises 9 common core modules. A core of at least 80% is required on accompanying quizzes to obtain a passing grade. Information on setting up a CITI account can be found at RCR Web-based Training: Getting Started The CITI online completion certificate should also be emailed to the program assistant upon completion of the course.
End of 3rd quarter	GEN_ENG 519 Responsible Conduct of Research	GEN_ENG 519 is a five-week course that meets weekly for three hours. The course is offered twice every academic quarter (Fall through Spring). Students should enroll in GEN_ENG 519 through Caesar during the regular course registration periods. Students must earn a satisfactory grade (S).

ACADEMIC HONESTY

All students are expected to adhere to the TGS Standards of Academic Integrity. Students are strongly advised that originality is essential in all homework, projects, exams, theses, etc. associated with graduate work. Students are required to do their own work. Ideas, data, or word-for-word quotations taken from others — including the work of fellow students and other group

members as well as web sources and AI systems like LLMs — must be appropriately referenced; otherwise, this will constitute plagiarism.

The following statements should help define what is meant by "appropriately referenced":

a. All ideas, data, mathematical expressions, and word quotes taken from the works of others should be clearly and directly attributed to the original author. This is best accomplished by listing a reference number after the material, with the numbered references appearing at the end of the manuscript.
b. Word-for-word quotes must have quotation marks at the beginning and end and be referenced in the manner described above.
c. Photocopied figures should be referenced as described in **a** above.
d. Redrawn figures or plots made from other people's tables of data can be appropriately labeled "after Name [ref number]."
e. Every person should receive proper recognition for contributions made.

Note that group collaboration on homework assignments is at the discretion of the instructor. Unless otherwise stated, students are expected to turn in their own original work. AI guidelines are determined by each course's instructor.

Per Graduate School regulations, "All cases of alleged academic dishonesty involving students of The Graduate School are to be referred by members of the faculty to the Dean of The Graduate School" as well as the Associate Dean of Graduate Studies of McCormick. A student found guilty of academic dishonesty runs the risk of being dismissed immediately from the graduate program.

TEACHING

All students in the PhD program are required to serve in some instructional capacity for at least one academic quarter. This may include, but is not limited to, serving as a full-time or reduced-time teaching assistant. Most students complete their teaching requirement during the second year of their studies.

Students are required to enroll in GEN_ENG 545 (reduced TA duties) or GEN_ENG 546 (full TA duties) as appropriate. Failure to do so can jeopardize their ability to graduate.

LANGUAGE PROFICIENCY

International PhD students must fulfill The Graduate School's English Proficiency Requirement, which establishes a minimum level of spoken English proficiency. All PhD students whose prior degrees were not in U.S. schools or from certain exempted institutions must demonstrate proficiency in spoken English before they can be appointed as graduate or teaching assistants. This requirement must be fulfilled by the end of Spring quarter of the first year of study for the student to maintain good academic standing. Failure to meet the requirement may result in dismissal from the PhD program at the end of Spring quarter of the first year.

Students needing to demonstrate English proficiency will be contacted directly by the Program or by TGS. Versant test sessions are held on the Evanston campus each year in early September. For

information about English language tutoring resources see, e.g., English language support services and English Learner Resources. Additional information is available during TGS's New Student Orientation.

LING 380 and 381 are recommended for students who do not initially pass the Versant test or may be required for students with low scores. Another course, LING 480, addresses common situations encountered while being a teaching assistant, and a passing performance in LING 480 will fulfill the English proficiency requirement.

3 Key Events

3.1 Preliminary Examination

Student preparation for the PhD Program in Applied Mathematics is likely to vary across undergraduate institutions and program focus. Thus, students may differ in their preparedness in the core mathematical fields necessary for the PhD program. To demonstrate sufficient mastery in these areas, students need to pass four Preliminary Examinations on advanced undergraduate material successfully.

To give students time to fill in possible gaps in their background, these examinations are offered at the beginning of Winter quarter. Thus, to remain in good academic standing in the PhD program and to continue into their second year of study, a student must demonstrate mastery in

- advanced calculus
- linear algebra
- ordinary differential equations
- complex variables.

As an alternative to taking the exam on complex variables, students can also opt for taking an approved course in complex variables (either ES_APPM 312 or Math 325), in which they must earn a grade of B or better.

Students who do not pass the exams in calculus, linear algebra, or ordinary differential equations in the first round can retake the exam at the beginning of Spring quarter. No retake of the complex variable exam is offered.

Students who are unable to complete all four examinations successfully but otherwise satisfy all the requirements for an MS degree, can be awarded an MS degree at the end of Spring quarter, but are not permitted to continue in the PhD program beyond the Spring quarter.

The exams will be given as four separate 2-hour closed-book exams, scheduled so that they do not conflict with first-year courses offered by the Department. Sample exams from previous years as well as a list of textbooks that cover the topics will be emailed to each entering PhD student before the start of the Fall quarter. Sample exams are also kept in the department office.

Students who require additional time should contact the AccessibleNU office as early as possible, preferably before the start of the Fall quarter.

3.2 Qualifying Examination

Students entering the Program with a BS degree or an MS degree from outside ESAM must pass the Qualifying Examination by the end of their 8th quarter in the Program. Students entering with an MS degree from ESAM must take the exam by the end of their 4th quarter in the Program. Students are encouraged to take the examination earlier, if possible. Exceptions for extenuating circumstances must be made by petition to the Chair and signed by the student's advisor.

THESIS COMMITTEE SELECTION

The Qualifying Examination and the Doctoral Thesis are evaluated by a group of faculty members known as the thesis committee. The thesis committee is made up of the Chair, who is the thesis advisor or one of the co-advisors, and at least two additional members. At least two members must have a core appointment in the Department. Note that it is possible to have committee members who are not part of the Northwestern University community, such as collaborators at other universities, national laboratories, or in industry.

Students should consult with their advisor(s) about who should serve on the committee. Committee members become more familiar with the student and the research than other faculty in the Department, and they may be able to provide scientific and career advice as well as letters of recommendation. Once the student develops a list of potential committee members, the student should secure their participation by email or in person, then fill out the relevant Section in GSTS and the corresponding form in the Student Enterprise System (CAESAR).

EXAMINATION PRCEDURE

The precise nature of the examination is decided by the research advisor in consultation with the other members of the committee. The examination will be oral and will be conducted by the student's approved thesis committee. It can include a brief presentation of the proposed thesis research project, along with questions drawn from course material relevant to the project. The student must identify, in consultation with the research advisor(s), at least three graduate-level ESAM courses that are most relevant to the proposed project. The list of courses must be approved by the committee prior to the examination, and the student is expected to be able to answer questions based on those courses.

Students are responsible for:

- Personally contact each member of the committee to find a date and time satisfactory to each one. Reserve a conference room for at least 3 hours.
- Complete and submit both the PhD Prospectus form and the PhD Qualifying Exam form on GSTS.
- Enter the names of the committee members in GSTS under the Committee tab and identify their role as Qualifying Exam Members.

The possible outcomes for the qualifying examination are:

- **PASS:** The student is now recognized by the Graduate School as a candidate for the Ph.D. degree.
- **FAIL with the option to retake**: The Qualifying Examination Committee determines the student has not performed satisfactorily on the exam, but well enough to have an opportunity to retake the Qualifying Examination later. The retaken Qualifying Examination must still be successfully completed by the end of the twelfth quarter for the student to continue in the PhD program.
- **FAIL:** The student cannot continue in the Ph.D. program and will be excluded. A student who fails the Qualifying Exam may consult with their advisor and the Department Chair to determine the best course of action following this result.

3.3 Annual Review

The Graduate School requires doctoral programs to conduct annual academic reviews of all students enrolled in their Program. As part of this review, PhD candidates must schedule an annual meeting, during the Spring or Summer quarter, with their thesis committee to discuss and receive feedback about their research progress. The annual review after the second year is replaced by the qualifying exam.

In preparation for this review, the student must provide all the information requested under the **Academic Progress** tab in GSTS, which constitutes their progress report. During the review meeting, the student presents to the thesis committee:

- a narrative description of their progress over the year and of their project as a whole,
- an update of awards, presentations, publications, and other work products,
- a plan for the following year.

As a guide, the presentation should last approximately 20 minutes, followed by questions and discussion.

The progress report and plan must be approved by the research advisor prior to the annual review. This progress report is required for all TGS programs and is akin to an 'individual development plan', as required by many NIH programs. Advisors may use additional methods of progress review at their discretion, and students are encouraged to discuss progress with their advisors frequently.

After the meeting, in the box labeled Annual Meeting, students must state the date of the meeting and give a summary of the feedback received from the committee. Once the summary is reviewed by the advisor(s) and given their approval in GSTS, the Director of Graduate Studies will do a final review and submit your report to the Graduate School. Annual reports must be completed by the beginning of Fall quarter.

If a student is expected to graduate by the end of December in a given year, the annual report for that year must still be completed by the end of August. In that case, it may consist of a simple acknowledgement by the student and advisor that the thesis will be completed within the next quarter. However, should the thesis not be completed in time for December graduation, then a full annual report must be completed by the end of January. **Failure to complete an annual report will result in the student being considered not in good standing and can result in loss of funding and/or dismissal from the Program.**

In addition to the annual review, there are two additional tasks to be completed in GSTS. First, students must also complete/update the information in the Research Project tab in GSTS, ensuring it is current and reflects any changes from the previous year. Second, students must sort the courses listed in the Unassigned list into the correct categories under the Plan of Study Tab.

INSUFFICIENT PROGRESS
An annual report showing insufficient progress is grounds for a student being placed on Probation. The student has then two quarters to show 'satisfactory academic progress,' and if adequate progress is not made, the student may be Excluded. In rare instances, the Department will reserve the right to Exclude a student immediately following an annual report that demonstrates completely inadequate progress.

3.4 Dissertation & Thesis Defense

Peer review is one of the essential mechanisms by which relevance to the research field is determined. Thus, as part of demonstrating a student's independent contribution to the field, it is expected that the students will have published one or more items in the peer-reviewed literature before the date of the thesis defense. The committee may have additional expectations.

A student's dissertation is the document detailing the work they have completed for their thesis. In their dissertation, a student must demonstrate the relevance of their work to the greater scientific enterprise, place their work in the context of both its narrow and broader fields, and describe their results and demonstrate their technical validity. Finally, a student must detail the conclusions they draw from their results, and how those conclusions advance the field.

The exact structure of the dissertation, including length, citation format, use of figures, etc., is field-dependent. The student must find out what is accepted practice from their advisor and from prior students in their research group and in related groups. Some specific formatting guidelines are given by TGS and must be followed (title page, margins, pagination, etc.).

The defense is the final presentation given to the thesis committee. Students should prepare a presentation that would last about 45 minutes if no questions were asked. Depending on the committee's preferences, they may either interrupt the student during the presentation or reserve all questions for the end. The faculty will ask broad and specific questions related to the student's

research, and the student should typically schedule a two-hour block with the committee for the defense, unless otherwise directed by the Chair. During the dissertation defense, questions may be asked about anything in the presentation, thesis, or entire body of work. The committee seeks to understand each student's unique, substantive contribution to new scientific understanding, which is the purpose of the PhD. The typical defense will include both a public and a closed period.

After the defense, the committee will meet privately to evaluate and collectively decide whether to award the PhD. It is important to remember that the decision is made collectively by the committee, and not solely by the advisor(s).

All requirements, including a successful thesis defense, for the doctoral degree must be met within nine (9) years of initial registration in a doctoral program. However, financial support beyond five (5) years is contingent upon sufficient progress as well as the availability of funding from the advisor. Substantial delays beyond 5 years can indicate a lack of 'satisfactory academic progress,' as per TGS policy, potentially leading to Probation and eventually Exclusion.

3.5 Graduation Deadlines

The Graduate School offers quarterly graduation for graduate students. Students working towards an MS or PhD degree may be awarded the degree in Fall, Winter, Spring, or Summer, assuming all work is completed before the published deadlines. It is imperative that students abide by these deadlines, as they are set by TGS and cannot be moved. Deadlines for graduation and for participation in the ceremonies are posted on TGS's main calendar.

Students must be continuously enrolled until all graduation requirements are met. In some cases of off-cycle graduation or missed deadlines, a student may need to register for TGS 512 'continuous registration' at their own cost (currently ~$100), even after they have completed all degree requirements and are not drawing a stipend. Graduate program staff work with students in such a situation.

Departing students must fill out the PhD exit survey and the Survey of Earned Doctorates from the TGS website, return all keys, and, depending on circumstances, cancel Northwestern health insurance or reconcile items with payroll. **Many research groups will have specific exit protocols that must be followed, including sample archiving and data management.**

Students are directed to consult their advisor and the Program Assistant to make sure that all exit requirements have been met.

4 Program Policies

4.1 Teaching

When teaching, students may be given a full TA assignment (100% of non-academic effort) or a partial assignment. Before the quarter begins, students should meet with the course instructor to clarify time and effort expectations. Student input is sought when TA positions are assigned, but a student cannot be guaranteed a particular position.

In quarters that a student is acting as a TA, they must sign up for GEN ENG 545 or GEN ENG 546 depending on whether they have a partial or a full TA assignment. Each of these courses is a zero-unit course and registration is required for tracking purposes. Failure to sign up for these courses could jeopardize the student's ability to graduate.

Every year, a faculty committee uses CTEC scores and nominations by faculty or students to select a graduate student who performs their TA duties outstandingly. The winner receives a plaque and a cash award.

4.2 Transfer

The MS program in Applied Mathematics is structured as a terminal degree. MS students cannot apply as a new student for any Northwestern PhD program and cannot initiate a transfer request on their own. In rare circumstances, a faculty member can initiate a request for transfer to a PhD program on behalf of a current MS student. Faculty members are directed to speak with the DGS for further details.

If a student is interested in leaving the PhD program for any reason, they are urged to contact their research advisor or the DGS as soon as possible so that concerns may be addressed and that an appropriate plan may be made.

4.3 Salary and Benefits

Up to and including their fifth year, all students in the PhD program who are making satisfactory academic progress and meeting progress milestones receive financial support, which includes a stipend, full tuition, and health care premiums. In the event of any lapses in payment of stipend, tuition, or health care premiums, the student should immediately notify the Department

administrator. Up to and including their 5th year, students should not pay for tuition or health premiums themselves.

If a student takes a leave or is suspending their stipend (e.g., for an external internship), it is incumbent upon the student to notify the Department office well in advance so that proper arrangements may be made and pay gaps can be avoided.

In addition to this financial support, TGS and the University provide several forms addressing additional assistance, such as childcare grants, childcare fee assistance, or emergency loans.

Further information may also be found in the Collective Bargaining Agreement.

4.4 Vacation Time, Accommodation, and Leaves

Nearly all PhD students, including those with external fellowships such as the NSF Graduate Research Fellowship, receive financial aid through the University via Research Assistantships, Fellowships, or Teaching Assistantships. As such, students are entitled to staff holidays. See the Human Resources calendar for a complete list of dates.

PhD students funded by RAs or TAs do not share the same vacation schedule as an undergraduate or self-funded graduate student. Their vacation and personal days are regulated by the Collective Bargaining Agreement.

Students should take a Leave if they require time away from the University longer than possible with reasonable vacation or sick time. The Program follows TGS policy with respect to Parental Accommodation and for Personal, Medical, or Family Leave. In addition, the Program will work with students and TGS to develop other reasonable accommodations that may be needed. Please initiate any official requests for accommodations through AccessibleNU.

Further information may also be found in the Collective Bargaining Agreement.

4.5 Fellowships, Internships, and Professional Development

FELLOWSHIPS
There are several external and internal fellowships for which students should consider applying. These can increase the stipend, open up new opportunities for flexibility in research, and can be quite prestigious. TGS maintains pages on available opportunities, but students should also seek advice from their advisor or the DGS. Preparing application narratives for marquee fellowships is supported by the Office of Fellowships.

Early-career, external fellowships are offered by the U.S. Department of Energy, National Science Foundation (GRFP), Department of Homeland Security, Environmental Protection

Agency, and the Department of Defense (NDSEG). Prestigious awards administered by private foundations include the P.E.O. Foundation, the Hertz Foundation, the Link Fellowship, the ARCS Foundation, the Soros Fellowships, the Ford Foundation Fellowships, the GEM Fellowship, the American Physical Society, the American Chemical Society, and many others. Be aware that the eligibility for these awards is not uniform; e.g., some of them require the applicant to have U.S. citizenship.

Students are expected to apply for at least one of these external fellowships in their first or second year.

Internal fellowships include the Ryan Fellowship (nanoscience), the John Nicholson Fellowship (basic sciences and engineering), and the Presidential Fellowship (University-wide, terminal-year fellowship). These and other fellowships are highly competitive and require nominations, which will be solicited periodically by the Department or the research advisors.

Training grants are also available at Northwestern University, and the Program is currently closely affiliated with some programs. These grants can support the studies of selected graduate students for 2 to 5 years. Typically, applications are requested from first- and second-year students during the Spring quarter. To be eligible for one of these training grants, students must participate in a rotation in one of the member research groups, in addition to other events. Note that these fellowships are highly competitive, requiring students to have performed at a high level in their coursework and research to be competitive. Even if a student does not apply for or receive a fellowship, they should make themselves familiar with the training grant activities, as those can enrich the graduate school experience and lead to contacts across the University.

TGS offers a **Conference Travel Grant** and a Dependent Care Grant, subsidized by the Department, which can be used to subsidize travel (and affiliated dependent care expenses) to a conference or other form of professional development.

INTERNSHIPS

Some students, with the support of their advisors, may find internships within industry, the national laboratories, or in the Federal government, such as through the Mirzayan Fellowship. Internships that involve time off campus are collectively managed through the Crown Family Internship. These experiences are best suited for the middle to latter stages (e.g., 3rd year) of PhD study, after candidacy. These 3- to 6-month, full-time internships are generally paid positions. It is expected that this experience will not require additional time to complete degree requirements. See McCormick's Crown Family Internship website for more details.

Students **must** discuss an internship well in advance (years, potentially) with their research advisor. Prior to the internship, students will need to complete an application for the Crown Graduate Internship Application and register for CRDV 510. This is critical, as it is required in order to maintain continuous enrollment and health insurance benefits.

PROFESSIONAL DEVELOPMENT

PhD students are allowed opportunities for professional and academic growth, including those outside the Program. However, external opportunities should be discussed with the student's advisor before embarking upon them. Any program involving significant time away from research **must** be discussed with the research advisor. These include:

- TGS-run workshops on fellowship writing and presenting one's work. These include writing bootcamps, a fellowship workshop, and the Research Communication Training Program (RCTP).
- Other opportunities for professional development within the PhD program include joining a committee of the graduate student governance, participating in one of many outreach activities, acting on the retreat committee or other departmental committees, or becoming more involved in laboratory management. These activities are performed on a volunteer basis.
- Kellogg's popular and highly selective Program called Management for PhDs. Kellogg also frequently offers courses to the wider NU community on their Facebook page, if space remains after the business students finish enrollment.
- Several programs are in place to support graduate students in carrying out part of their work at the national laboratories of the U.S. Department of Energy, the National Institute of Standards and Technology, or in foreign countries (DAAD, BAEF, etc.). Other fellowships help students get access to specialized resources, such as supercomputing time. Students are urged to consult with their advisors about such opportunities.

4.6 Conflict of Interest

Our Program follows the conflict of interest and conflict of commitment policies of the University. Students are directed to Northwestern's Conflict of Interest Office and Office for Research Integrity. While students are not generally required to make the conflict-of-interest statements that are required annually of faculty and staff, participation in research carries certain obligations. All students should be aware of TGS and University general policies, as they can become significant if a student is involved in developing intellectual property or a company while at Northwestern, and in the student's future career. We discuss two specific areas of attention next.

STUDENT ENGAGEMENT IN FACULTY ENTERPRISES

Numerous faculty members actively consult or have developed companies based on their research. There is a specific policy from the Conflict of Interest Office to which students should refer if they are asked to engage in research or any other work related to such faculty activities, if it is outside the scope of a sponsored research agreement. Specifically, students cannot be coerced to perform any work that does not promote educational and professional growth or prevents satisfactory academic progress.

EFFORT COMMITMENT

Most students performing research with faculty in the Department do so under the umbrella of "sponsored research." Sponsored research can include federal or state government support, support from private foundations, or support from companies. Students receiving federal fellowships (e.g., the NSF Graduate Research Fellowship) are under the same guidelines. Sponsored research requires a commitment of effort, typically 100%, except in very special cases. This 100% effort commitment requires that any outside scientific, professional, or business activities involving more than a trivial amount of time must be monitored and should be closely aligned with their research or educational development. Any activity that interferes with this 100% obligation is a conflict of commitment. Potential conflicts of commitment include any paid employment, engaging in startup activities (even if unpaid) unrelated to research or a class, self-employment, or work as an independent contractor. The latter classes of conflict could include activities like managing a high-volume Etsy account or extensive driving for Uber.

TGS requires the Graduate Student Permission to Work Request Form when external activities exceed thresholds of time or compensation (see TGS guidelines for more details). Regardless of thresholds, **students must discuss all potential conflicts of commitment with their research advisor**. True conflicts of commitment must be approved by the Department Chair and Northwestern's Conflict of Interest Office. Effort commitments are certified by Principal Investigators on research grants (who may or may not be the research advisor) and by several offices within Northwestern. **An unreported conflict of commitment is therefore a form of falsification of research effort and can result in the cancellation of grants, federal audits of the entire Northwestern community, or even criminal prosecution**. Conflicts of commitment can also invalidate intellectual property generated at Northwestern or the other entity.

Penalties for a student violating effort commitment policies are the same as any other conduct violation, as discussed in the next Section.

Note that nothing in this Section is to be construed as restricting a student's ability to engage in recreational, community service, or other forms of leisure activity outside of the student's academic and research time commitments.

5 Academic Affairs

5.1 Academic Standing and Probation

During their time in the PhD program, students must maintain satisfactory academic standing both in TGS and within the ESAM PhD program. A student who fails to do so will be placed on academic probation.

The TGS criteria for maintaining satisfactory academic standing, probation, and exclusion are listed on the website Satisfactory Academic Progress (TGS).

The criteria for maintaining satisfactory academic standing within the ESAM department include (see also Section 2):

- Maintain a GPA of 3.5 across all courses presented for the degree, including the Research Rotations.
- By the end of the Spring quarter of the first year:
    - Match with an advisor.
    - Pass the preliminary exams.
- By the end of the second year:
    - Complete all required courses.
    - Form a thesis committee.
    - Pass the qualifying exam.
    - Satisfy the language proficiency requirement (international students only).
- Make satisfactory progress in research, guided by the student's advisor. The progress is assessed by the student's committee, which includes the advisor.

If an advisor or committee is concerned that a student is not making satisfactory research progress, a meeting of the student, their advisor, and the ESAM DGS should be arranged. This meeting can also include the other members of the committee. The purpose of the meeting is to state clearly in what respect the progress is unsatisfactory and to detail in writing the requirements for the student to demonstrate that they are resuming satisfactory academic progress. A student may not be placed on probation for unsatisfactory research progress without such a meeting with the DGS and without developing a written remediation plan.

Students placed on departmental probation have one quarter to resolve the issues that led to their being placed on probation. Under extenuating circumstances, the DGS and/or the committee may allow a more extended probation period. When a student is placed on probation by the program, the student and TGS must be notified in writing.

5.2 Exclusion

The criteria for Exclusion from TGS are given on the website Satisfactory Academic Progress (TGS)

Students not removed from departmental probation by the end of the probationary period will no longer be considered to be in good standing and will be excluded from the PhD program, subject to review by the graduate committee. The decision to exclude a student is made by the program faculty or a subset of faculty that includes the DGS. No individual faculty member may exclude a student.

A student can also be excluded by a program without first being put on Probation, but only in cases that have been clearly stated by the Program (such as in Section 2) and effectively disseminated to the student. Prior to exclusion, a student is given reasonable opportunity to remediate the deficiency. Exclusion always requires approval from both the DGS and the Chair of the Department.

NOTIFICATION OF EXCLUSION
When a decision to Exclude is made, both the student and TGS must be informed in writing within three business days of the decision being made. The notification must include the effective date of the exclusion, a clear statement of the reason(s) for exclusion, and any relevant documentation.

APPEALS PROCESS
Students wishing to appeal a Program's decision to exclude must first appeal directly to the Program. The Program must inform both the student and TGS of the outcome of the student's appeal(s) in writing. A student may appeal Program decisions to TGS. Appeals will only be considered by TGS based on procedural errors or failure to comply with established Program or TGS policy. The Graduate School will not consider appeals based on academic decisions.

Appeals to TGS must be made in writing within ten days of the Program's final written determination of exclusion and include any supporting materials at that time. The Dean of The Graduate School will determine if an appeal should be administered within TGS, UHAS (University Hearing and Appeals System), or other sanctioning body within the University. The Dean may request additional information from, or a meeting with, the student and/or Program before making a final decision. The Dean's decision will be made in a timely manner and will be communicated in writing to the student and the Program. This decision is final and cannot be further appealed.

5.3 Improper Conduct

Cases of improper academic and/or research conduct, and inappropriate or unprofessional behavior are considered outside the boundaries of 'satisfactory academic progress.' These cases are covered separately under TGS's Academic Integrity policy, as well as the published policies of

the Office for Research Integrity, the Office of Equal Opportunity and Access, and the Student Handbook. These cases are addressed according to the University's existing disciplinary procedures and may result in a range of sanctions up to and including Exclusion from the University.

Students engaging in experimental research should be aware that all programs take laboratory safety very seriously. Repeated and/or willful violations of safe laboratory practices can be grounds for Probation or Exclusion and can be reported as a violation of the University Code of Conduct.

NORTHWESTERN'S NONDISCRIMINATION STATEMENT

Northwestern University prohibits discrimination on the basis of actual or perceived race, color, religion, creed, national origin, ethnicity, caste, sex, pregnancy, sexual orientation, gender identity, gender expression, parental status, marital status, age, disability, citizenship status, veteran status, genetic information, reproductive health decision making, height, weight, or any other class of individuals protected from discrimination under federal, state, or local law, regulation, or ordinance or any other classification protected by law in the matters of admissions, employment, housing or services or in the educational programs or activities it operates, as required by Title IX of the Education Amendments of 1972; Title III of the Americans with Disabilities Act of 1990, as amended in 2008; Section 504 of the Rehabilitation Act of 1973; Title VI and VII of the Civil Rights Act of 1964; the Age Discrimination Act of 1975; the Age Discrimination in Employment Act of 1967; and any other federal, state, or local laws, regulations, or ordinances that prohibit discrimination, harassment, and/or retaliation.

The University has designated the Associate Vice President for Civil Rights and Title IX Compliance to coordinate the University's compliance with federal and state civil rights laws regarding protected characteristics, including Title IX and those other laws and regulations referenced above. Their contact information is available here.

The University complies with all federal and state laws that protect individuals with disabilities from discrimination based on their disability or perceived disability status. As such, reasonable accommodations and auxiliary aids and services are available to individuals with disabilities when such modifications and services are necessary to access the institution's programs and services. Additional information on the roles of the University's ADA/504 Coordinator can be found here.

Inquiries about Title IX or the University's prohibitions against discrimination, harassment, and retaliation can be directed to the Associate Vice President for Civil Rights and Title IX Compliance, the ADA/504 Coordinator (for disability-related questions), or to the U.S. Department of Education Office for Civil Rights.

Any person who believes that the University, as a federal contractor, has violated nondiscrimination or equal opportunity obligations may contact the Office of Federal Contract Compliance Programs.

CONFIDENTIAL COUNSELORS

If a student wishes to speak with someone who is legally privileged to keep communications confidential, they may contact a confidential counselor. After consulting with a confidential counselor, the student is within their discretion to take no further action. Because of the confidential nature of the counselor/patient relationship, seeking advice from a confidential counselor does not constitute reporting an incident.

***EthicsPoint* HOTLINE**

Northwestern has selected *EthicsPoint* to provide the community with a simple way to report activities that may involve misconduct or violations of University policy. Anyone may file a report online or by calling 866-294-3545. This service is not a substitute for, nor does it supersede, any existing reporting methods or protocols already in place at Northwestern for reporting suspected problems or complaints. Instead, the *EthicsPoint* system provides an additional means of reporting such issues. Individuals who report concerns of sexual harassment via the *EthicsPoint* online option are encouraged to check the status of their report periodically, in order to receive updates as to the status of the investigation. Any suspected problems or complaints reported via *EthicsPoint* will be reviewed in accordance with relevant University policies and/or procedures and other requirements stated in the relevant Handbooks.

6 Appendix

6.1 Research Rotations

Overview: Each student conducts independent research in the form of a Research Rotation with at least two different approved faculty members before the selection of a thesis advisor. This research complements the formal coursework taken during the first year and exposes students to various research areas within applied mathematics. These Rotations also provide the advisors with an opportunity to evaluate the performance and research potential of each student. These evaluations will constitute a major factor - along with the student's performance in the classes and the prelims - in the department's decision whether the student will continue in the PhD program after their first year.

TIMELINE

- August: Students are informed which faculty members are likely to take on a student.
- Students should explore faculty research and contact faculty to discuss potential rotation opportunities.
- A brief introduction to faculty research will be provided during orientation, the week before classes start.
- Students submit their preferences for Fall quarter by a specified date during the first week of classes.
- Matching of students and faculty by the end of the first week of classes
- During Fall quarter: longer faculty presentations (~30 min per faculty) to inform about Winter Rotations.
- Students should reach out to faculty to discuss potential Rotations for Winter quarter before the end of Fall quarter.
- Student reports for Fall quarter due on the Friday of finals week
- Students submit their preferences for Winter quarter by the end of finals week.
- Matching of students and faculty during the week after finals week.
- Student reports for Winter quarter due on the Friday of finals week.
- Spring quarter: advisor selection or optional third Research Rotation.

TOPIC SELECTION

The faculty member and student discuss potential research topics and decide on a short-term research project. The projects may involve any aspect of research, including literature review, development of mathematical frameworks, data analysis, method implementation, analytic investigations, and numerical development. Given the short-term nature of the project, it is not

necessary or expected for the student to produce publishable results. Projects also do not need to form the basis for a thesis, but should provide a valuable research experience.

STUDENT EVALUATION

The advising faculty will ultimately determine evaluation criteria of the rotation, and students and faculty should discuss rotation expectations at the start of the rotation.

- Written report: At the end of each rotation, all students will produce a short report (1-2 pages), which will be made available to all faculty members.
- Oral presentation: In addition, students will have the option to participate in an oral research presentation session. The presentations will be 10 minutes long and allow an additional 5 minutes for questions. The session is intended for students and interested faculty. Faculty may require the oral presentation as part of their evaluation. This session may also be useful for faculty who did not have the opportunity to work with the student to learn about their interests.
- Faculty evaluation: At the end of each Research Rotation the advising faculty will fill out a short form evaluating the student. They will rate the student in several categories, including those below, and provide a brief written evaluation (~1 paragraph).

EVALUATION OF SUITABLE MATCH

Evaluation of suitable match: A key function of the Research Rotation is to facilitate establishing successful and mutually agreeable student-thesis advisor partnerships between students and faculty. By participating in the daily work of research, students can gauge how comfortable they feel working with a potential advisor. Faculty use several criteria to assess whether a student will be a good fit for their research program. Among them are:

1. Commitment. Students should take each Research Rotation seriously and show effort and commitment to the project.
2. Progress. The activities of the students during the Research Rotation and their final report should demonstrate clear progress. The progress could be comprised of reproducing or implementing previously published results and possibly slightly extending them, demonstrating sufficient understanding of the topic, or providing a suitable literature review.
3. Documentation of work. A research career depends on the clear communication of results such that others may reproduce them.
4. Interest. A hallmark of independent investigators is that they are motivated by curiosity, driven by the “need to know.” Students are encouraged to seek out published information relating to their projects and to think critically about how their project relates to the overall scientific enterprise.

5. Maturity. Scientific research depends on effective communication among researchers. Common sense, cooperation, and courtesy are essential qualities for a good mentor-mentee relationship.

LOGISTICS
Students receive credit and a letter grade for the Research Rotation through ESAM 499 Independent Study.

6.2 Checklist for Thesis Defense

This list aims to help students navigate their thesis defense and graduation. Notice that instructions provided by TGS supersede any conflicting information below.

1. Apply for a PhD degree in GSTS under the TGS Forms tab and create a new Application for a Degree form.
2. After finalizing your thesis committee, enter the committee on the PhD Final Exam Form in GSTS, and also enter their names under the Committee tab in GSTS and mark their role as Final-Thesis Member.
3. Contact committee members to set date and time. Once the date is set, enter the date on the PhD Final Exam Form.
4. Receive the advisor's approval that the dissertation is in final form and ready to be presented to the committee for review. (`` Final form'' means fully proofread. Faculty members should not be expected to serve as proofreaders.)
5. Reserve a conference room. Contact the Department office staff to reserve a room, so that a public notice of the presentation can be posted.
6. Note that the deadline for taking the exam and submitting the dissertation to the Graduate School varies each quarter. Consult the timetable on the Graduate School website for exact dates each year.
7. Be reminded that the format of the dissertation must conform to the standards established by The Graduate School at Dissertation Formatting Requirements.
8. At the latest, two weeks before the examination, present each examining committee member with a copy of the dissertation.
9. After the defense, complete the PhD Final Exam form under the TGS Forms tab and create a new TGS PhD Final Exam form. Each committee member must approve the form they receive via email, generated by this form.
10. After final approval, turn in the final PDF version of your dissertation to the Department office to have it bound. The Department covers the cost of one copy for the student, one for the advisor, and one for the department archives. Additional copies may be requested at the student's expense.

11. Submit the dissertation to the ProQuest website. Once the dissertation is submitted to ProQuest, a Student Services representative will review the formatting and confirm by email that it is acceptable or notify you of any necessary changes.
12. Provide the Department with a 1-2 paragraph summary of your dissertation in a form that is written for a general audience and could be posted on the department website.
13. Check with the Program Assistant to ensure that all X, Y, K, and NR grades on your transcript have been changed and submitted to TGS.
14. Before final departure, complete the sign-out sheet provided by the front office, return borrowed items (office keys, theses, library books, etc.), and be sure to leave a forwarding address with the office of the Department of Engineering Sciences and Applied Mathematics.

6.3 Miscellaneous

CHANGE OF ADDRESS
The Department Office must be notified of any change of address. Students must change their home address through **both** the HR website and in Caesar. Be sure to change your address in both systems, as they are separate.

The U.S. Citizenship & Immigration Services (USCIS) requires every international student and scholar to report a change of address within 10 days of their move. It is critical for F-1 and J-1 students to update their address in CAESAR immediately upon their relocation.

J-1 and H-1 scholars will also need to inform the international office as soon as possible.

All F-1 students, J-1 students and scholars, and H-1B scholars will also need to complete a change of address form (AR-11) available here. **Failure to do so will be a violation of their F-1 or J-1 status and could result in severe consequences for them and their dependent(s)!**

CONSUMPTION OF ALCOHOLIC BEVERAGES
Consumption of alcoholic beverages in the Technological Institute, except at official departmental functions and such recognized events as post-defense celebrations, is incompatible with sound safety and work-place practices and is therefore unacceptable. **We expect our students to abide by Illinois and applicable federal laws concerning all controlled substances**.

DEPARTMENT OFFICE, STUDENT DESK & RESEARCH SPACE ASSIGNMENT
Every graduate student is assigned a desk for personal use. The assignment of both desk and research space is handled by the Department on an annual basis. Office assignments may change each year, usually over the summer. No changes should be made without authorization by the Department Chair. When not in use, please unplug any appliances (e.g., coffee makers, water heaters) to reduce the risk of fires and environmental impacts.

A black-and-white printer is provided in the Student Lounge, M443. A color printer is provided in the main office, M426. The black-and-white printer should be used, with duplexing turned on to save paper, unless color is **absolutely necessary**. Use of the printers is for academic and research purposes only, and not for personal use. Information about accessing the printers from the department-provided computers or your personal computer can be found on the Department website under student resources.

A photocopying machine for research and teaching-related copying is available in the Department Office. Copy cards for use in copying machines at the library are available through the Wildcard Office or the Main Library. Photocopying services are also located at Norris Center and 2020 Ridge for large orders. Personal copying should be kept to a minimum on the department machine.

Keys. Graduate students will receive a key for their office in the Technological Institute. To obtain your keys, you must visit the Department Office to request a key from the program assistant. Keys are not transferable. Students may not be in the Department Office outside regular working hours, generally 8:30 AM to 5:00 PM.

Postal Service. Mail is delivered once a day to the Department Office. The student mailboxes are in M426; you will find your mail and messages in your assigned box above your name label. It is advisable to check your mailbox daily. Use of the University mailing address for personal mail is not allowed by NU regulations.

Supply Cabinet (M426). Limited supplies (pens, notebooks, etc.) are available for research purposes. These supplies are not for personal or class use. Please only take one of each item at a time.

INTERNATIONAL STUDENTS

Upon arrival, all international students must register immediately with the International Student Office, 630 Dartmouth Place, Evanston Campus, which will act as advisor on all matters concerning employment practice, visa renewals, etc.

PARKING

The University Police Parking Division controls the NU parking lots. Students requiring a sticker that will enable them to park in the various University parking lots should obtain an application from the Parking Office located at 1841 Sheridan Road, Evanston (open Monday through Friday, 8:00 AM to 4:00 PM). Applications are issued upon presenting your University I.D. card, driver's license, and payment of a fee. Additional information can be found here.

STUDENT LOUNGE & KITCHEN

The graduate student lounge is located in room M443. It is managed by the ESAM graduate student leadership. All students are expected to comply with the rules set by the graduate student leadership to keep the lounge a pleasant place for students to gather. Access to the student lounge is by an access code for a numeric pad on the door. Contact the program assistant if you

do not know the access code. Please do not share the access code with non-ESAM people. Use of the lounge is intended only for students and postdocs in ESAM or in ESAM research groups.

Kitchen use is restricted to ESAM department members. Please comply with the kitchen rules that are posted. Do not leave personal items in the kitchen. After washing your dishes, be sure to dry them and put them away promptly. The microwave and toaster oven should not be left unattended while in use. Clean up any food that splatters, drips, or spills. Remember, it is easier to clean up the mess when it is still fresh. As a courtesy to other department members, please only take tea and other supplies on a single-use basis. Finally, to prevent flooding, make sure the hot water dispenser is completely turned off after use. There is no janitorial service to clean up this space, so it is each user's responsibility to keep the area clean and clear of personal belongings.

STUDENT ORGANIZATIONS

The **Northwestern Student chapter of SIAM** (Society for Industrial and Applied Mathematics) was established in 2011. Each year (usually at the end of the Spring Quarter), an election is held to fill the offices of President, Vice President, Secretary/Treasurer, Activities Chairman, and Faculty Representative. The Officers serve as liaisons to the Faculty and Department administration in representing the students' interests. They also organize various social and professional activities throughout the year. Students are automatically members and are encouraged to participate. For international students, the club provides valuable interaction for the development of English proficiency.

The Women of Engineering Sciences and Applied Mathematics (WESAM) Group brings together students, postdocs, and faculty to promote equal opportunity for women in the mathematical sciences. The WESAM group organizes events aimed at science outreach, professional development, and community building. It meets monthly to discuss articles, plan events, and plan fun events for the group. Contact **Prof. Mangan** for more information.