# INFORMATION FOR MS STUDENTS

# IN ENGINEERING SCIENCES AND APPLIED MATHEMATICS

2025–2026

September 1, 2025

Dear Graduate Students,

This handbook is prepared to aid you in earning a Masters of Science degree in Applied Mathematics. Please read it carefully and be aware of the requirements and responsibilities described. The information contained in this handbook is more specific than that in the Graduate School Bulletin. You should also familiarize yourself with the general regulations of The Graduate School.

Please feel free to come in to see me if you have any questions, problems, or points of concern.

Hermann Riecke, Professor and Chair

# Contents


**1 MS Program Mission Statement and Goals** **6**

1.1 Mission Statement . . . . . 6

1.2 Program Goals . . . . . 6

**2 Course Advisor** **6**

**3 MS DEGREE WITHOUT THESIS** **7**

3.1 Residency and Course Load . . . . . 7

3.2 Course Requirements . . . . . 7

3.2.1 Core Courses in Engineering Sciences and Applied Mathematics . . . . . 7

3.2.2 Elective Courses . . . . . 8

3.2.3 Timeline for Approval of Plan of Study . . . . . 9

**4 MS DEGREE WITH THESIS** **9**

**5 BS/MS Program** **10**

**6 Additional Information for All MS Degree Programs** **10**

6.1 Versant Language Examination . . . . . 10

6.2 Admission into the PhD Program . . . . . 11

6.3 Graduate Student Tracking System (GSTS) . . . . . 11

6.4 Academic Standing . . . . . 12

6.5 Filing for Graduation . . . . . 12

6.6 Appeals Process . . . . . 12

**7 GENERAL INFORMATION** **12**

7.1 Nondiscrimination Statement . . . . . 12

7.2 Pass/No-Credit Option . . . . . 13

7.3 Academic Honesty . . . . . 13
7.4 Student Support and Conflict Resolution . . . . . 14
7.5 Consumption of Alcoholic Beverages . . . . . 14
7.6 Student's File . . . . . 14
7.7 Change of Address . . . . . 14
7.8 International Students . . . . . 15
7.9 Colloquium Series . . . . . 15
7.10 Safety . . . . . 15
7.11 Computing Facilities . . . . . 15
7.12 Student Lounge . . . . . 16
7.13 Telephone, Fax, Mail, Photocopying, and Printing . . . . . 16
7.14 Kitchen, Large Conference Room, and Supply Cabinet . . . . . 16
7.15 Automobile Regulations . . . . . 17
7.16 The SIAM Student Group . . . . . 17
7.17 Bike Riding and Skateboarding . . . . . 17

## INFORMATION FOR GRADUATE STUDENTS

*Welcome to the Engineering Sciences and Applied Mathematics Department. Please keep and refer to this booklet through completion of your MS degree. Every effort has been made to anticipate your questions–from arrival 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 |
| MS Academic Advisor | Michael Miksis | miksis@northwestern.edu | 847-491-3345 |
| Director of Graduate Studies | Alvin Bayliss | a-bayliss@northwestern.edu | 847-491-7221 |
| Business Administrator | XXXX | XXX | 847-491-5586 |
| Program Assistant | Ted Shaeffer | ted.shaeffer@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 | 847-491-3345 |
| Safety Coordinator | Petia Vlahovska | petia.vlahovska@northwestern.edu | 847-491-8782 |

The department offers two MS Options:

- MS Degree without Thesis
- MS degree with Thesis

The MS degree without Thesis option will be assumed unless the student informs the ESAM MS advisor prior to the end of the 2nd quarter of registration in the program, that he/she is selecting the Thesis option.

**Disclaimer:** 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.

# 1 MS Program Mission Statement and Goals

## 1.1 Mission Statement

The MS program is designed to develop graduate students with a broad skill-set in mathematical modeling and analytical and computational solution methods. Upon completion, the graduate should be fully prepared to enroll in a PhD program in applied mathematics or be prepared to employ their skills in private-sector research.

## 1.2 Program Goals

| Learning objectives | Requirement | Assessment Strategies and Criteria |
|---|---|---|
| Develop core applied mathematics skills | Core applied math curriculum | Demonstrate competency in differential equations, asymptotic methods, and numerical methods |
| Develop expertise in a single area of mathematics | Math content theme | Student must complete three courses that are related through a proposed and approved math content theme |
| Develop expertise in an area of application of mathematics | Math modeling theme | Student must complete three courses that are related through a proposed and approved application area theme or complete one modeling course along with an MS Thesis on an application of mathematics. |

# 2 Academic Advisor

During New Student Week, you will meet with your advisor who will assist you in selecting courses for your first quarter of study. The advisor must be consulted about course selection. The advisor will continue to be your academic advisor through the completion of your MS degree. ***Responsibility for meeting published deadlines and degree requirements rests with the student.*** The Northwestern University Academic Calendar is available at http://www.registrar.northwestern.edu/calendars/index.html. The Graduate School deadlines and requirements can be found on their website at

http://www.tgs.northwestern.edu/academics/degree-requirements/index.html

Also see The Graduate School Key Dates.

Students whose goal is to enter the PhD program at Northwestern at the end of their MS program are strongly advised to discuss this option with his or her course advisor at the first meeting as this will significantly influence course selection for the MS degree. Students pursuing this track typically take the same courses as the students in the first year PhD program and also take the Preliminary Examinations when they are offered in the Winter and Spring quarters. **Because space is limited in the PhD program, successful completion of the MS degree does not guarantee admission to the PhD program.**

# 3 MS DEGREE WITHOUT THESIS

## 3.1 Residency and Course Load

The minimum residence requirement for the MS degree is three consecutive quarters at Northwestern. **Course and 590 (research) units should total to 3-4 units each quarter to maintain full-time status. To complete the MS degree in 3 quarters, 4 units per quarter will be required.**

## 3.2 Course Requirements

Students must take at least twelve graded academic courses listed in the Graduate School catalog. To view available Graduate School courses, search for classes in CAESAR (http://www.northwestern.edu/caesar/) and set Course Career to the Graduate School. P/N grades are not allowed. Enrollment in the core curriculum is mandatory. According to University policy, students must maintain a 3.00 average within the twelve graded courses to receive the MS degree. In addition, students must maintain a 3.00 average for the four Core Courses plus the two Numerical Elective courses. Satisfactory progress in the program is determined by department review of course grades, and faculty recommendations.

Student GPA is calculated according to the following scale: A = 4, A- = 3.7, B+ = 3.3, B = 3, B- = 2.7, C+ = 2.3, C = 2 and will appear on the graduate student transcript.

### 3.2.1 Core Courses in Engineering Sciences and Applied Mathematics

The following courses comprise four units of the graduate core curriculum for the MS degree in engineering sciences and applied mathematics.

| | |
|---|---|
| ES_APPM 420-1 | Asymptotic and Perturbation Methods in Applied Mathematics |
| ES_APPM 446-1 | Numerical Solution of Partial Differential Equations |
| ES_APPM 314-0 | Advanced Methods for Differential Equations |
| One unit of | ES_APPM 312, ES_APPM 322, ES_APPM 345, ES_APPM 405-1, ES_APPM 412, ES_APPM 414, ES_APPM 420-2, ES_APPM 429, ES_APPM 440, ES_APPM 442 , ES_APPM 479, ES_APPM 495 (if approved by advisor) |

BS/MS Northwestern Undergraduates who used either 311-0, 314-0, or 411-1 for the BS degree must take one of the other listed Core courses to fulfill the ES_APPM 314 Core course requirement.

**Waiving Core Courses:**

Students who are sufficiently prepared in the subject matter of a core course may petition for a waiver from the course requirement. The instructors may require documentation, e.g. text used, course outline, lecture notes, exams, etc. The signed form should be given to the Graduate Student Assistant to be placed in the student's file. Please note that the waiving of a course does not decrease the total number of courses required.

### 3.2.2 Elective Courses

The remaining of the eight courses for the MS degree are to be selected by the student in consultation with his or her advisor and must be approved by the advisor. Of these electives two must be a course in numerical methods, three must be in mathematical modeling, and three courses must have mathematical content. More specifically:

- Numerical Elective: Students must take at least two of the following courses:

| | |
|---|---|
| ES_APPM 344/444 | Introduction to High Performance Scientific Computing |
| ES_APPM 445 | Iterative Methods for Elliptic Equations |
| ES_APPM 446-2 | Numerical Methods for Partial Differential Equations |
| ES_APPM 447 | Boundary Integral Method |
| ES_APPM 448 | Numerical Methods for Random Processes |
| ES_APPM 449 | Numerical Methods for Moving Interfaces |

- Mathematical Modeling Electives: Students are expected to select 3 classes where mathematics is applied to an area of application. Courses typically taken to satisfy this requirement within ESAM are ES_APPM 421-1 and two special topics classes offered in our yearly graduate modeling sequence. If classes are taken outside of the department, the course sequence should have a theme, e.g., financial mathematics, fluid mechanics, data science, etc. Themes can be chosen from the accompanying list (cf. p.18), or designed in consultation with the MS advisor. Designated ES_APPM modeling courses may be substituted for theme electives subject to advisor approval .

- Mathematical Content Electives: Students are expected to select 3 classes where mathematics is the focus of the class. For example, within ESAM students may wish to complete the ES_APPM 314 and ES_APPM 420 sequences by taking ES_APPM 414, ES_APPM 420-2, and ES_APPM 412-0. If taken outside of ESAM, the classes should have a theme, e.g., stochastic methods, optimization, etc. Themes can be chosen from the accompanying list (cf. p.18), or designed in consultation with the MS advisor. Designated ES_APPM math content courses may be substituted for theme electives subject to advisor approval.

At least three of the six courses used to satisfy the Mathematical Modeling and Math Content Electives must be at the 400/500 level.

Any courses taken for the MS must be an extension of the student's background rather than a repetition of work done as an undergraduate.

### 3.2.3 Timeline for Approval of Plan of Study

To ensure that students maintain a proper path toward completion of the MS degree and to remain in academic good standing, all students are required to meet with their advisor at the designated times below and have their plan of study approved. Each quarter the student's 12 course Plan of Study, including both the math modeling and math content themes, must be listed on GSTS and approved by the advisor. **The Math Modeling and Math Content Themes must be entered on the bottom left of the Plan of Study page on GSTS in the Comments Section.** A student's Plan of Study can evolve over the academic year but Final Approval must be given at the beginning of Spring Quarter for those students expecting to graduate in June or December 2026.

**September 22:** Last day to get approval for Fall classes plus the 12 proposed courses to complete the degree. The proposed modeling and math content themes and the 12 proposed courses must be entered in the GSTS Plan of Study page. All future changes to this plan of study must be approved by the MS advisor.

**November 10-14:** All MS students must meet with the MS advisor to review their proposed Winter schedule prior to registration. The advisor will contact all students before Winter registration begins to schedule this meeting. Any changes to the Plan of Study must be entered on GSTS and approved by the MS advisor.

**February 16–20, 2026:** All students must have their Spring schedule and 12 course Plan of Study on GSTS approved by the MS advisor. This can be done by email.

**April 6, 2026:** Last day to get Final Approval of the Plan of Study. This plan must contain the math modeling and math content themes plus the courses to be counted to complete the themes.

**Important:** Students that who do not get approval for their plan of study are considered not in good academic standing and may be placed on probation and/or excluded from the program for failure to comply.

# 4 MS DEGREE WITH THESIS

This option is only offered to students entering the program in the Fall and who expect to graduate at the end of Fall quarter of the following year.

The course requirements are the same as for the MS degree without thesis option except two of the Mathematical Modeling electives are replaced by ES_APPM 590. Only one unit of 590 can be taken per quarter.

To complete the MS with thesis option, the student must identify an approved research advisor before the end of the 2nd quarter of study within the program. Otherwise the student will default to the MS Degree without thesis option. If by the end of the 3rd quarter of residence, the student has completed the necessary course requirements and maintained an adequate GPA, a MS without thesis degree will be awarded at that time.

The ESAM department will require a written thesis to be approved at a final examination. The thesis must be completed by the end of the Fall quarter of the second year of study in the program or the student's degree path will revert to the coursework only option. The student's Examining Committee will determine by the end of the first summer of study whether the student is making sufficient progress to complete the

thesis by the end of the Fall quarter of the second year of study. If they do not judge that sufficient progress has been made, the student's degree path will revert to the coursework only option. The final examination shall include a presentation by the student of the thesis material and examination of this material by the Examining Committee. The Examining Committee will be comprised of at least two full-time members of the Northwestern University Faculty, who must also be members of the Graduate Faculty. At least one of the members of The Examining Committee must be an ESAM faculty member. The Examining Committee must be approved by the program advisor.

The thesis should be based on original research that is of publishable quality. It should be prepared according to the Graduate School format for PhD dissertations.

**Time Line for Full Time Students for Completion of MS Degree with Thesis**

- First year of study
  - End of Winter quarter: Student must identify and get departmental approval for choice of thesis advisor. A written research proposal must be submitted on GSTS for approval. The proposal should list the thesis committee that includes the advisor and at least one ESAM faculty member.
  - Before end of Summer quarter: Student must give an oral presentation to his/her committee to determine if sufficient progress is being made toward completion of the thesis.
- Fall quarter of second year of study
  - Two weeks prior to thesis defense: Student must give a written draft of the thesis to the thesis committee.
  - Before the last week of class in Fall quarter: Student must give an oral thesis defense for the thesis committee.

To obtain the MS Degree with Thesis, the MS degree requirements stated above must be completed by the end of Fall quarter of the second year of study.

# 5 BS/MS Program

Students who enter the ESAM MS program via the BS/MS program at McCormick have the same requirements for the MS degree as listed above. Graduate courses taken as an undergraduate prior to entering the ESAM MS program can be applied toward the MS degree requirements with department approval. No course used to fulfill requirements to receive the BS degree may also be used toward fulfilling the MS degree. For information about this program, please contact Ward Lavino, Assistant Dean, Office of Professional Education, McCormick School, email: mccormick-gradprograms@northwestern.edu.

# 6 Additional Information for All MS Degree Programs

## 6.1 Versant Language Examination

The Versant Language exam is not required of students pursuing the MS degree. However, it is mandatory for international students whose country of origin is not Australia, Canada, New Zealand, or United Kingdom

when pursuing a PhD degree. If an international MS student is interested in pursuing a PhD at Northwestern at the completion of their MS degree, he or she may optionally take the Versant Language Examination if approved by his or her course advisor. Students in the MS program that wish to take the Versant Examination must notify his or her course advisor no later than the fifth week of the Winter quarter to be registered for the Spring testing. It is mandatory for international students to pass the Versant Language exam in order to be admitted into the ESAM PhD program from the MS program. For more information about the Versant test as well as English language tutoring resources, see the Versant testing page. Also see the TGS page on Language Testing and Support.

## 6.2 Admission into the PhD Program

MS students in good standing may wish to be considered for admission into the PhD program. Because space is limited admission is very competitive, and students should be aware of this. **Thus, passing the preliminary examinations as a MS student does not guarantee admission to the PhD program.** Students interested in pursuing the PhD are strongly encouraged to discuss this option with their MS advisor. The following is a list of necessary conditions that must be met if a student wishes to be considered for the PhD program:

1. The student must take the 1st year PhD sequence of classes. Please see the ESAM PhD Graduate Student Handbook for the list of courses.
2. The student must take the written preliminary exams. For details see the ESAM PhD Graduate Student Handbook.
3. International students must satisfy The Graduate School's spoken English proficiency requirement before the end of spring quarter of their 1st year of study, see Section 6.1 above and: http://www.tgs.northwestern.edu/funding/assistantships/graduate-and-teaching.html
4. Identify a PhD thesis advisor before the end of the Spring quarter of the $1^{st}$ year of study.

Because admission to the PhD program is very competitive, the department recommends that MS students seeking admission pursue all their options in addition to the PhD program. This includes applying to other programs and schools, applying to other programs of study within Northwestern, and actively pursuing employment for after graduation. If the student seeks admission, he/she must inform the ESAM MS student advisor. A decision will be made before the end of the Spring Quarter.

## 6.3 Graduate Student Tracking System (GSTS)

Students are expected to maintain their current information in the Graduate Student Tracking System (GSTS). The Graduate Student Tracking System allows students to track their progress and activity in one place. Students log in with their NetID and use the tool to communicate with their program on their plan of study, coursework, milestones, and annual progress. Students should enter their MS Academic Advisor on the Committee page of GSTS.

## 6.4 Academic Standing

The Graduate School details procedures for determining Good Academic Standing, Probation, and Exclusion. See the Graduate School website Satisfactory Academic Progress.

## 6.5 Filing for Graduation

For graduation, the student must complete two TGS forms on GSTS: The Application for Degree and the Master's Degree Completion form. For the exact deadlines see the TGS website and the academic calendar. Usually, the Master's Degree Completion form is submitted at the beginning of the quarter the student plans to graduate. The Committee Members on the form should be the MS Academic Advisor as Chair and the ESAM Director of Graduate Studies as the Co-Chair. Students obtaining an MS Degree with Thesis should use their thesis committee members on the form.

The Application for Degree is submitted prior to the MS Completion form. BS/MS students planning to graduate with their BS and MS in the same quarter will not have access to these forms on GSTS until the last quarter of registration.

## 6.6 Appeals Process

The faculty make every effort to ensure that each student's progress is carefully reviewed and the resulting feedback is accurate and constructive. There may be, however, instances in which a student feels that a review decision is unjust or is based on incomplete or inaccurate information. If this occurs, there are appeal channels available to the student.

First, the student should discuss his/her concerns with their advisor in order to resolve any misconception or misperception. If the advisor and the student are not able to resolve the concern, an appeal may be directed to the Department Chair. The University policy for academic-related grievances is provided in The Graduate School Catalog. For non-academic matters, such policies are provided in the Northwestern Student Handbook.

# 7 GENERAL INFORMATION

## 7.1 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 references above. Additional information can be obtained at:
https://www.northwestern.edu/civil-rights-office/about/statements/non-discrimination-statement.html

## 7.2 Pass/No-Credit Option

Students working toward an MS or a PhD in Engineering Sciences and Applied Mathematics may **not** use courses taken on a P/N basis to satisfy course requirements. Graduate students may, with the approval of their advisor, take courses on a P/N basis *after* satisfying the departmental course requirements.

## 7.3 Academic Honesty

All students are expected to adhere to 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 other sources **(including the work of fellow students and other group members)** must be appropriately referenced; otherwise plagiarism will have been committed. The following statements should help define what is meant by "appropriately referenced":

1. All ideas, data, mathematical expressions, and word quotes taken from the works of others should be clearly and directly referenced 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. The following format is also acceptable:

   "The equation can be derived following the approach of Jones[33] as follows:..."

2. Word for word quotes must have quotation marks at the beginning and end and be referenced in the manner described above.

3. Photocopied figures should be referenced as described in 1. above.

4. Redrawn figures or plots made from other people's table of data can be appropriately labeled "after Smith[43]".

5. Each person should receive proper recognition for contributions made.

**Special note: group collaboration on homework assignments is at the discretion of the professor. Unless otherwise stated, students are expected to turn in their own original work.**

In accordance with 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.

*On Being a Scientist* by the Governing Board of the National Research Council is available at

http://www.nap.edu/catalog.php?record_id=12192#toc

Northwestern University's Office for Research Integrity provides guidance on ethical conduct of research. Information about research misconduct is available online at

https://researchintegrity.northwestern.edu/research-misconduct/.

Students should be familiar with the contents of these two documents. The Department expects the highest levels of integrity from students and faculty.

## 7.4 Student Support and Conflict Resolution

Students should speak with the Department Chair to interact in a confidential manner when concerns arise.

## 7.5 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 laws concerning all controlled substances.**

## 7.6 Student's File

Most information about the student is contained in GSTS and can be viewed by the student. Any additional information not found in GSTS is kept in a folder in the department office. In accordance with Government regulations a student is allowed access to his/her file after submitting a written request to the department. Educational records cannot be released to any outside agency without the student's written consent. Students applying for credit cards, etc., which require employment and/or salary verification by the department, must inform the department that such a request may be forthcoming. Verification of employment may also be done through NU's Employment Verification Infoline at https://www.theworknumber.com.

## 7.7 Change of Address

The Department Office must be notified of any change of address. Students may change their home address through the HR website https://myhr.northwestern.edu and also in Caesar. Be sure to change your address in both as the two systems are separate.

The US 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. For J-1 and H-1 scholars they will 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 on the USCIS website at:

http://uscis.gov/. 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)!

## 7.8 International Students

Upon arrival all international students must register immediately with the International Student Office, 630 Dartmouth Place, Evanston Campus, who will act as advisor on all matters concerning employment practice, visa renewals, etc. International students interested in pursuing the Ph.D. degree are required to pass the Versant English Test in order to fulfill The Graduate School's spoken English proficiency requirement http://www.tgs.northwestern.edu/funding/assistantships/graduate-and-teaching.html, also see http://groups.linguistics.northwestern.edu/esl/versant.htm.

## 7.9 Colloquium Series

The Department organizes the colloquium series that generally meets on Thursdays at 11:15am. Its primary purpose is to broaden the education of each graduate student by bringing to campus the leaders in our field. Attendance is recommended for all graduate students.

## 7.10 Safety

The department has taken a number of steps to help provide a safe environment for your research. In the event of an alarm requiring evacuation of the building, all members of the department are expected to evacuate to the department rally point in the lobby of the Catalysis Center, which is located at the end of the bridge on the second floor of the K wing on the south side of Tech. When you arrive at the rally point, report to the Safety Coordinator so we can ensure everyone's safe exit from the building.

## 7.11 Computing Facilities

Linux computers are available for general academic and research use in the student offices. Not all computers in student offices are for general use, but are for specific research projects. Contact the Department Computing Manager if you have any questions about which computers are available for general use. New students are assigned a user ID based on their NU net ID that allows them to log in to any of the department Linux computers, and also allots storage space that is on a shared server that can be accessed from any of the Linux computers. The Manager must be consulted prior to addition or deletion of any software or hardware on these systems, or in the event of system malfunctions. **Important: The department linux computers are backed up nightly, so they must be left on and connected to the network at all times.** Please check beforehand with the Manager if a computer must be disconnected for any reason.

Students may also access the department network via their own personal computer. To obtain access, send an email to the Graduate Student Assistant with: Name, office #, operating system, whether it is a laptop or desktop, and the Ethernet MAC address. An Ethernet connection is required to use the department printers, wireless connections are not on our local subnet, and hence will not allow access to the printers.

## 7.12 Student Lounge

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 as 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 Graduate Student 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 ESAM students, faculty, and staff.

## 7.13 Telephone, Fax, Mail, Photocopying, and Printing

**Telephones**. Telephones are provided in all student offices, however, their use should be limited to university business only. **Personal calls should be made on cell phones**. Long distance calls require an access code. Persons who may have occasion to call you for business purposes from outside the University should be given the telephone number of the main Department office (847)-491-3345. **Collect calls are not acceptable, by Northwestern regulations.**

**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.

**Photocopying, Copy Cards, and Faxing**. 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 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. A fax machine is located in the Department Office. Long distance faxes require an access code. See the department for personal faxes.

**Printing**. A black and white and 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.

## 7.14 Kitchen, Large Conference Room, and Supply Cabinet

**Kitchen**. 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 remove them 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 your responsibility to keep the area clean and clear of personal belongings.

**Large Conference Room (M416)**. If you need to enter/exit the conference room, please do so through the Tech hallway, not the department office. The conference room should be left in the condition that it is

found. If chairs or other furniture are moved, they should be returned to their original position. Do not leave food in the room; properly dispose of any garbage. This room acts as a classroom and event space, and should be kept tidy at all times.

**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.

## 7.15 Automobile Regulations

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 A.M. to 4:00 P.M.). Applications are issued upon presenting your University I.D. card, driver's license and payment of a fee. Additional information can be found at http://www.northwestern.edu/up/parking. For your information, all students who park cars on campus are required to register the car with the Parking Office. Bicycles should also be registered.

## 7.16 The SIAM Student Group

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 liaison 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.

## 7.17 Bike Riding and Skateboarding

For obvious safety reasons, bike riding and skate boarding are prohibited in the corridors of Tech. **In addition, bikes may not be stored in public spaces in the building, in particular the stairwells where they can pose an evacuation hazard.**

# Example Modeling Themes

| Theme | Suggested Courses (Choose 3 from the list) |
|---|---|
| Finance | ECON 308, ECON 310, ECON 311, ECON 349, ECON 360, ECON 362, ECON 383, ECON 410-1, ECON 411, IEMS 405, FINC 485-1, STAT 365, IEMS 326, FINC 585-1 |
| Data/Machine Learning | ES_APPM 495, ES_APPM 421-1, ELEC_ENG 435, ELEC_ENG 473, ELEC_ENG 475, COMP_SCI 349, COMP_SCI 469, DATA_SCI 421, DATA_SCI 422, DATA_SCI 423, STAT 301 |
| Mechanics | ES_APPM 495, MECH ENG 417, MECH ENG 495 |
| Financial Engineering | FINC 485-1, IEMS 326, IEMS 373, IEMS 473, STAT 365 |
| Economics | ECON 308, ECON 310, ECON 311, ECON 360, ECON 381, ECON 383, ECON 410-1, ECON 410-2, FINC 485-1, ECON 362 |
| Applied Multivariate Analysis | STAT 348-0, ES_APPM 495, ES_APPM 421-1 |

# Example Math Content Themes

| Theme | Suggested Courses (Choose 3 from the list) |
|---|---|
| Applied Analysis | ES_APPM 322, ES_APPM 411-1, ES_APPM 411-3, ES_APPM 420-2, ES_APPM 412 |
| Statistics | ES_APPM 412, ES_APPM 420-2, IEMS 303, IEMS 304, IEMS 315, IEMS 401, IEMS 435, IEMS 460, IEMS 461, IEMS 462-1, STAT 350, STAT 352, STAT 357, STAT 420-1, STAT 439, STAT 455, ECON 480 |
| Optimization | ES_APPM 311-3, IEMS 313, IEMS 450-1, IEMS 450-2, IEMS 451, IEMS 452 |
| Predictive Analytics | ES_APPM 420-2, ES_APPM 412, IEMS 462-1 |
| Linear Programming | IEMS 450-1, ES_APPM 322, ES_APPM 411-1 |
| Operations Research | ES_APPM 421-1, ES_APPM 495, IEMS 310, IEMS 450 |
| Statistical Dynamics | ES_APPM 322, MECH ENG 460-2, OPNS 516 |