

INFORMATION FOR PhD STUDENTS  
IN MATERIALS SCIENCE AND ENGINEERING  
2020-2021

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Northwestern University does not discriminate or permit discrimination by any member of its community against any individual on the basis of race, color, religion, national origin, sex, pregnancy, sexual orientation, gender identity, gender expression, parental status, marital status, age, disability, citizenship status, veteran status, genetic information, reproductive health decision making, or any other classification protected by law in matters of admissions, employment, housing, or services or in the educational programs or activities it operates. Harassment, whether verbal, physical, or visual, that is based on any of these characteristics is a form of discrimination. Further prohibited by law is discrimination against any employee and/or job applicant who chooses to inquire about, discuss, or disclose their own compensation or the compensation of another employee or applicant.

Northwestern University complies with federal and state laws that prohibit discrimination based on the protected categories listed above, including Title IX of the Education Amendments of 1972. Title IX requires educational institutions, such as Northwestern, to prohibit discrimination based on sex (including sexual harassment) in the University's educational programs and activities, including in matters of employment and admissions. In addition, Northwestern provides reasonable accommodations to qualified applicants, students, and employees with disabilities and to individuals who are pregnant.

Any alleged violations of this policy or questions with respect to nondiscrimination or reasonable accommodations should be directed to Northwestern's Office of Equity, 1800 Sherman Avenue, Suite 4-500, Evanston, Illinois 60208, 847-467-6165, [equity@northwestern.edu](mailto:equity@northwestern.edu).

Questions specific to sex discrimination (including sexual misconduct and sexual harassment) should be directed to Northwestern's Title IX Coordinator in the Office of Equity, 1800 Sherman Avenue, Suite 4-500, Evanston, Illinois 60208, 847-467-6165, [TitleIXCoordinator@northwestern.edu](mailto:TitleIXCoordinator@northwestern.edu).

A person may also file a complaint with the Department of Education's Office for Civil Rights regarding an alleged violation of Title IX by visiting [www2.ed.gov/about/offices/list/ocr/complaintintro.html](http://www2.ed.gov/about/offices/list/ocr/complaintintro.html) or calling 800-421-3481. Inquiries about the application of Title IX to Northwestern may be referred to Northwestern's Title IX Coordinator, the United States Department of Education's Assistant Secretary for Civil Rights, or both.

September 3, 2020

Dear Incoming Graduate Students,

## **Welcome to our Department!**

This booklet is prepared to aid you in your educational and research endeavors. Please read it carefully and be aware of the requirements and responsibilities described. The information supplied herein is more specific than that provided by the Graduate School (<http://www.tgs.northwestern.edu/>). You should also familiarize yourself with the general regulations of The Graduate School.

We hope your stay with us will be a most rewarding and pleasant experience. I look forward to getting to know you and working with you. I am always (well, almost always) available to help you with problems and to discuss your life at Northwestern. Please feel very free to come in to see me.

Erik Luijten  
Professor and Chair

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## **INFORMATION FOR GRADUATE STUDENTS**

Welcome to the Materials Science and Engineering Department. Please keep and refer to this booklet throughout your years as a graduate student. Every effort has been made to anticipate your questions-on adviser selection through final checkout. You are responsible for knowing this material!

### **I. TEMPORARY ADVISERS**

We will have a course advising session during New Student Orientation to assist you in selecting courses for your first quarter of study before online course registration for new students is available on Friday, September 11th.

### **II. PERMANENT ADVISERS**

#### **A. The Selection Process**

Students arriving for the Fall Quarter are given the opportunity to meet all our research active faculty members prior to selecting an adviser. Most of the faculty will opt for Zoom presentations of their research during New Student Orientation. Others may choose to meet with students individually. Faculty members giving Zoom presentations will encourage interested students to contact them for follow-up meetings. One-on-one student-faculty meetings are absolutely required as they aid the faculty in evaluating the qualifications of a given student. Individual sessions may be used to discuss specific research projects and availability of funding, but no formal or informal agreement as to adviser selection is to be made at this time.

Before 12:00 pm on Tuesday, December 1st, 2020 each student must submit a form to the Graduate Coordinator containing the student's first choice of research adviser and research topic. We require that a student meet individually with a prospective adviser prior to listing the faculty member as a preferred adviser. These choices will be collated, reviewed, and acted upon by the faculty. Students' preferences for permanent adviser and research topic will be honored to the extent possible. In the event that not all students are placed at the end of this process, unplaced students will be given a list of projects which are still available, and a second round of the selection process will take place. For this round, students will submit a ranked order of their top two choices, and the process will proceed as before.

Students entering in the winter, spring or summer quarter will work with the recruiting chair and the department chair to select an adviser prior to formal admission.

It is hoped that these processes will provide each student with an adviser who will satisfy the student's research interests. Faculty members in the Department conduct research over a wide spectrum of areas. Please be aware, however, that availability of any particular project is governed by the presence of funds to support that research.

In rare instances, a change of adviser may be necessary due to loss of funding or for other reasons. The Director of Graduate Studies handles such changes on an individual basis.

#### **B. The Faculty Adviser's Role and the Student's Study Plan**

The permanent adviser is available to provide advice concerning your graduate studies and must be consulted about course selection. The adviser must approve the Study Plan in GSTS and be consulted on any changes. The adviser may, especially in the early stages of your graduate career, provide fairly close direction of your thesis research. The adviser will also serve as chairman of the faculty committee that conducts your qualifying examination and your thesis defense.

Before registration for winter quarter begins (November 9th) a complete program of study should be planned, approved by your adviser and then submitted for approval by the Director of Graduate Studies. A Study Plan form is available online in the Graduate Student Tracking System (GSTS) at <https://gsts.northwestern.edu/site/login>. Any subsequent changes in this program must have the approval of the adviser and the plan must be updated in the student's file.

*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/about/policies/phd-degree-requirements.html#timeline>

### III. PhD DEGREE IN MATERIALS SCIENCE AND ENGINEERING

#### A. Course Load

Full-time enrollment is 3 or 4 units per quarter. Course and 590 (research) units should total to four each quarter. In the event that a student drops a class, they'll still be enrolled in 3 units and still be considered full-time.

Part-time students may study for the PhD in Materials Science and Engineering. Responsibility lies with the student to be aware of modified residency requirements and other conditions required by the Graduate School (<http://www.tgs.northwestern.edu/about/policies/general-registration-policies.html#parttime>). Part-time students may not receive financial aid from the Department. A study plan, approved by the adviser, must be submitted to the Director of Graduate Studies prior to any academic work. Fulltime students spend nearly two full years on course work followed by one, two, or more years of fulltime research. Part-time students should therefore anticipate a lengthy program with substantial release time from their employers in order to fulfill a part-time PhD. A leave of absence is often required to complete the thesis.

#### B. Research

Graduate study should be considered full-time employment. Students are expected to be fully involved in laboratory research under the supervision of their advisers, with a minimum 20-hour week requirement during coursework. After coursework is completed, a minimum of 40 hours per week is expected. Each student's research is evaluated by faculty at the Preliminary Evaluation at the end of the first year. It is the responsibility of the adviser to provide continuing feedback to the student regarding their progress after the first year.

#### C. Course Requirements

##### 1. Students Entering with BS Degree

Students entering with a BS Degree must take at least twelve courses. P/N grades are not allowed. Full-time students are required to take at least nine academic courses during their first three quarters (excluding the summer quarter) of graduate study at Northwestern. Enrollment in the core curriculum is mandatory. Petitions for exceptions due to course conflicts, etc., must be signed by the adviser and approved by the Director of Graduate Studies (DGS). In addition to the core courses, two additional departmental 400 level courses and four other electives (excluding 499) are required. According to University policy, students must maintain a 3.00 average to remain enrolled in The Graduate School. A Study Plan must be submitted in GSTS prior to the start of Winter registration (November 9).

GPA's are calculated according to the following scale: A = 4, A- = 3.7, B+ = 3.3, B = 3, B- = 2.7, C+ = 2.3, C = 2, C- = 1.7 and will appear on graduate student transcripts.

a. Core Courses in Materials Science and Engineering: The following six courses comprise the graduate core curriculum in materials science and engineering and are to be taken in sequence by all students in their first three quarters (excluding summer) of graduate study. Students are expected to maintain a minimum 3.2 GPA in the core courses.

Fall Quarter (1st Year)

401 Chemical and Statistical Thermodynamics of Materials

402 Structure of Crystalline and Noncrystalline Materials

Winter Quarter (1st Year)

404 Imperfections in Materials

408 Phase Transformations in Materials

Spring Quarter (1st Year)

405 Physics of Solids

406 Symmetry and Mechanical Properties of Materials

Students entering in the winter quarter should consult with their advisers concerning core course registration.

Preparing for the Core Courses:

Temporary advisers will assist students in determining their academic readiness for the graduate core program. To ensure adequate preparation, students may, with the permission of the adviser and DGS, include up to two courses in the twelve-course requirement from the following list of classes normally not open to MSE graduate students. The Preparation for Core Courses form must be submitted to the Graduate Coordinator prior to registration in the course. The course must aid preparation for core courses and must not correspond to any courses taken previously. MSE 451 is recommended for students with insufficient background in elementary quantum mechanics to prepare for 405; MSE 332 is recommended for students with insufficient background in mechanical behavior for MSE 406. Because of the math content of the core courses, Applied Math 311-1 and 2 may be useful for some students, particularly to strengthen knowledge of differential equations.

Classes normally not open to MSE PhD students:

315 Phase Equilibria and Diffusion in Materials

316-1, 2 Microstructural Dynamics

332 Mechanical Behavior of Solids

351-1, 2 Introductory Physics of Materials

360 Electron Microscopy

Waiving Core Courses:

Students who are sufficiently prepared in the subject matter of a core course may submit a waiver form signed by the instructor of the course and approved by the adviser and DGS. The instructors may require documentation, e.g. text used, course outline, lecture notes, exams, etc. The signed form should be given to The Graduate Coordinator 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.

The remaining 6 courses for the PhD are to be selected by the student in consultation with his or her adviser and must be specified on the Study Plan. These can be in the Department or in engineering, mathematics or the physical sciences provided they are approved for graduate level credit (<http://www.tgs.northwestern.edu/about/policies/general-registration->

[policies.html#authorized](#)) and are not among the 300-level MSE courses listed above. 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.

International students may take Linguistics 380, Spoken English for Non-Native Speakers, Linguistics 381, Written English for Non-Native Speakers and Linguistics 480, The Language of Teaching and Learning, in place of units of 590. These courses, however, do not count toward the 12 courses required for the PhD and may be taken P/N. See <https://www.elp.northwestern.edu/> for more information.

## 2. Students Entering with MS Degree

A maximum of five courses taken during study for an MS degree may be counted toward the 12-quarter course requirement if a grade of "B" or better was obtained in each course. All other requirements, i.e. six core courses, two additional 400-level MSE courses, and four electives must still be satisfied. P/N grades are not allowed for NU coursework. A 3.00 average must be maintained to remain enrolled in The Graduate School. The Graduate School requires that a minimum of nine graded courses be taken at Northwestern. For students entering with an MS degree, two quarters of MAT SCI 499 are allowed.

Permission to count courses taken during MS study against the six core courses may be granted by the individual instructors of those courses and approved by the adviser and Director of Graduate Studies. The instructors may require documentation, e.g. text used, course outline, lecture notes, exams, etc. If an exemption is granted, a signed waiver form should be returned to the Graduate Coordinator to be placed in the student's file. If the exemption is not granted, the student may still opt to take a representative final exam for the course. A grade of B or better is necessary to receive credit for the course. Please note that waived courses do not decrease the total number of courses required.

## D. Teaching Assistant (TA) Requirement

PhD students are required to serve as TAs during their graduate programs. The Assistant Chair assigns graduate students to assist in MSE classes with sufficient enrollments or laboratory requirements. Assignments vary in the number of hours per week and in tasks required (grading, office hours, assisting in lectures, etc.) Each doctoral student is required to serve as a TA for two to three quarters depending on the workload of the course and the experience gained. Students generally serve as TAs between their second and fourth years in the program. Prospective TAs are strongly encouraged to attend the training sessions offered by the Searle Center for Advancing Learning and Teaching (<https://www.northwestern.edu/searle/initiatives/grad/index.html>). Students are encouraged to serve more than the required minimum, particularly if a career involving teaching is a possibility. TAs currently receive modest additional compensation for their service, currently \$250/quarter for a 10-hour assignment and \$150/quarter for a 5-hour assignment. Each quarter you will receive a list of courses requiring TAs. The Assistant Chair makes actual assignments. Students will not necessarily assist in courses taught by their adviser. Because the workload necessarily varies between courses, the Department and cognizant faculty will make every effort to clearly establish the responsibilities associated with a given course at the time the assignments are being made. To assist in this effort, TAs are required to complete a TA Responsibility Form together with the faculty teaching the course.

## E. The Preliminary Evaluation

After three quarters students wishing to continue toward the PhD must undergo a Preliminary Evaluation by the entire faculty. The basis for the Preliminary Evaluation will be performance in

research, core course performance (a minimum 3.2 average is expected), overall grade point average, and adviser comments. Other factors such as the student's undergraduate major and work ethic may also be considered. An accurate study plan must be on file in GSTS.

The Research Report: Performance in research is evaluated through the student's provision of a research report, submitted to the Graduate Coordinator by September 1, 2020. The report is a one-page write-up of research progress (not a literature review) to date. It should follow the format as specified in the Preliminary Research Report.

Three possible outcomes will result from the preliminary evaluation:

- a. Satisfactory Progress: The student may proceed with coursework and begin to prepare for the Qualifying Examination.
- b. Questionable Progress: The student will be re-evaluated after a time period specified by the faculty. Students being re-evaluated after an additional specified time period will be notified whether their progress is "satisfactory" or "unsatisfactory".
- c. Unsatisfactory Progress: The student is not eligible for the PhD program. A student who fails the Preliminary Exam may consult with his/her adviser and the Associate Chair to determine the best course of action following this result.

Part-time students are required to complete all core courses prior to undertaking any other coursework. They will undergo the Preliminary Evaluation outlined above upon completion of the six core courses. If their progress is deemed "questionable", they will be reevaluated after a time period specified by the faculty.

## **F. The Qualifying Examination**

1. Time Requirements: Students entering with a BS degree must take the Qualifying Examination before the sixth week of their ninth quarter (including summers). Students are encouraged to take the examination earlier, if possible. Those entering with an MS degree must take the Qualifying Examination before the end of their fifth quarter (including summer). Exceptions for extenuating circumstances must be made by petition to the DGS by email, with the permission of the student's adviser.

Part-time students must take the Qualifying Examination within one quarter after completing coursework.

One of three possible outcomes will result from the qualifying examination:

- a. Pass: The student is now recognized by the Graduate School as a candidate for the Ph.D. degree.
- b. Conditional Pass: The Qualifying Examination Committee has the right to pass a student with the requirement that certain additional conditions (such as English proficiency – see below) be satisfied within specified time limits. Once these conditions are met, the student will be recognized by the Graduate School as a candidate for the Ph.D. degree.
- c. Fail: The student cannot work directly toward the Ph.D. degree. A student who fails the Qualifying Exam may consult with his/her adviser and the DGS to determine the best course of action following this result. Under extenuating circumstances, the student may be allowed to continue study within the department.

Students failing to pass the Qualifying Examination within the time limits outlined above are generally not eligible to receive financial aid from University sources (Research Assistantships, Fellowships, and Teaching Assistantships). With approval from the advisor and associate chair, exceptions can be made for students who have received a conditional pass.

The Graduate School does not recognize a candidate for the PhD degree until the Qualifying Examination is passed.

2. Qualifying Examination Procedure and Committee Makeup: The examination will be wholly or partially oral and may cover courses taken both in and out of the Department, though emphasis is normally on the student's specialty in Materials Science and Engineering and the proposed thesis research. The exam will be conducted by a committee consisting of three or more core faculty members of this Department (internal members) and at least one faculty member from another department, or a suitable expert in the field of the candidate's thesis from outside the University (external member). All committee members must hold doctoral degrees, and at least three committee members must be listed as members of the graduate faculty of the University. Faculty members with joint appointments in the Department are considered internal members of a committee, as are emeritus faculty from the MSE department. Faculty members with courtesy appointments can be considered as either internal or external members of the committee, provided that the committee has at least two core MSE faculty members.

Students should:

a. Personally contact each member of the committee asking if each is willing to serve and to find a date and hour satisfactory to each one. Reserve a conference room for at least 2 hours. Be sure to allow yourself time to set up.

b. Make sure their Study Plan is up to date, update the PhD Qualifying Exam and PhD Prospectus form in GSTS and complete the Request for Qualifier form. Update and have the adviser approve any changes on the Study Plan and obtain the DGS's approval.

c. Return the form to the Graduate Coordinator two weeks before the qualifying exam is to be held. Enter information into GSTS under PhD Qualifying Exam and PhD Prospectus.

d. Furnish each member of the committee with a copy of the proposed thesis research at least two weeks prior to the examination. A good proposal should be concise and convey all of the following in not more than 7500 words (about 20 pages of text): (1) The objectives of the research--what is to be accomplished. (2) The significance of the research--what impact the accomplished objectives would have, assuming the research progresses as planned. (3) The literature background--enough description of prior knowledge for readers to understand what is deficient that makes the proposed work important and useful, and what is known so that the proposed work has a reasonable chance of success. (4) A logical plan of attack—a description of foreseen difficulties, options, and plans to overcome the difficulties. (5) A brief description of the procedure, which could be theoretical, analytical, computational, or experimental. (6) A brief description of work completed by the student. Students are encouraged to base the structure of the thesis proposal on past outstanding examples of successful proposals as determined by the thesis adviser.

3. English Language Proficiency Requirement: All international students (except those from Australia, Canada, New Zealand, or the United Kingdom) are required to take the Versant test in fulfillment of the English proficiency testing requirement for international PhD and MFA students mandated by The Graduate School. Those students whose first language is not English are advised to take every opportunity to converse with others in English. The Linguistics Department offers Spoken English for Non-native Speakers (LING-380)

(<http://groups.linguistics.northwestern.edu/esl/courses.htm>). For those who wish smaller conversation groups, tutors are available through the Community Council for International Students (CCIS). Also, there are a number of Americans who wish to improve their knowledge of another language and are willing to exchange English conversation for (for example) Spanish conversation. For more information on these opportunities, call the current CCIS Chairman, whose phone number is available from the Office of International Student and Scholar Services (1-5613) or visit their website at <https://www.northwestern.edu/international/programming/community-council-for-international-students/ccis-conversation-partners.html>.

### **G. The Crown Family Graduate Internship**

PhD candidates may pursue participation in the Crown Family Graduate Internship Program, usually sometime after the Qualifying Examination, gaining practical experience in industry or national research laboratories in areas related to research interests. An internship can significantly boost the thesis effort and may provide a basis for future employment; the student and adviser should agree on the benefits of the position to the advancement of the student's PhD and career. The student works full time for three, six or nine months and generally is paid by the participating sponsor. In the rare instance where an internship is taken earlier in the student's program, it may postpone the Qualifying Exam.

### **H. Annual Reviews**

The Graduate School requires programs to conduct annual reviews of all students in the program. You will be notified in writing of the outcome of the review, and a copy will be placed in your file. The preliminary exam serves in this capacity for the first year and the qualifying exam for the third year.

More information can be found on the Graduate School's website at

<https://www.tgs.northwestern.edu/academic-policies-procedures/policies/satisfactory-academic-progress.html#criteria>.

### **I. The Thesis Defense/Final Examination**

Each PhD candidate must successfully pass a Final Examination based principally on work presented in the dissertation. A faculty committee, composed for the Qualifying Examination, conducts the examination; the same members normally serve on both committees. This examination involves a mandatory open and publicized oral presentation and discussion during the first hour followed by a closed examination with only the committee during the second hour. A conference room should be reserved for three hours.

Procedures:

Students should

- a. Contact committee members to set date and time.
- b. Submit a list of publications to the Graduate Coordinator.
- c. Receive the adviser'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.)
- d. Complete the Application for Degree in GSTS.
- e. Reserve a conference room. Give the Graduate Coordinator a Request for Final Defense form so that a public notice of the presentation can be posted. Supply names of committee members for submission to the Graduate School at least three weeks before the exam. Enter information regarding committee members, date and title of thesis in GSTS PhD Final Defense.

f. Note that the deadline for taking the exam and submitting the dissertation to the Graduate School varies each quarter. Consult the timetable on the Academic Calendar website for exact dates each year ([https://planitpurple.northwestern.edu/calendar/academic\\_calendar](https://planitpurple.northwestern.edu/calendar/academic_calendar)).

g. Be reminded that the format of the dissertation must conform to standards established by The Graduate School and available on their website:

<http://www.tgs.northwestern.edu/documents/policies/dissertation-format-guidelines.pdf>.

The Department further requires that titles and first and last page numbers be included in references. This requirement makes the list of references a much more useful document.

h. Present each examining committee member with a copy of the dissertation at least two weeks before the examination.

i. After final approval, submit a PDF copy to the Graduate Coordinator for the MSE collection.

j. Before final departure, complete the sign-out sheet, return borrowed items (theses, library books, etc.), properly dispose of all research chemicals, and be sure to leave a forwarding address with the Materials Science and Engineering Department office. Upon return of all keys, the key deposit will be returned.

## **J. Academic Standing**

### Criteria for Satisfactory Academic Progress

TGS sets the minimum standard for satisfactory academic progress. There are three sets of criteria that The Graduate School takes into account in determining whether or not students are making satisfactory academic progress:

1. Program length. Doctoral students must complete all requirements for the PhD within nine years of initial registration in TGS. Students who do not complete degree requirements by the established deadlines will not be considered in good academic standing, will be placed on probation, and will be subject to TGS 513 (advanced continuous registration).

2. Grades and cumulative GPA. A student whose overall grade average is below B (3.0 GPA) or who has more than three incomplete (Y or X) grades is not making satisfactory academic progress and will be placed on probation by TGS.

3. Internal milestone deadlines. Doctoral students who have not been admitted to candidacy (passed the qualifying exam) by the end of their third year, or who have not completed the dissertation prospectus by the end of the fourth year are not making satisfactory academic progress and will be placed on academic probation by TGS.

Failure to make satisfactory academic progress, as determined by the program, may be a result of (but is not limited to): core course GPA below 3.2, unsatisfactory performance on the qualifying exam, or unsatisfactory research progress.

Each student's academic progress is reported annually by the student's program to the student and to TGS. Failure to make satisfactory academic progress as determined by either The Graduate School or the program will result in probation or exclusion (dismissal).

### Petitioning for Extension

Students who have not achieved the GPA requirement or exceeded their time to degree deadline, qualifying exam or prospectus milestone deadline and cannot remediate within the two-quarter probationary period may petition TGS for an extension. The petition for an extension must contain the following information:

- The specific length of the extension including the exact date by which the requirement will be met. The extension time frame should be realistic.
- A detailed rationale for the extension
- A detailed timeline for meeting the new deadline including what work remains to be completed and the specific timeline, with proposed deadlines by which that work will be completed within the extension period

- A detailed letter of support for the extension from the Director of Graduate Study
- A detailed letter of support for the extension from the student's academic/research advisor

### Probation

A student who is not making satisfactory academic progress due to one of the reasons outlined above will be placed on academic probation by The Graduate School and/or the program. When a decision to place a student on probation is made by The Graduate School, the student will be notified in writing, along with the program's Director of Graduate Study, and will be given at most two quarters (not including summer quarter) to resume satisfactory academic standing. The Graduate School notifies students of probation status on a quarterly basis.

During the probationary period, students will remain eligible to receive federal and institutional assistance (except when they have exceeded their degree deadline). At the end of the probationary period, progress will be reviewed. If a student cannot re-establish satisfactory academic standing during the two probationary quarters, the student will become ineligible to receive financial aid and will be excluded (dismissed) from TGS.

When a decision to place a student on probation is made by the program, the student and The Graduate School must be notified in writing.

### Exclusion (Dismissal)

The University defines exclusion in the Student Handbook. A student who fails to resume satisfactory academic standing after at most two quarters (excluding summers) after being notified of placement on probation by The Graduate School will be excluded from The Graduate School. Under certain circumstances, a student can be excluded by a program without first being placed on probation. This may occur only if: the criteria for exclusion have been stated clearly by the program and have been disseminated to the students effectively, and both the Director of Graduate Study and either the Chair of the graduate program's student advisory committee or the Chair of the student's department approve the exclusion.

Funding will cease on the effective date of the exclusion unless other arrangements are made.

### Notification of Exclusion (Dismissal)

When TGS determines that a student is to be excluded, both the program and the student will be informed in writing (e-mail communication is considered to be "in writing") within five business days of the determination. Similarly, when a decision to exclude a student is made by the program, both the student and TGS must be informed in writing within five business days of the decision. The exclusion (dismissal) notification must include the effective date of the exclusion and a clear statement of the reason(s) for exclusion.

### Appeal Process

Students wishing to appeal a program's exclusion decision may appeal the final program exclusion decision to The Graduate School. To appeal a program decision, students should submit a request in writing to the attention of the Director of Student Services within ten days of the date of the program's final written determination of exclusion to the student and include any supporting materials at that time. If no appeal is filed within the ten-day appeal period, the program's decision becomes final and not subject to appeal.

Exclusion appeals are reviewed by the Dean of The Graduate School (or his designate) who 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 within 30 days of the submission and will be communicated in writing to both the student and the program. When resolution cannot be achieved within 30 days, students and programs will be informed in writing of the delay and the final disposition will be achieved as quickly as possible.

The Dean's decision is final in both program and Graduate School exclusions proceedings related to academic progress.

#### **IV. GENERAL INFORMATION**

##### **A. Stipend Checks**

All recipients of Research Assistantships or Fellowships must complete Employment Eligibility (I-9) forms, the Federal W-4 and IL W-4 forms for the University. International students must also complete the Alien Tax Status and other forms required by the Federal government. These forms are now on the web and the Human Resource Department will assist you. The I-9 form must be completed electronically (see <http://www.northwestern.edu/hr/payroll/e-verify/index.html>)

All checks must be direct deposit and hard copies are not available. To view your check, please use the FASIS Self Service website. Please note: To avoid financial problems at the beginning of Fall Quarter, all incoming students should be aware that you will not receive your first check until September 30th.

External Fellows: In order to process supplements and stipends, we *must* have copies of your original award letter and any renewal/adjustment letters in subsequent years.

Avoiding late fees: Tuition bills are online. If anything other than tuition is owed, the bill will be passed on immediately to the student for payment. If you have any questions regarding your tuition bill, see the Payroll Financial Assistant.

##### **B. Post-Qualifier bonus**

Beginning the quarter following a student's qualifier, the monthly check will be increased by approximately \$100 for research assistants and those fellows whose stipends are less than the department's base external fellowship level.

##### **C. Research Registration**

Doctoral candidates should enroll in courses and Mat Sci 590 Research (as appropriate) for the first eight quarters, then TGS 500 for the duration of the program. The timing of the Qualifying Exam has no bearing on appropriate registration.

Note: Summer registration is mandatory for all students on university support or on F1 or J1 visas.

##### **D. Pass/No-Credit Option**

Students working toward a PhD in Materials Science and Engineering may not use courses taken on a P/N basis to satisfy course requirements. Graduate students may, with the approval of their adviser, take courses on a P/N basis *after* satisfying the departmental course requirements.

##### **E. Academic Honesty**

Students are strongly advised that originality is essential in all laboratory reports, term papers, 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; failure to do so is considered plagiarism. The following statements help clarify 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 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<sup>33</sup> as follows..."

- b. Word for word quotes must have quotation marks at the beginning and end and be referenced in the manner described above.
- c. Figures should be referenced as described in a. above.
- d. Redrawn figures or plots made from other people's table of data can be appropriately labeled "after Smith<sup>43</sup>".
- e. 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](http://www.nap.edu/catalog.php?record_id=12192#toc). Northwestern's Office for Research Integrity policies are available online at:

<http://www.researchintegrity.northwestern.edu/research-misconduct/>. These two documents discuss ethical standards in the scientific community. Students should be familiar with the contents of these two documents, and how the principles of ethical conduct apply in an academic setting as discussed during the mandatory seminar series on responsible conduct in research. Students must enroll in GEN\_ENG 519 Responsible Conduct of Research during their first academic year. The Department expects the highest levels of integrity from students and faculty. Students must complete the mandatory CITI program assessment no later than December 1, 2020. A PDF copy of the completion certificate must be submitted with the advisor selection form on December 1<sup>st</sup> or the student will not be placed in a research group.

#### **F. Work Obligation of Graduate Students and Other Limits on Outside Compensation**

Students are expected to work on thesis research an average of no less than twenty hours per week while taking courses, and full time otherwise, for the research project from which the stipend, supplement and/or tuition are paid. Since all support monies are derived from government or industry contracts and grants, it is the students' responsibility to perform their assigned research tasks in a timely manner. It should be noted that most contracts require formal progress reports on the research performed.

Students are not to hold additional part-time jobs, except where there are exceptional extenuating circumstances and with the consent of the adviser and department chair. Awards won by students based on work done in the department should be discussed with the Business Administrator so that an account can be set up for proper disbursement of the funds. If the award includes salary support, the project derived stipend will be adjusted so that total support does not exceed that of the Cabell awards for the current year. However, the support from the research grant or contract cannot be less than the minimum specified for Graduate Research Assistant Tuition Scholarships. Other award money should be used to support the student's educational expenses; e.g., conference travel, books, computer purchases, etc. Accounting assistance is available from the department office if spending must be documented.

#### **G. Vacation Policy for Graduate Students**

Students receiving financial aid through the University (Research Assistantships, Fellowships, Teaching Assistantships) are entitled to staff holidays. Please note that the breaks between academic quarters, such as at Christmas and spring break, are not vacation periods. Paid vacation or excused absences must be arranged in advance with the faculty adviser. A paid

vacation of two weeks per year is considered normal for a student making satisfactory progress toward a degree. If approval from the adviser is not obtained before taking any time off, loss of financial support may result. Students electing not to take vacation are not entitled to any extra compensation.

#### **H. Student Support and Conflict Resolution**

The department has designated the following representatives as points of contact to interact in a confidential manner with students who have concerns as they arise:

Erik Luijten, Department Chair

Ken Shull, Director of Graduate Studies

Lincoln Lauhon, Associate Department Chair

Kathleen Stair, Assistant Department Chair

Alice Camacho, Department Business Administrator

Students who would benefit from support due to personal difficulties or interactions with persons outside the department are encouraged to contact any of the above representatives for guidance to appropriate university counseling resources. Students who have concerns arising from personal interactions within the department should raise said concerns as early as possible with any of the above representatives. We encourage students with a personal conflict to first attempt to resolve the conflict by speaking directly with the other party. If the student is not comfortable doing so for any reason, or the student is not sure whether there really is a “problem”, Alice Camacho and Kathleen Stair serve as confidential, non-research faculty points of contact. If a problematic situation is identified, and the student agrees, the Department Chair will be informed of the situation and the plan to address the conflict. If at any time the student feels that his or her concerns are not being understood or addressed, he or she may contact the Department Chair directly.

#### **I. Consumption of Alcoholic Beverages**

Consumption of alcoholic beverages in Cook Hall, 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.

#### **J. Student's File**

Each student has an electronic file in the Graduate Student Tracking System. They contain application materials, approved study programs, grades for completed courses, records of completed examinations, names of committee members, current address, phone numbers, etc. In accordance with Government regulations a student is allowed access to his or her file. 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 <http://theworknumber.com>.

#### **K. Change of Address**

The Department Office must be notified of any change of address. Students may change address through the HR website <https://www.northwestern.edu/myhr/index.html> 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 F1 or J1 status and could result in severe consequences for them and their dependent(s)!

#### **L. International Students**

Upon arrival all international students must register immediately with the Office of International Student and Scholar Services, 630 Dartmouth Place, Evanston Campus, who will act as adviser on all matters concerning employment practice, visa renewals, etc.

#### **M. Colloquium Series**

The Department organizes, at considerable expense, the colloquium series, "Advances in Materials Science". Its primary purpose is to broaden the education of each graduate student by bringing to campus the leaders in our field. Attendance is required of all graduate students.

#### **N. Safety**

Although the University and faculty project advisers strive to maintain a safe working environment, students must continually be vigilant regarding safe laboratory practice and equipment. No amount of information and training can replace common sense on the part of the experimenter. If you are uncertain about the safety of a procedure, contact your faculty adviser, the Assistant Chair Kathleen Stair, or the Office of Research Safety, (1-5581). The department has taken a number of steps to help provide a safe environment for your research. Each incoming student is given a copy of the Cook Hall Emergency Evacuation Plan, which describes the building's alarm system and evacuation procedures. You must read this material carefully and retain it for future reference. Safety glasses and appropriate clothing must be worn at all times when carrying out experiments in the laboratory or the shop. Safety glasses are available through the Laboratory Stockroom KG48 or your adviser. Safety glasses and lab coats are available, free of charge, through the Office of Research Safety. Handbooks of dangerous materials and lists of biohazardous/carcinogenic chemicals are available from Research Safety in Tech NG71, and from your adviser. Attendance at department safety meetings is required. Special safety procedures apply to the Instrument Shop. Students are encouraged to use certain shop equipment provided they are familiar with the equipment. Check with your adviser for current information.

#### **O. Keys**

Graduate students will receive keys for Cook Hall, for their laboratories and offices. In order to get your keys, you must complete a key request form and return it to Kristina Lugo ([kristina.lugo@northwestern.edu](mailto:kristina.lugo@northwestern.edu)). Students working on research projects may be issued keys to project laboratories (from MSE office) and MRC central facilities (from the MRC Office in the Jacobs Center, room 5246) upon approval of the faculty member responsible for that laboratory. **Keys must not be passed on to anyone else.**

Students are not to enter the office of a faculty member at any time when the faculty member is not present, and students may not be in the Department Office outside normal working hours, generally 8:30 AM to 5:00 PM. Office hours may be limited due to COVID-19.

#### **P. Computer/Design Labs**

Computers are available for individual use in the Undergraduate Teaching Lab in Cook 2022 and the Bodeen-Lindberg Materials Design Studio in Tech C115. However, these are not meant to substitute for the computers that should be found in an adequately equipped research group. Access is generally limited: classes and MSE undergraduates are given first and second priority use of the machines. Both rooms may be unavailable during lab periods. These facilities are intended for academic use only. New students are assigned a user ID based on their NU net ID. Other individuals who require access may submit their request to the lab/studio manager, Dr. Kathleen Stair in Cook 2022. 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. Access to the labs after hours is by access code for a numeric pad (Tech C115). Please do not share the access code with non MSE people. Access may be limited due to COVID-19.

#### **Q. Desk and Research Space Assignment**

A desk for personal use will be assigned to each graduate student once the permanent adviser has been assigned. The assignment of both desk and research space are handled by your adviser; please see him or her concerning any move you wish to make. No changes should be made without your adviser's authorization. Be sure to inform the Department Office of any changes in office assignment.

#### **R. Telephone and Mail Service**

Personal calls should be made on cell phones. Each laboratory is provided with a telephone for calls connected with University business.

Persons who may have occasion to call you from outside the University should be given the telephone number of your lab or office. Collect calls are not acceptable, by Northwestern regulations.

U.S. Postal Service. Mail is delivered once a day to the Department Office, usually around lunchtime. The student mailboxes are in the main office, Cook 2036 in mail bins alphabetized by last name. Due to current COVID restrictions, mail pick-up is by appointment only. You can schedule an appointment for pick-up here:

<https://outlook.office365.com/owa/calendar/NorthwesternMaterialsScienceDepartment@nuwildc.at.onmicrosoft.com/bookings/>. **We strongly encourage you to send all mail to your**

**personal address as we receive excessive amounts of paper mail to the department office which can lead to mailings being lost.** Use of the University mailing address for personal mail is not allowed by NU regulations. The US mail basket in the office is for university business only.

#### **S. Photocopying, Copy Cards, and Faxing**

Photocopying machines for research related copying are available in the Department Office, and in the south corridor of the third floor of Cook Hall. A user code, which can be obtained from the department, is required. Copy cards for use in copying machines at the library are available through the Wildcard Office or at Seeley Mudd 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 machines.

A fax machine is located in the Department Office. International faxes require an access code. See the department for personal faxes.

## T. 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>. *Argonne and other off-campus students must obtain daily parking stickers for \$8.25 if they choose not to purchase the yearly sticker.* 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. *Students working at Argonne are not eligible for mileage reimbursements.*

## U. Purchases

Please note: Primary Investigators (PIs) are required to sign off on purchases on their sub award—either electronically or manually.

### iBuyNU Orders:

1. Please assign all iBuyNU carts to [michele.mcmanmon@northwestern.edu](mailto:michele.mcmanmon@northwestern.edu). Include the justification and chart string in the notes section when assigning the cart.

### Non-iBuyNU Orders:

All orders that cannot be purchased using iBuyNU should be submitted with the MSE purchase request form, currently obtained by e-mailing MSE purchasing staff.

1. Please complete the purchase request form and save the file as: first initial.last name.vendor.PI.date (eg: E.Blair.McMaster.Murphy.0804).
  - a. Check with MSE purchasing staff to see if the vendor is an NU vendor. If not, determine if the products can be purchased using an approved NU vendor. Otherwise, please provide the vendor's contact information so that we can obtain a W-8 or W-9 from vendors who agree to NU terms. In addition to this, you will need to complete a conflict of interest form for the office.
  - b. PDFs of quotes are encouraged, but not mandatory.

### Both iBuy NU and Non-iBuy NU Orders:

1. PI Approval Process, varies by group.
  - a. Electronically: Forward the purchase order (including items requested, total cost, chart string, & justification) to the PI for approval. The PI should forward the approval to [MSEPurchasing@northwestern.edu](mailto:MSEPurchasing@northwestern.edu) with a simple "approved" note in the body of their email. These "*electronic signatures*" will be saved in our file system.
  - b. Blanket approvals: some PIs allow for purchases under a certain dollar amount to be processed without their email approval. Above that dollar amount, email approval is needed.
2. A robust justification is needed for all orders. The justifications don't need to be long, they just need to explain what, why, and how clearly. A justification stating "I need 10 units of bottled gas to work on my project" is true, but not sufficient.
3. If an item ordered is Capital Equipment over \$5k, then the following form needs to be completed and sent in with the PO submission:  
<https://www.northwestern.edu/controller/accounting-services/equipment-inventory/capital-equipment-purchase-form-effective-7.25.2019.pdf>

### Shipping & Receiving:

All orders for MSE will be available for pick up in Tech D110 M-F between 12:00pm – 1:00pm, unless otherwise noted on your requisition. MSE staff will forward tracking updates received from the company and it is your responsibility to check when your package will arrive. The only exception is you will receive an email for perishable packages which are available for pick-up in Tech MG92 between 8:00am – 4:00pm. Please be sure to email packing slips for non-iBuy orders and receivers to [msepurchasing@northwestern.edu](mailto:msepurchasing@northwestern.edu). If the packing slip is lost or is not provided please e-mail MSE purchasing upon receiving the complete shipment. Otherwise, you may receive an email from MSE staff requesting confirmation your order has been received. Please respond promptly to these emails to indicate the order status and estimated ship date (obtained from vendor) or notify us that the order has been received, using the PO number and status of the order (RECEIVED or EXPECTED DATE) in the subject line.

**\*\*Note that the status of RECEIVED indicates that you are fully satisfied with the product, the order is complete and you are authorizing payment to be released. Without processing a receiver, payment cannot be released by Accounts Payable on non-I BUY orders.**

The University is exempt from Illinois Sales Tax. A Sales Tax Exemption form is available in the department office, to be used to apprise stores that your purchase is for Northwestern so that tax will not be charged. We are not permitted to reimburse state taxes.

### **V. Services and Supplies in Tech**

Please note that most facilities have usage fees. Students must have the permission of their advisers before charging any time on equipment or obtaining supplies from any storerooms. Make sure accounts used are active and proper account codes are open before charging.

1. University Instrument Shop (NG40): Graduate students in the Materials Science Department may find that the machine shop can play an important role in the conduct of their thesis research. The Shop Foreman will be happy to help students with problems relating to machining or participation in the student shop program.

2. Laboratory Stockroom KG48:

<https://www.northwestern.edu/procurement/purchasing/purchasing-strategic-sourcing/stockroom-ordering/>

### **W. The Materials Science Student Association (MSSA)**

The MSSA was established in 1960 as the Student Chapter of ASM/AIME. 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.

### **X. U-Pass**

All full-time students will receive a U-Pass, which allows unlimited rides on the CTA. Information about use of the U-Pass and distribution dates is available at <http://www.tgs.northwestern.edu/campus-life/housing-transportation/u-pass.html>

### **Y. Bike Riding and Skateboarding**

For obvious safety reasons, bike riding and skate boarding are prohibited in the corridors of Tech and Cook. In addition, bikes may not be stored in labs or in public spaces in the building.