

**INFORMATION FOR PhD STUDENTS
IN MATERIALS SCIENCE AND ENGINEERING
2011-2012**

September 13, 2011

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 in the *Graduate School Bulletin*. 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.

Michael J. Bedzyk
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

During New Student Week, you will be assigned a temporary adviser who will assist you in selecting courses for your first quarter of study, and you will have time to meet with him/her before online course registration for new students is available on Friday, September 16th.

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 group presentations of their research during New Student Week. Others may choose to meet with students individually. Faculty members giving group 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 noon on Monday, October 10th, 2011, each student must submit a form to Laura Gerety containing the student's first, second, and third choices of research adviser and research topic. A fourth choice is encouraged but not required. Three choices must be indicated, though it is permitted to include two (but not three) research projects of one faculty member. In this case, a fourth choice (third possible adviser) must be indicated. We require that a student meet individually with a prospective adviser prior to listing the faculty member as a preferred adviser. These lists will be collated, reviewed, and acted upon at a meeting of the faculty. Students' preferences for permanent adviser and research topic will be honored to the extent possible. Any student who can be accommodated only by his or her third choice will be consulted by the Department Chair before final assignments of permanent advisers are made.

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.

Part-time students may take up to a full quarter to select a permanent adviser.

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 Department Chair 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 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 14) a complete program of study should be planned, approved by your adviser and the Associate Chair and submitted to Jeannine Hall. A Study Plan form is available online. 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/academics/academic-services/phd/index.html>.

III. PhD DEGREE IN MATERIALS SCIENCE AND ENGINEERING

A. Residency and Course Load

The minimum residence requirement for the PhD degree is eight consecutive quarters, including summer, at Northwestern. **Course and 590 (research) units should total to four each quarter.**

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/academics/academic-services/registration/part-time-study/index.html>). Part-time students may not receive financial aid from the Department. A study plan, approved by the adviser, must be submitted to the Associate Chair prior to any academic work. Full-time students spend nearly two full years on course work followed by one, two, or more years of full-time 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. Annual research progress reports must also be submitted by the student in June of each year following the first year.

C. Course Requirements

1. Students Entering with BS Degree

Students entering with a BS Degree must take at least fifteen 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 Associate Chair. In addition to the core courses, four additional 400 level MSE courses (excluding 499), or 400 level courses in other departments that are taught by MSE or courtesy faculty, are required. According to University policy, students must maintain a 3.00 average to receive financial assistance. A Study Plan must be submitted to Jeannine Hall prior to the start of Winter registration (November 14).

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 and will appear on graduate student transcripts.

a. Core Courses in Materials Science and Engineering: The following five 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.

Fall Quarter (1st Year)

401 Chemical and Statistical Thermodynamics of 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 and core-course instructors will assist students in determining their academic readiness for the graduate core program. To insure adequate preparation, students may, with the permission of the adviser and Associate Chair, include up to two courses in the fifteen 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 Jeannine Hall 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.

Classes normally not open to MSE graduate 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 Associate Chair. The instructors may require documentation, e.g. text used, course outline, lecture notes, exams, etc. The signed form should be given to Jeannine Hall 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.

b. Minor Field of Study: PhD students are required to increase the breadth of their knowledge by taking at least two advanced courses *outside of the area of their research specialty*. These two courses should be closely related so as to constitute an identifiable minor field of study. They may be from within the Department provided they are 400-levels, or outside the Department if in engineering, mathematics or the physical sciences, and if listed in the *Graduate School Bulletin* (300-levels permitted). Students are encouraged to get an early start on taking their minor courses.

The courses for the minor field of study must be declared on the Study Plan and approved by the adviser.

The remaining of the 15 courses for the PhD is 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 listed in the *Graduate School Policy, Program, and Course Catalog* (http://www.tgs.northwestern.edu/documents/academic-programs/10_11_Course_Catalog_rev1_11.pdf) 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.

A student may apply one unit of 499 (Projects) toward the 15-course requirement (but not the four 400-level MSE course requirement).

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 Teachers, in place of units of 590. These courses, however, do not count toward the 15 courses required for the PhD and may be taken P/N.

2. Students Entering with MS Degree

A maximum of eight quarter courses taken during study for an MS degree may be counted toward the 15 quarter course requirement if a grade of "B" or better was obtained in each course. All other

requirements, i.e. five core courses, four additional 400-level courses, and a minor field (section III.C.b.) must still be satisfied. Transferred courses (included in the eight) can be used for these. Transferred courses should be listed on the study plan *with the grade received*. P/N grades are not allowed for NU coursework. A 3.00 average must be maintained to receive financial assistance. The Graduate School requires a minimum of nine graded courses taken at Northwestern.

In the event that an entering student has been enrolled in, but not completed, a degree-granting MS program, a maximum of eight courses satisfactorily completed with a grade of "B" or better while in that program may be counted toward the PhD requirements. Again, all other requirements, i.e. core, 400-level, and minor course requirements, must still be fulfilled; transferred courses can be used for these.

Permission to count courses taken during MS study against the five core courses may be granted by the individual instructors of those courses and approved by the adviser and Associate Chair. 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 Jeannine Hall 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 transfer credit for the course. Please note that waived courses do not decrease the total number of courses required.

D. Teaching Assistant (TA) Requirement

Whether students intend to follow careers in academia or in industry, presentation skills and the ability to function in a question and answer setting are invaluable. To this end, PhD students are required to serve as TAs during their graduate programs.

The Department assigns graduate students to assist in MSE classes with large 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 Teaching Excellence (<http://www.northwestern.edu/searle/programs/graduateprograms/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 \$150/mo for a full time 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.

E. The Preliminary Evaluation

1. PhD Students Entering with BS Degree: After completing nine course credits and the required core courses, 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, 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.

The Research Report: Performance in research is evaluated through the student's provision of a research report, submitted to Laura Gerety on or before the last day of classes of the 3rd quarter of course work (June 1, 2012). 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. The report must be prepared in a 12-pt. font.

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. Under extenuating circumstances, the student may be allowed to continue study within the department.

2. PhD Students Entering with an MS Degree: Full-time students are required to take at least six academic courses, for letter grades, during the first two quarters (excluding summer) of graduate study as a PhD student. Any core courses being offered for which the student does not have transfer credit must also be taken. A signed study plan should be submitted before registration for the second quarter of study (November 14, 2011). Before their third academic quarter, these students must undergo a Preliminary Evaluation. (Submit the research report before second quarter exams, as indicated above.) In the event that the student is deemed to be making "questionable progress", he or she will be re-evaluated after a time period specified by the faculty. At this time the decision will be "satisfactory" or "unsatisfactory", with the outcomes as spelled out above.

3. Part-time PhD Students: 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 five core courses if entering with a BS, or three if entering with an MS. If their progress is deemed "questionable", they will be re-evaluated 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 Associate Chair, signed by 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:

- 1) Pass: The student is now recognized by the Graduate School as a candidate for the Ph.D. degree.
- 2) 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.
- 3) 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 Associate Chair 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.

- 3. 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) Obtain their Study Plan and a complete the Request for Qualifier form. Update and have the adviser initial any changes on the Study Plan and obtain the Associate Chair's approval.

c) Return the form and the approved Study Plan to Jeannine Hall **three weeks** before the qualifying exam is to be held. Enter information into Caesar under PhD Prospectus.

d) Furnish each member of the committee with a copy of the proposed thesis research **at least ten calendar days** prior to the examination. A good proposal should be concise and convey all of the following in not more than 20 pages: (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 Requirement: 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) described in the *Graduate School Policy, Program, and Course Catalog*. 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 International Office (1-5613).

The committee for the PhD Qualifying Examination will judge the candidate's ability to understand and convey ideas in the English language. Committee members will recommend needed courses or tutoring in this area and the Qualifying Examination will not be considered complete by the department until this requirement (as well as the others) is fulfilled *to the committee's satisfaction*. If the student passes the technical portions of the examination, but not the language portion, the student will be certified as having passed only the minimum requirements of The Graduate School. (However, the student will be responsible for all tuition costs until the English language requirement is satisfied, in view of the research time lost in continued study of English.)

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. In subsequent years, the student will prepare a one-page annual report of research progress to be submitted in June. This report will be reviewed by the thesis committee and associate chair and feedback provided as necessary.

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.

Procedures:

Students should

- a) Contact committee members to set date and time.
 - b) Submit a list of publications.
 - 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) Reserve a conference room. Give Jeannine Hall 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 on the Caesar website under PhD Final Defense.
 - e) Note that the deadline for taking the exam and submitting the dissertation to the Graduate School varies each quarter. Consult the timetable on the Graduate School website for exact dates each year.
 - f) Be reminded that the format of the dissertation must conform to standards established by The Graduate School and available on their website at http://www.tgs.northwestern.edu/documents/academic-services/guidelines_for_students.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.
- g) Present each examining committee member with a copy of the dissertation **at least two weeks** before the examination.
 - h) After final approval, turn in one unbound copy of the dissertation to the Department office to be bound (at department expense) for the MSE collection. (Additional copies may be given to the office to be bound at the student's expense.) Also furnish the Department with a copy of the abstract, and the

Certificate of Careful Editing, signed by the student and adviser.

i) 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

The Graduate School details procedures for determining Good Academic Standing, Probation, and Exclusion. See the Graduate School website at <http://www.tgs.northwestern.edu/academics/academic-services/satisfactory/index.html> for details.

IV. GENERAL INFORMATION

A. Stipend Checks

All recipients of Research Assistantships or Fellowships must complete Employment Eligibility (I9) 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 by the start of classes 9/21/10** (see <http://www.tgs.northwestern.edu/financialaid/payrolleverify/>). In addition, the department will need a copy of your completed Personal Data Form.

All checks are must be direct deposit and hard copies are not available. To view check, please check the HRIS 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.**

Research Assistants and University Fellows: Since you do not start your University activities on the first of September, your September paycheck will be adjusted accordingly. Subsequent paychecks will reflect the full monthly stipend noted in your offer letter.

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 on line. 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 Julie Dell.

B. Post-Qualifier bonus

Beginning **the quarter following a student's qualifier**, the monthly check will be increased by \$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 Mat Sci 590 Research for the first eight quarters, then TGS 500 for the duration of the program.

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 an MS or 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; otherwise plagiarism will have been committed. The following statements should help define what is meant by "appropriately referenced":

a. All ideas, data, mathematical expressions, and word quotes taken from the works of others should be clearly and directly 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 Jones³³ 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. Photocopied 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 Smith⁴³".

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. Northwestern University's *Guidelines for*

Investigators in Scientific Research is available online at <http://www.research.northwestern.edu/ori/misconduct/documents/GuidelinesforInvestigatorsinScientificResearch.pdf>. These two documents discuss ethical standards in the scientific community. Students should be familiar with the contents of these two documents. The Department expects the highest levels of integrity from students and faculty.

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 Laura Gerety 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:

I. Consumption of Alcoholic Beverages

Consumption of alcoholic beverages in the Materials/Life Science Building, 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

Folders are kept in the department offices for each student. 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 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 <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://nuhr.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 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 International Student Office, 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, a member of the Department Safety Committee, 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 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 Chemistry Storeroom or your adviser. Prescription safety glasses and lab coats are available, free of charge, through your adviser. 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, and for Room 2032 (student mailboxes). In order to get your keys, you must obtain an application in the Department Office, to be filled out and returned to Molli Connell with a key deposit of \$15 (cash only).

Students working on research projects may be issued keys to project laboratories (from MSE office) and MRC central facilities (from the MRC Office in K111 Tech) 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 after normal working hours, generally 8:30 AM to 5:00 PM.

P. Computer/Design Labs

Computers (both Mac and PCs) are available for individual use in the Undergraduate Teaching Lab in Cook 2068 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 managers, Dr. Kathleen Stair in Cook 2068. Managers 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 your Marlok building key (Cook 2068) or an access code for a numeric pad (Tech C115). Please do not share the access code with non MSE people.

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.

Long distance calls require an access code. Students may be assigned their own codes, but the adviser must give approval for this to Laura Gerety in writing. 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 Cook 2032; you will find your mail and messages in your assigned box. It is advisable to check your mailbox *daily*. 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. Long distance 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 1819 Hinman, 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 www.northwestern.edu/up/parking. ***Argonne and other off-campus students must obtain daily parking stickers for \$7.50 from the Department Office 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 eligible for mileage reimbursements.

U. Purchases

Please note: Primary Investigators (PIs) are required to sign off on 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 Molli Connell, mbconnell@northwestern.edu
2. PI Approval Process, electronically or manually: **Carts cannot be processed without approval!**
 - a. **Electronically:** Shoppers should take a screen shot of the shopping cart and email it to the PI for approval after saving the cart with **LAST NAME/CHART STRING** in heading of cart. If the chart string is not available, the PI should provide a chart string in the approval e-mail.
The PI should forward the email to mbconnell@northwestern.edu with a simple “approved” in the body and the screen shot of the cart attached.
 - b. **Manually:** If a quick response is not received, requesters will be informed to print the cart and obtain a signature from the PI.

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: **LAST NAME/DATE/VENDOR NAME**
 - a. Check with Cook 2036 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-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.
 - c. If the order is over \$25,000 a Single Source Justification or Bid document needs to be submitted.

2. PI Approval Process, electronically or manually: **Electronic versions are always preferred**
 - a. **Electronically:** Forward the electronic purchase order to the PI for approval. The PI should forward the attachment to 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. **Manually:** signed forms can be dropped off to Cook 2036 or scanned and emailed to MSEPurchasing@northwestern.edu

Shipping & Receiving:

All orders for MSE will be shipped to Cook 2036, unless otherwise noted on your requisition. You will be notified via e-mail when your package arrives. Please be sure to submit packing slips for non-iBuy orders and receivers to the purchasing agent for processing. If the packing slip is lost or is not provided please e-mail MSE purchasing upon receiving the complete shipment. For outstanding orders over 30 days, you will get an email requesting a status update on your order. **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.

Order Processing & General Purchasing queries:
Materials Science Purchasing
MSEPurchasing@northwestern.edu

Questions or concerns:
Molli Connell
mbconnell@northwestern.edu

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 will find that the machine shop plays 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 Operated by VWR International
<http://www.univsvcs.northwestern.edu/labsupplies/stockrooms.htm>

W. The Materials Science Student Association (MSSA)

The MSSA was established in 1960 as the Student Chapter of ASM/AIME. Jointly with the undergraduates' Materials Science Club, it is an official student chapter of ASM and TMS-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/studentlife/Upass/>.

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.**