

School of Materials Science and Engineering
Georgia Institute of Technology

Graduate Student Handbook

2016-17



materials science and engineering

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A. INTRODUCTION

The purpose of this Handbook is to acquaint all graduate students entering the School of Materials Science and Engineering with the relevant requirements and procedures. The general rules and regulations governing all graduate students at Georgia Tech (GT) are contained in the Georgia Tech General Catalog (<http://www.catalog.gatech.edu/>), particularly in the section entitled “Information for Graduate Students”. **All MSE graduate students must carefully read and become familiar with both the Georgia Tech General Catalog and the MSE Graduate Handbook.** The MSE handbook should be viewed as a supplement to the material in the General Catalog. Although some portions of the material in the General Catalog will be repeated here, this handbook is not a substitute for the GT Catalog or the GT Graduate Office website.

Graduate students should consult their advisors or the School Office for Graduate Studies & Research for further information regarding curricula, research areas, and other program-related matters. The School Office for Graduate Studies & Research should also be consulted regarding financial assistance, assistantships, fellowships, tuition waivers, etc. The necessary forms for handling matters such as dropping courses, proposed and approved programs of study, petitions for degree, etc., can be obtained from the MSE main office or online at <http://www.gradadmiss.gatech.edu/thesis/forms.php>.

Other general sources of information for MSE graduate students include the following:

- MSE School Web Site: <http://www.mse.gatech.edu/>
- Information on various inter-disciplinary certificate programs GT: <http://www.catalog.gatech.edu/colleges/coe/geninfo/multidisc.php>
- Graduate Student Handbook (covering all GT students): <http://www.grad.gatech.edu/student-handbook>
- Graduate Student Government information: <http://www.sga.gatech.edu/graduate>
- Manual for Graduate Theses: <http://www.grad.gatech.edu/sites/default/files/documents/thesismanualapr15.pdf>
- OSCAR, listing all classes to be offered in the following semesters, also containing registration instructions (<https://oscar.gatech.edu/>)
- Information specific for international students available in the Office of International Education (<http://www.oie.gatech.edu/>)

For more information regarding the MSE graduate program, please contact the Graduate Program Manager or the Associate Chair for Graduate Program:

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B. GRADUATE PROGRAM OVERVIEW

The MSE graduate program is broadly focused in materials research primarily at the Ph.D. level. However, a limited number of admissions are also granted to students wishing to pursue M.S. degrees. The MSE School dates back over a hundred years, the graduate program is fairly young and evolving, and is rapidly establishing itself as one of the leading research and education programs in Materials Science and Engineering. MSE graduates are hired by the leading companies, government laboratories, as well as academic institutions, both nationally and internationally. The MSE School has 38 full time or joint faculty, with an additional almost 30 courtesy or adjunct appointments associated with the school. Approximately two thirds of the full time faculty specialize in hard materials with the remainder specializing in polymers and soft matter. There are also approximately 200 students in the MSE graduate program. Students with a B.S. or M.S. degree in Polymer Science and Engineering, Chemical Engineering, Materials Science and Engineering, Mechanical Engineering, Textile Engineering, Chemistry, Biomedical Engineering, Biology, Physics, or in a related field of science and engineering can be admitted in the Ph.D. program. Ph.D. admissions are generally granted with financial assistance in the form of graduate research assistantships.

The MSE faculty has diverse backgrounds and expertise in the areas of Materials Science and Engineering, Polymer Science and Engineering, Chemical Engineering, Mechanical Engineering, Textile Engineering, Chemistry and Physics. The MSE students, research scientists, and faculty are engaged in research in the following strategic areas:

- *Polymers and Macromolecules*
- *Biologically Enabled and Bioinspired Materials*
- *Nanomaterials and Nanoengineered Devices*
- *Computational Design, Modeling, and Simulations*
- *Functional Electronic and Optical Materials*
- *Fibers and Composites*
- *Energy Storage and Harvesting*
- *Advanced Structural Materials*
- *Multi-scale Structural & Chemical Characterization*

C. Ph.D. DEGREE PROGRAMS

The School of Materials Science and Engineering offers a program of study and research leading to the Doctor of Philosophy degree. The Ph.D. degree recognizes demonstrated proficiency and high achievement in research. Beyond mandatory core classes the students in the Ph.D. program pursue an individually structured study plan culminating in a dissertation that makes an original and substantial contribution to the fundamental knowledge in the field of study.

The graduate student will work with the Faculty Advisor to develop a Program of Study consistent with the student's educational objectives and the School's mission and submit it to the School Office for Graduate Studies & Research by the end of the first semester in residence for review and approval.

C.1. REQUIREMENTS FOR THE Ph.D. CANDIDACY

When starting the Ph.D. program students are considered to be 'probational' Ph.D. students, until they successfully complete the qualifying requirements at which point they become 'candidate' Ph.D. students. The requirements for the Ph. D. candidacy are outlined below:

C.1.1. Placement Mechanism (administered by the School Graduate Committee)

Based on student records and the chosen area of research, the 'major' course work requirements for an incoming graduate student will be chosen during their first semester. The majority of incoming students will be expected to follow the MSE course work, and complete the Ph.D. candidacy requirements in 1 academic year. In some cases, such as students entering the program without a sufficient subject background, pre-requisite classes will be recommended. In this latter case the student will normally be working on a two-year cycle to complete the Ph.D. candidacy requirements.

C.1.2. Major Course Work

All graduate students starting their Ph.D. program are required to take the core courses in the 1st year. Students must complete all core courses with a minimum grade of B in each course before proceeding to the qualifying examination. Students who receive a 'C' or lower grade in a core course will be given only one chance to improve their grade in that course. Students will be dropped from the Ph.D. program having either 2 'C's or a combination of a 'W' and a 'C' in core courses. (6 Hours)

The total number of hours required for a Ph.D. depends on whether the student enters with a BS or suitable MS (see table in Section C 1.9). Three credit hours toward a graduate degree may be taken for courses under the pass/fail system, only if the major school has approved the course prior to taking it. The rules for withdrawal from letter grade courses apply to pass/fail courses as well. Institute rules for the pass/fail system can be found at:

<http://www.catalog.gatech.edu/rules/10/>

Failure to comply with all of these standards will terminate the students' degree candidacy.

Core and major course work is described below.

Core Courses	Hours	Description
MSE 6411 (Fall)	3-0-3	THERMODYNAMICS
MSE 6412 (Fall)	3-0-3	STRUCTURE OF MATERIALS

Other Required Courses	Hours	Description
MSE 8001 seminar** Seminar (8801S)	1-0-1	Technical Communications Every Fall and Spring Semester
RCR (Online CITI and in-person PHIL6000 class) Safety Seminar and MSE Safety Exam		http://rcr.gatech.edu/

** Minimum requirement – can be substituted for an approved technical communication alternative. Alternative advanced technical communication courses include MSE 6754, Engineering Communication. Only 1 hour of the alternative course credit will be allowed to satisfy total MSE hours required.

Ph.D. Requirements

- Students must complete all core courses with a minimum grade of B in each course before proceeding to the qualifying examination. Students who receive a 'C' or lower grade in a core course will be given only one chance to improve their grade in that course. Students will be dropped from Ph.D. program having either 2 'C's or a combination of a 'W' and a 'C' in core courses. (6 Hours)
- Twenty one hours from approved MSE curriculum (21 hours)
- Nine hours in an approved minor (9 hours)
- Pass the qualifying exam
- Complete all course work with a minimum GPA of 3.0
- Write, present and defend a Ph.D. dissertation

Additional Ph.D. Requirements

- 37 credit hours are required for Ph.D. if direct from B.S.
- 25 course credit hours are required for Ph.D. if direct from M.S.

*MSE Approved Elective Courses (*not limited to*):

MSE 6010	Functional Materials
MSE 6105	Diffraction Studies
MSE 6110	Transmission Electron Microscopy
MSE 6120	Quantitative Characterization of Microstructures
MSE 6130	Surface Characterization
MSE 6403	Kinetics of Phase Transformations
MSE 6404	Scattering Theory
MSE 6405	Advanced Nanomaterials
MSE 6406	Corrosion of Materials
MSE 6407	Biological Properties
MSE 6510	Polymers for Electronic and Photonic Applications
MSE 6600	Advanced Polymer Processing
MSE 6602	Tensor Anal and Math Tech

MSE 6750	Preparation & Reactions of Polymers
MSE 6751	Physical Chemistry of Polymers in Solutions
MSE 6752	Polymer Characterization
MSE 6755	Theoretical Chemistry of Polymers or Statistical Mechanics
MSE 6768	Polymer Structure, Physical Properties
MSE 6774	(MSE/BMED): Biomaterials: Structure and Function
MSE 6776	Integrated Low-Cost Microelectronics System Packaging
MSE 6777	Advanced Biomaterials
MSE 6795	Mathematical, Statistical, and Computational Techniques in Materials Science
MSE 6796	Structure-Property Relationships in Materials
MSE 7140	Impedance and Dielectric Spectroscopy
MSE 7420	Solidification Processing
MSE 7771	Mechanics of Polymer Solids and Fluids
MSE 7772	Fundamentals of Fracture Mechanics
MSE 7774	Fatigue of Materials and Structures
MSE 8803A	Nanomaterials and Nanotechnology
MSE 8803C	Advanced X-ray Diffraction
MSE 8803 E	Materials for Energy Storage and Conversion
MSE 8803HG	Statistical Mechanics of a Heterogeneous Media
MSE 8803I	Fundamentals of Nanomaterials & Energy
MSE 8803M	Biomaterials Properties
ME 6104	Computer-aided Design
ME 6124	Finite-Element Method: Theory & Practice
ISyE 6739	Basic Statistical Methods
CHEM 6172	Physical Methods in Inorganic Chemistry
CHEM 6181	Chemical Crystallography
CHEM 6283	Electroanalytical Chemistry
CHEM 6382	Computational Methods in Organic Chemistry and Biochemistry
CHEM 6752	Polymer Characterization
CHEM 6572	Macromolecular Structure
MATH 4247	Partial Differential Equations I
MATH 4348	Partial Differential Equations II
MATH 4255	Monte Carlo Methods

* The majority of courses must be at 6000 level or above, but up to 3 hrs credit at 4000 level can be used.

C. 1.3. Technical Communications

All graduate students in MSE must complete the 1 credit hour course, MSE 8001 *Seminar*. It is highly recommended that this course be taken within the initial phase of the degree i.e. before taking the Proposal Defense. By agreement with the MSE Graduate Office, this course can be substituted by an alternative advanced technical communication course, either offered through MSE or CETL. Alternative advanced technical communication courses include MSE 6754, Engineering Communication. Only 1 hour of the alternative course credit will be allowed to satisfy total MSE hours required.

C.1.4. Minor Course Work

GT requires course work of 9 credit hours for ‘minors’. Minor course work should be completed in a field other than the major field, and is very broadly defined to “encourage a wider interest on the part of the student and to provide a broader basis for the evaluation of the student's capabilities” (see <http://www.catalog.gatech.edu/academics/graduate/doctoral-degree-info/#minor-field-of-study>).

The choice of minor courses is usually decided upon by the student, in conjunction with their research advisor. Although the student need not complete the minor as a prerequisite for admission to candidacy, the minor must be completed and approved in order to be cleared for graduation. A GPA of 2.8 or greater must be attained in the minor courses with no course lower than a ‘C’. It is normal practice to decide which courses to take for a minor after passing the qualifying exams.

On completing all the minor courses it is necessary to complete, sign and submit the request for Doctoral Minor form to the MSE Graduate Office:

http://www.grad.gatech.edu/sites/default/files/documents/doctoral_minor_form.pdf

C.1.5. MSE Qualifying Requirements

The school qualification to candidacy is essentially in 2 parts.

(1) *Core Courses* – The first is to take the required major courses and maintain a GPA of 3.0 or greater. Ph.D. students must complete both core courses with a minimum grade of B in each course. Students will be dropped from Ph.D. program having either 2 ‘C’s or a combination of a ‘W’ and a ‘C’ in core courses. A maximum of one course can be repeated. A second grade below B will result in being dropped from the Ph.D. program.

(2) *Written exam* – Students will be provided with research papers supplied by faculty involved in graduate courses (or by selection from graduate committee). A written exam will be taken by the students 3-4 weeks after receiving papers students will have to answer 6 out of 18 questions, each based on the research papers. The written exam will last 3 hours and will test the ability to read, understand and critically analyze the pre-supplied research papers, but will require knowledge of the core courses and related science discussed in the papers. Students are not allowed to discuss the research papers with their supervisors, but are encouraged to discuss them with their colleagues.

It is permissible to receive only one ‘C’ or ‘W’ in any of the core courses. Receiving two ‘C’s’ or two ‘W’s’ or any combination of a ‘C’ and a ‘W’ will cause the student to be terminated from the Ph.D. program. In addition to the GPA requirement, at the end of the first year (unless in exceptional circumstances students have been put on a 2 year cycle) the students will take a written comprehensive exam.

Comprehensive Written Exam

All full-time Ph.D. students enrolled in the Fall semester without any course deficiency are required to take the Comprehensive Exam scheduled on a day in the early summer of the first year (at end of May). Candidates will be given a set of papers from the research literature (articles from published scientific journals) 4 weeks before the Comprehensive Exam. The papers could cover

all aspects of materials science. A single 3-hour written exam will be based on the supplied research papers, and will require answering 6 questions. The exam will test the ability to read, understand and critically analyze the supplied research papers, and will be based on a thorough knowledge of the core courses. Candidates are not allowed to discuss these research papers with any faculty members, but are actively encouraged to discuss the papers with their peers.

Students who fail this Comprehensive Exam will be offered a repeat examination scheduled sometime in mid-August to September of the same year on a new set of supplied literature. In total, only 2 chances will be allowed to pass the Comprehensive Exam. (See Dismissal Policy, Section J).

C.1.6. Students Entering the Ph.D. Program Directly with a BS

Students entering the Ph.D. program holding a BS as their highest degree must complete additional MSE or MSE related course(s) over the lifetime of their Ph.D. compared to the standard requirement for students entering with a MS. A total of 37 credit hours (including 9 credit hours in the minor subject) are required if entering the program directly with a BS (compared to 25 minimum from a MS).

C.1.7. MSE School Seminars

Every graduate student must sign up for the MSE graduate seminar series (MSE 8801S) every Fall/Spring semester they are resident as a graduate student. Exception will be granted (with permission from the Seminar Organizer) if the student will be away from Georgia Tech for extended periods during the semester for academic study. Students in their final semester and writing up their thesis are also exempt and are not required to register for this course.

The seminars are held weekly and run through the Fall and Spring semesters, and presented by experts in their field who present their work to the school. This course is given on a S/U basis. A register of attendance will be taken at each seminar, and students must attend at least 50% of the seminars to obtain an 'S'. Students are encouraged to meet with the seminar speaker during that individual's visit.

C.1.8. TA Requirements Policy

Teaching assignments are considered to be part of the graduate educational process; consequently, all graduate students are required to participate in TA activities, with the exception in two cases: 1) students whose sponsors specifically prohibit this, 2) students who have petitioned for graduation i.e. in their last semester, or are taking comprehensive exams. Each TA assignment will be allocated points based on the expected workload, ranging from 1 point for duties with the lightest time commitment (i.e. most classes, where marking scripts is required) to 4 points for highest time commitment (i.e. design class, where partial supervision is expected). Over the course of your graduate program, you are required to obtain a minimum of 10 points if a Ph.D. student

and 5 points if a MS student. Once you have reached 10 (or 5 if MS) points you will automatically be removed from the list of possible TAs, but you can of course choose to continue TA duties if you wish.

At the end of the previous semester the MSE Graduate Office will request your preferences for which TA type duties (and therefore point score) you wish to have in the proceeding semester. These requests will be used as far as possible to comply with your preferences. All the points accumulated will be kept by the MSE Graduate Office. Students who exceed the expectations of the TA duties in any semester may be awarded more points than initially designated. On the other hand, if you are signed up for TA duties and do not fulfill them you will not be credited with the point(s).

C.1.9. Dissertation Proposal

The dissertation proposal defense must be held within 12 months after the student has passed the Ph.D. Comprehensive Exam. The dissertation proposal must give promise of being a genuine addition to the fundamental knowledge in the field or a new and better interpretation of facts already known. The proposal should include the following:

- Executive summary clearly identifying the topic and the need of the research
- A critical analysis of the related literature including current state of the art
- Description of the overall objectives of the proposed research
- Discussion of the theoretical, fundamental and/or experimental approaches to be used to achieve the objectives
- Preliminary results and discussion
- Detailed project work plan/timeline for completion e.g. Gantt chart

The recommended length of this proposal document should be not exceed 20 pages of text (assuming a minimum 11 pt font, single line spacing, and 2.5 cm margins) i.e. an approximate maximum of 12000 words. Tables, figures and references would not be counted in this page/word limit. After an editorial review by the advisor, the proposal should be distributed to the other committee members at least 2 weeks before the date of the oral presentation to the whole Advisory Committee. **Written notice of this oral presentation clearly stating topic, time, date and place MUST be given to the School populace at least two weeks before the presentation.**

The proposal defense will be evaluated by the committee, both on the written document and oral presentation using the ‘Proposal & Defense Committee Assessment Form’ – see Section M. This form is also available from the MSE website: http://www.mse.gatech.edu/graduate/grad_current the ‘resources and forms’ menu. It is the responsibility of the student to provide the committee members with these feedback forms at the beginning of the oral presentation. The forms should be collected by the thesis advisor and returned to the MSE Graduate Office after the proposal defense. The Graduate Office/thesis advisor will provide feedback from the evaluations to the student after the information is collated.

After the successful defense of the proposal, a completed Certificate of Thesis Approval form approved by the Dissertation Committee must be submitted to the School Office for Graduate

Studies & Research. This form is available on the GT Graduate Office website: <http://www.gradadmiss.gatech.edu/thesis/forms.php>.

After completing all course requirements, achieving a satisfactory scholastic record (at least 3.0 GPA), passing the Ph.D. Comprehensive Exam, defending the dissertation proposal, and receiving approval of the dissertation topic, the GT Office of Graduate Studies and Research will formally admit the student to candidacy for the Ph.D. degree.

Stipends for Ph.D. students will increase after the student completes their thesis proposal. (See “Stipend Policy”, Section L)

C.1.10. Summary of MSE Ph.D. Requirements

Requirements specific to MSE are given below, additionally Institute requirements must be complied with:

	With BS	With MS
Total required ‘core’ course credit hours	6	6
*MSE/MSE-approved <i>elective courses</i>	21	9
Minimum Communications (MSE 8001 seminar) [§]	1	1
Total <i>minor</i> subject credit hours	9	9
Total minimum credit hours	37	25

Additional Requirements

Core course minimum GPA requirement	3.0
Core course minimum grades (in total over all core courses)	Only 1 ‘C’ or 1 ‘W’
Pass Qualifying Exam	Yes
Register for MSE Seminars (MSE 8801S as S/U)	Yes
RCR (Online CITI and in-person PHIL6000 class)	Yes
Safety Training	Yes

* The majority of courses must be at 6000 level or above, but up to 3 hrs credit at 4000 level can be used.

§ This minimum 1 hour course can be substituted for an approved alternative; however only 1 hour will be counted towards minimum degree requirement (Section C.1.1.3)

C.2. DISSERTATION ADVISOR AND DISSERTATION COMMITTEE

Ph.D. dissertation advisor must be selected by the end of the sixth week during the first semester in residence. Each new student is recommended to discuss thesis research interests with several members of the faculty in the School. **Failure to meet this deadline may result in suspension**

of financial aid. The student, in consultation with the advisor, will recommend to the School Office for Graduate Studies & Research a Dissertation Committee. The Dissertation Committee is chaired by the dissertation advisor and will consist of at least five members, two of whom are generally (at least one is required) from Schools outside the student's major School. The composition of the Dissertation Committee must meet all the requirements for **both** the Ph.D. Thesis Advisory Committee and the Final Doctoral Examination Committee, as stated in Georgia Tech's Policy on the Advisement of Graduate Student Research and the Appointment of Thesis Advisory Committeesⁱ. The Dissertation Committee must be approved by the School Chair, the MSE Office for Graduate Studies & Research and the Georgia Tech Office of Graduate Studies and Research. The Dissertation Committee assists the student in planning an appropriate program of study, approves the research topic, provides advice and guidance during the research and is charged with approving the dissertation when the research is completed.

C.3. DISSERTATION RESEARCH GRADING AND REQUIREMENTS

All thesis hours are graded on a Pass/Fail basis (S or U). If the progress on the dissertation research of a student is considered unsatisfactory by his/her dissertation advisor, the student will receive a grade of "U" for the term. This grade will appear on the student's transcript and be permanent. **A "U" grade for dissertation research is potentially cause for termination of financial aid, which would ultimately jeopardize the visa status of international students. Two "U" grades will result in loss of stipend** and being dropped from the program. (*See 'Dismissal Policy', Section J*)

ⁱ There are two committees which function to advise, approve and conduct the final doctoral oral examination of the thesis and the student's knowledge of the field in which it lies.

The first committee is called the Thesis Advisory Committee or the Thesis Reading Committee and consists of at least three persons, one of whom is the Thesis Advisor. This committee approves the research topic, provides advice and guidance during the research and is charged with approving the thesis when the research is completed and presented as the doctoral thesis. When the Thesis Advisory Committee considers the thesis to be satisfactory, a recommendation is made to the Dean of the Graduate Division for the appointment of the second committee, which is called the Final Doctoral Examination Committee, and it consists of at least five individuals.

The Thesis Advisory Committee consists of at least three members satisfying the following: (1) the thesis advisor shall be a member of the Academic Faculty (with approval of the school or college Graduate Committee, an adjunct* faculty member appointed for the specific purpose of advising graduate students may serve as the thesis advisor); (2) the majority of committee members shall be members of the Academic Faculty. The Committee is approved by the Graduate Committee of the School of College, recommended by the School Director through the College Dean, and appointed by the Dean of the Graduate Division.

The Final Doctoral Examination Committee, which consists of at least five persons, always contains the Thesis Advisory Committee members and others as appropriate, who are recommended by the school or college to the Dean of the Graduate Division for approval. At least one member of the Final Doctoral Examination Committee must be from the academic faculty of a School (or College) which is distinct from the unit in which the student is enrolled.

It is recognized that some Schools and Colleges may wish to appoint a Thesis Advisory Committee which consists of five or more persons and to recommend this committee to serve as the Final Doctoral Examination Committee. Where the constraints outlined above are met for both committees, this is permissible. (http://www.grad.gatech.edu/admin/advise_policy.html)

* - "adjunct" does not indicate formal appointment, but rather appointment as indicated in this policy statement.

All Ph.D. students must register for MSE 9000 at the time of beginning their research and continue to do so each semester until the dissertation is completed. The hours of research for which a student registers each semester must be consistent with a realistic appraisal of the amount of work yet to be done on the dissertation and the amount of faculty time required.

It is essential to sign up for a total of 21 credit hours (full time GRA) for Fall and Spring semesters and 16 credit hours in the Summer semester.

C.4. DEGREE PETITION

Applications to degree petitions must be made through the GT *online application for graduation* (OAG):

<http://www.registrar.gatech.edu/students/deginfo/oag.php>

Full details of the OAG application process is given at:

<http://www.registrar.gatech.edu/docs/pdf/oaghta.pdf>

Students must adhere to all Institute deadlines and requirements for graduation

C.5 DISSERTATION DEFENSE

To help ensure that the student is making satisfactory progress on his/her dissertation, the student **is encouraged to discuss his/her research with all the members of the Dissertation Committee periodically over the course of the research.** At the conclusion of the research, the student will prepare a written dissertation that meets the criteria published by the GT Office of Graduate Studies and Research at <http://www.gradadmiss.gatech.edu/sites/default/files/documents/thesismanualapr15.pdf>.

The Dissertation Committee will review the dissertation and, if the committee deems it satisfactory, will schedule the candidate for an oral examination on the subject matter of the dissertation and the field in which it lies. It is the responsibility of the student to carefully check the grammar, spelling, and sentence structure of the thesis before submitting it to the Dissertation Committee for review. The Dissertation Committee reserves the right of asking the student to have the dissertation corrected by a professional proof reading/editing service, for which the student is financially responsible for the cost.

Every student must orally present his/her research to the Dissertation Committee, other interested faculty and fellow graduate students prior to graduation. A draft of the dissertation, approved by the major Dissertation Advisor, **must be given to the Dissertation Committee at least two weeks before this presentation. Written notice of the oral dissertation defense clearly stating topic, time, date and place MUST be given to the School populace at least two weeks before the presentation.** Additionally, a Ph.D. dissertation defense notice should be sent to the Office of Graduate Studies and Research at least two weeks prior to the oral examination.

A typed draft of the dissertation approved by the Dissertation Committee and the School Chair must be approved by the Assistant to the Dean of the Graduate Division before preparation of the final dissertation document. The draft dissertation must be submitted for approval about 4 weeks prior to graduation (the actual dates are posted on the GT Graduate Office website.). Upon approval, the dissertation may be prepared for final submission and duplication.

The final submission of the Ph.D. dissertation must be made by the deadline established by the Graduate Office (<http://www.grad.gatech.edu/theses-dissertations-deadlines>). Georgia Tech requires that the thesis be submitted electronically. For guidelines and instructions about submission, please visit:

<http://www.grad.gatech.edu/sites/default/files/documents/thesismanualapr15.pdf>

The Dissertation Committee will officially conduct the dissertation defense. The participating faculty and students will be permitted to ask questions during the oral presentation. At the conclusion of the presentation, all but the members of the Dissertation Committee and the candidate will be asked to leave the room for the closed-door oral examination. Following this, the Dissertation Committee will decide whether the student's dissertation is acceptable. If a candidate should fail the final oral defense, the Dissertation Committee may recommend permission for one additional dissertation defense to the Office of Graduate Studies and Research. If the candidate is successful in their Ph.D. defense they will need to fill out the *Certificate of Thesis Approval for Doctoral Students*:

<http://www.grad.gatech.edu/sites/default/files/documents/certiphd.pdf>

This form needs to be signed by all of the Dissertation Committee, and subsequently by the MSE Graduate Coordinator. It is the responsibility of the candidate to get this form completed.

Costs associated with the preparation of the dissertation is the responsibility of the student.

The student should also check with each member of the Dissertation Committee whether they want a printed copy of the thesis and/or whether they prefer an electronic copy. Once the thesis has been approved it must be submitted electronically as part of the final Institute approval process:

<http://www.grad.gatech.edu/theses-dissertations-electronic-submission>

If both the dissertation and the oral defense are satisfactory and the candidate has completed the requirements of residence, minor field and any additional school requirements, the Office of Graduate Studies and Research will certify the candidate as qualified to receive the appropriate Ph.D. degree from the School of Materials Science and Engineering.

C.6 GEORGIA TECH PHD REQUIREMENTS

In addition to the MSE internal requirements, there are a number imposed by the Institute. These include:

Description	Requirement
GPA Requirement	3.0
Minimum Full-time enrollment in residence	2 semesters
Qualifying/Comprehensive Exam required	Yes
Minor credit hours required	9
Time limit for completion of degree after admission to candidacy (Max)	7 years
Prior approval of dissertation topic	Yes
Public defense of dissertation	Yes

A complete list of all the requirements for Ph.D. candidates can be found in the Institute handbook:

<http://www.catalog.gatech.edu/academics/graduate/doctoral-degree-info/>

D. MASTER'S DEGREE PROGRAMS

The School of Materials Science and Engineering offers a program leading to a Master of Science with or without a thesis.

D.1 MASTER OF SCIENCE

Students with a bachelor's degree in engineering, chemistry or science may be accepted into the M.S. program. Generally, students are only accepted into the MS program either if faculty have a specific requirement for such a student, or the students are self-financing.

D.2. COURSE REQUIREMENTS

Students in the M.S. program may take the thesis option or non-thesis option. The general requirements are:

	With Thesis	Without Thesis
Total required 'core' course credit hours	6	6
*MSE/MSE related <i>elective courses</i>	6	12
Minimum hours at 6000 and above	12	24
<i>Minimum total course hours</i>	18	27*
Minimum thesis hours (MSE 7000)	6	-
Total Minimum hours	30	30

*MS without thesis students can take a special problems (MSE8903 – P/F) course for research experience

The graduate student will work with the Faculty Advisor to develop a Program of Study consistent with the student's educational objectives and the School's mission and submit it to the School Office for Graduate Studies & Research by the end of the first semester in residence for review and approval.

Because graduate degrees with thesis are research oriented, once a student obtains financial support as a GRA, the only option available to him/her is to complete a thesis. Students receiving funding for more than 1 semester will not be permitted to change to the non-thesis degree option.

D.3. MAJOR COURSE REQUIREMENTS

No core courses used for graduate credit may be taken on a Pass/Fail basis. However, up to three credit hours of elective course work may be taken Pass/Fail, and applied toward the degree hour requirements.

Major course work for MSE-MS degree is described below.

Core Courses	Hours	Description
MSE 6411 (Fall)	3-0-3	THERMODYNAMICS
MSE 6412 (Fall)	3-0-3	STRUCTURE OF MATERIALS
Other Required Courses	Hours	Description
Seminar (8801S)		Every Fall and Spring Semester
RCR (Online CITI or in-person PHIL6000 class)		http://rcr.gatech.edu/
Safety Seminar and MSE Safety Exam		

***MSE Approved Elective Courses (*not limited to*):**

MSE 6010	Functional Materials
MSE 6105	Diffraction Studies
MSE 6110	Transmission Electron Microscopy
MSE 6120	Quantitative Characterization of Microstructures
MSE 6130	Surface Characterization
MSE 6403	Kinetics of Phase Transformations
MSE 6404	Scattering Theory
MSE 6405	Advanced Nanomaterials
MSE 6406	Corrosion of Materials
MSE 6407	Biological Properties
MSE 6510	Polymers for Electronic and Photonic Applications
MSE 6600	Advanced Polymer Processing
MSE 6602	Tensor Anal and Math Tech
MSE 6750	Preparation & Reactions of Polymers
MSE 6751	Physical Chemistry of Polymers in Solutions
MSE 6752	Polymer Characterization
MSE 6755	Theoretical Chemistry of Polymers or Statistical Mechanics
MSE 6768	Polymer Structure, Physical Properties
MSE 6774	(MSE/BMED): Biomaterials: Structure and Function
MSE 6776	Integrated Low-Cost Microelectronics System Packaging
MSE 6777	Advanced Biomaterials
MSE 6795	Mathematical, Statistical, and Computational Techniques in Materials Science
MSE 6796	Structure-Property Relationships in Materials
MSE 7140	Impedance and Dielectric Spectroscopy
MSE 7420	Solidification Processing
MSE 7771	Mechanics of Polymer Solids and Fluids
MSE 7772	Fundamentals of Fracture Mechanics
MSE 7774	Fatigue of Materials and Structures
MSE 8803A	Nanomaterials and Nanotechnology
MSE 8803C	Advanced X-ray Diffraction
MSE 8803 E	Materials for Energy Storage and Conversion
MSE 8803HG	Statistical Mechanics of a Heterogeneous Media
MSE 8803I	Fundamentals of Nanomaterials & Energy
MSE 8803M	Biomaterials Properties
MSE 8903	Special Problems
ME 6104	Computer-aided Design
ME 6124	Finite-Element Method: Theory & Practice

ISyE 6739	Basic Statistical Methods
CHEM 6172	Physical Methods in Inorganic Chemistry
CHEM 6181	Chemical Crystallography
CHEM 6283	Electroanalytical Chemistry
CHEM 6382	Computational Methods in Organic Chemistry and Biochemistry
CHEM 6752	Polymer Characterization
CHEM 6572	Macromolecular Structure
MATH 4247	Partial Differential Equations I
MATH 4348	Partial Differential Equations II
MATH 4255	Monte Carlo Methods

* The majority of courses must be at 6000 level or above, but up to 3 hrs credit at 4000 level can be used.

* Submit Program of Study to MSE Academic Office for Approval

D.4. BS-MS PROGRAM

Current undergraduate students may participate in the BS-MS Program offered by the School. Georgia Tech undergraduate students may be admitted into the program after completing a minimum of 30 semester credit hours (and no more than 75 hours) at Georgia Tech and have a GPA of 3.5 or higher at time of application. Both the application fee and the GRE test score are waived. Students need to maintain at least a 3.0 GPA when receiving the B.S. degree in order to be converted into graduate student status and must continue immediately into the M.S. program in order to qualify for the 6 semester-hour “Graduate Course Credit” option.

The following hours are required at the MS level:

30 hours total

of which:

- 18 hours of approved MSE courses (6 hours of core courses MSE 6411 and MSE 6412 + 12 hours of elective courses (see Section D.3.))
- 21 hours must be at 6xxx or above

The BS-MS Program allows eligible students to use up to six credit hours of graduate-level MSE courses (or MSE approved courses) for both BS and MS degrees. A maximum of 12 hours graduate level courses can be taken as a BS level student, but only 6 hours can double towards the MS. No course below 4xxx are permitted.

No core courses used for graduate credit may be taken on a Pass/Fail basis. However, up to three credit hours of elective course work may be taken Pass/Fail, and applied toward the degree hour requirements.

Approved ‘core’ BS/MS courses:

<u>Core Courses</u>	<u>Hours</u>	<u>Description</u>
MSE 6411 (Fall)	3-0-3	THERMODYNAMICS
MSE 6412 (Fall)	3-0-3	STRUCTURE OF MATERIALS

MSE Approved Elective Courses (*not limited to*):

MSE 6010	Functional Materials
MSE 6105	Diffraction Studies
MSE 6110	Transmission Electron Microscopy
MSE 6120	Quantitative Characterization of Microstructures
MSE 6130	Surface Characterization
MSE 6403	Kinetics of Phase Transformations
MSE 6404	Scattering Theory
MSE 6405	Advanced Nanomaterials
MSE 6406	Corrosion of Materials
MSE 6407	Biological Properties
MSE 6510	Polymers for Electronic and Photonic Applications
MSE 6600	Advanced Polymer Processing
MSE 6602	Tensor Anal and Math Tech
MSE 6750	Preparation & Reactions of Polymers
MSE 6751	Physical Chemistry of Polymers in Solutions
MSE 6752	Polymer Characterization
MSE 6755	Theoretical Chemistry of Polymers or Statistical Mechanics
MSE 6768	Polymer Structure, Physical Properties
MSE 6774	(MSE/BMED): Biomaterials: Structure and Function
MSE 6776	Integrated Low-Cost Microelectronics System Packaging
MSE 6777	Advanced Biomaterials
MSE 6795	Mathematical, Statistical, and Computational Techniques in Materials Science
MSE 6796	Structure-Property Relationships in Materials
MSE 7140	Impedance and Dielectric Spectroscopy
MSE 7420	Solidification Processing
MSE 7771	Mechanics of Polymer Solids and Fluids
MSE 7772	Fundamentals of Fracture Mechanics
MSE 7774	Fatigue of Materials and Structures
MSE 8803A	Nanomaterials and Nanotechnology
MSE 8803C	Advanced X-ray Diffraction
MSE 8803 E	Materials for Energy Storage and Conversion
MSE 8803HG	Statistical Mechanics of a Heterogeneous Media
MSE 8803I	Fundamentals of Nanomaterials & Energy
MSE 8803M	Biomaterials Properties
MSE 8903	Special Problems
ME 6104	Computer-aided Design
ME 6124	Finite-Element Method: Theory & Practice
ISyE 6739	Basic Statistical Methods
CHEM 6172	Physical Methods in Inorganic Chemistry
CHEM 6181	Chemical Crystallography
CHEM 6283	Electroanalytical Chemistry
CHEM 6382	Computational Methods in Organic Chemistry and Biochemistry
CHEM 6752	Polymer Characterization
CHEM 6572	Macromolecular Structure
MATH 4247	Partial Differential Equations I
MATH 4348	Partial Differential Equations II
MATH 4255	Monte Carlo Methods

D.5. PROGRAM OF COURSE STUDY

In consultation with his/her faculty advisor, the student should prepare a tentative schedule for a complete M.S. study program during his/her first term in Graduate School, including the selection of thesis/non-thesis option. The form to be used can be obtained in the MSE graduate office. The student needs to complete the Proposed Program of Study form, approved by his/her advisor and submit it before registration for his/her second term of study to the MSE Office for Graduate Studies & Research.

D.6. M.S. THESIS TOPIC SELECTION

For thesis degree candidates, the thesis advisor must be selected and approved by the end of the fourth week during the first semester in residence. Each M.S. candidate is required to discuss thesis research interests with several members of the School of Materials Science and Engineering faculty. **For a student financially supported by the School, failure to meet this deadline may result in suspension of financial aid.** The student and his/her thesis advisor will recommend to the School Office for Graduate Studies & Research a Thesis Committee consisting of at least three members. One member of the Thesis Committee can be from outside the School. The composition of the Thesis Committee must meet all the requirements for the MS Thesis Advisory Committee, as stated in the Georgia Tech's Policy on Advisement of Graduate Student Research and Appointment of Thesis Advisory Committeesⁱⁱ. Finalization of the Thesis Committee and approval of the thesis topic must be completed by the fourth week of the second term in residence. The Thesis Topic Form must be approved by the Thesis Committee.

Non-thesis degree candidates can take a three credit hour, graduate-level Special Problems (MSE 8903) on a Pass/Fail basis. In that case, a final Technical Report approved by three faculty members is required. *Only three* (3) credit hours of MSE 8903 may be applied toward the institute minimum of 30 credit hours required for the M.S. degree.

D.7. THESIS RESEARCH GRADING

All thesis hours are graded on a Pass/Fail basis (S or U). If the progress on his/her thesis research is considered unsatisfactory by the thesis advisor, the student will receive a grade of "U" for the semester. This grade will appear on the student's transcript and be permanent. **A "U" grade for thesis research is a potential cause for termination of financial aid, which may also jeopardize the visa status of international students. A 2nd "U" will result in loss of stipend.**

ⁱⁱ For Master's Thesis advisement, the Thesis Advisory Committee consists of at least three members, the majority of whom must be members of the Academic Faculty. The thesis advisor who serves as the Chairman of the Thesis Advisory Committee must be a member of the Academic Faculty (with approval of the school or college Graduate Committee, an adjunct* faculty member appointed by the specific purpose of advising graduate students may serve as the thesis advisor.) The committee is recommended by the School Director through the College Dean and appointed by the Dean of the Graduate Division.

<http://gradadmiss.gatech.edu/sites/default/files/documents/thesismanualapr15.pdf>

* - "adjunct" does not indicate formal appointment, but rather appointment as indicated in this policy statement.

D.8. DEGREE PETITION

The Degree Petition form, Program of study and the Online Application for Graduation (OAG) must be completed and filed with the Registrar's Office during *the preceding term* of the expected term of graduation.

The form and deadline for filing the Degree Petition is found at:

http://www.registrar.gatech.edu/docs/pdf/GRAD_PETITION_FOR_DEGREE.pdf

Always pre-register for the following term until such time as you have been certified for the degree. The best-laid plans sometimes fail! If you do not complete your thesis on schedule, your petition for graduation must be reactivated.

Those M.S. students following thesis degree paths must register for MSE 7000 at the time of beginning the research and continue to do so each term until the thesis is completed. The hours of research for which the student registers each term must be consistent with a realistic appraisal of the amount of work yet to be done on the thesis and the amount of faculty time required.

D.9. THESIS DEFENSE

At the conclusion of the proposed research, the student shall prepare a thesis that meets the criteria (see <http://www.grad.gatech.edu/sites/default/files/documents/thesismanualapr15.pdf> for guidelines and instructions). The Thesis Committee will review the thesis and, if the committee deems it satisfactory, will schedule the candidate for an oral examination on the subject matter for the thesis and the field in which it lies. The student should give the Thesis Committee at least two weeks to read the thesis document.

Every student must orally present his/her research to the Thesis Committee, other interested faculty and fellow graduate students prior to graduation. The Thesis Committee will officially conduct the thesis defense. If a candidate fails to pass the final oral defense, the Thesis Committee may recommend permission for one additional thesis defense to the Office of Graduate Studies and Research.

Costs associated with the preparation of the dissertation is the responsibility of the student. The student should also check with each member of the Dissertation Committee whether they want a printed copy of the thesis and/or whether they prefer an electronic copy. Once the thesis has been approved it must be submitted electronically as part of the final Institute approval process:

<http://www.grad.gatech.edu/theses-dissertations-electronic-submission>

To help ensure that the thesis will be accepted by the Thesis Committee, the student is encouraged to discuss his/her progress with all members of the committee frequently.

D.10. FINAL SUBMISSION OF THESIS

The final submission of the Master's thesis must be made by the deadline established by the Graduate Office. Georgia Tech requires that the thesis be submitted electronically. For guideline and instructions, please visit:

<http://www.grad.gatech.edu/sites/default/files/documents/thesismanualapr15.pdf>

If both the thesis and the oral defense are satisfactory and the candidate has completed the course requirements, and any additional school requirements, the Office of Graduate Studies and Research will certify the candidate as qualified to receive the appropriate Master of Science degree from the School of Materials Science and Engineering.

D.11. SPECIAL PROBLEMS REQUIREMENTS & GUIDELINES

Non-thesis M.S. degree candidates can take a three-hour credit, graduate-level Special Problem (MSE 8903 taken on a Pass/Fail basis). A final Technical Report is required. Before a final grade can be assigned the following must be satisfied:

- a) Only those students pursuing the Non-thesis M.S. degree will be allowed to sign up for MSE 8903 Special Problem hours. All other MS students should sign up for thesis hours (MSE 7000) to satisfy their degree research requirements.
- b) Only *three (3)* credit hours of MSE 8903 may be applied toward the Institute minimum of 30 credit hours required for the Non-thesis M.S. degree.
- c) The student must register for MSE 8903 on a Pass/Fail basis. Thus the student cannot count any regular course taken as Pass/Fail toward graduation because of the 3-hour maximum allowed for Pass/Fail courses.
- d) During the first week of the term in which a student begins the Special Problem research with guidance from a principal advisor, two additional committee members will be chosen by the principal advisor; the principal advisor will also chair the three-person committee. The committee will monitor the progress of the research throughout the semester(s) in which it is conducted, and evaluate the quality and adequacy of the research and the final report.
- e) **It is the responsibility of the student to keep the principal advisor and the committee informed about the progress of the research. The student should schedule regular discussions with the principal advisor and the committee.**
- f) The signatures of all three committee members are required on the final report, and a signed copy must be submitted to the MSE Main Office before the grade (assigned by the principal advisor) can be submitted to the Registrar's office.
- g) If the Special Problem is being completed during the term the student is planning to graduate, the final report must be submitted to the committee at least two (2) weeks before the Registrar's deadline for grade submission (normally Friday of the week before Finals).

Failure to do so may jeopardize the student's graduation date. The approved report must be submitted by the last day of classes for students not graduating that term.

D.12 GEORGIA TECH MS REQUIREMENTS

There are a number of requirements imposed by the Institute. These include:

	With Thesis	Without Thesis
GPA Requirement		2.7
Minimum Full-time enrollment in residence	1 semester/year (min. 3 hours)	
Qualifying/Comprehensive Exam required		No
Time limit for completion of degree after admission to candidacy (Max)		6 years
Prior approval of dissertation topic	Yes	-
Public defense of dissertation	Yes	-

E. CLASSIFICATION OF GRADUATE STUDENTS

Graduate students are classified according to their graduate standing (i.e., full graduate standing, conditional graduate standing, and special graduate standing) and according to their course workload (i.e., full-time and part-time). These different classifications and what they imply are discussed below. Additional information can be found at:

<http://www.policylibrary.gatech.edu/student-affairs/graduate-student-policies>

E.1. CLASSIFICATION ACCORDING TO GRADUATE STANDING

- a) Full Graduate Standing - Students who satisfy the entrance requirements (see General Catalog) as judged by the Chair of the School and the School Graduate Committee, the Registrar, and the Dean of Graduate Studies and Research are admitted to full graduate standing for study toward an M.S. or Ph.D. degree.
- b) Conditional Graduate Standing - Students who do not meet the requirements for full graduate standing may be admitted for study toward a graduate degree on conditional graduate standing. Students whose academic backgrounds do not satisfy the prerequisites for a degree program will be expected to take a number of courses to make up for this deficiency. Such courses will not count toward a graduate degree. In general, the student will be expected to demonstrate an ability to do effective workⁱⁱⁱ before his or her classification is changed from conditional to full graduate standing. This change of classification requires the recommendation of the MSE Graduate Committee and the approval of the Chair of MSE. Courses passed by a student while on conditional standing can be counted toward a degree program upon the recommendation of the School Graduate Committee to the School Chair.
- c) Special Graduate Standing - A student who wishes to enroll for course work but not to pursue a program of study for a graduate degree can be admitted as a special graduate student upon approval by the School Chair (upon recommendation by the MSE Graduate Committee), the Registrar, and the Dean of the Division of Graduate Studies. Courses taken by students on special standing cannot apply more than 16 semester credit hours taken on special standing toward a graduate degree.

E.2. CLASSIFICATION ACCORDING TO COURSE WORKLOAD

Graduate students are classified as full-time or part-time depending upon the number of hours of course work taken in a given semester. Course work includes regularly scheduled courses, seminars, special problem courses, and thesis research (that is, any activity carrying a course number, whether or not these carry graduate credit or are taken on an audit basis). A full-time student must register for at least 12 hours per semester, excluding audit, with a maximum of 21 hours. Exceptions to the maximum load of 21 hours must have the approval of the School Chair and the Dean of Graduate Studies. The only exception is that a minimum of 1 hour course load may be taken in the semester of graduation. *This exception can only be applied once.* A part-time

ⁱⁱⁱ i.e. maintaining a GPA of at least 3.0 for Ph.D. or 2.7 for MS students.

student will register for not more than 11 and not less than 3 credit hours.

E.3. COURSE LOAD REQUIREMENT

The following regulations govern the term workloads of students who are pursuing graduate degrees (see <http://www.policylibrary.gatech.edu/hour-loads-graduate-students>):

1. Full-time students must be enrolled **for at least 12 hours per semester**, excluding audit.
2. The maximum course load for all students is **21 hours per semester**.
3. The minimum load for part-time students is **3 hours per semester**.
4. Students with fellowships, traineeships, or tuition waivers, and those assigned to the Institute by the Armed Forces for the purpose of pursuing a degree are required to be enrolled for at least **12 credit hours per semester, excluding audit**.
5. **The minimum load for foreign students on visas is 12 hours per academic term, excluding audit, with the possible exception of the Summer term.** After at least two consecutive semesters of full-time enrollment, students on F-1 or J-1 visas may be eligible to reduced number of hours. For detailed advice, please contact the Office of International Education.
6. Students in the Graduate Cooperative Program are required to carry a full-time load during study terms.
7. Full-time GRA students working on thesis/dissertation research must register for a total of 21 or more credit hours (that includes course credits + MSE 7000 or 9000, as appropriate) during Fall and Spring semester and up to 16 hours during summer.
8. *The student must register during Phase I of registration.*
9. GRA must enroll for a minimum of 12 credit hours on a Letter Grade or Pass/Fail basis. One 3-hour Letter Grade or Pass/Fail course may be taken on an audit basis with the permission of the advisor, MSE Chair and the Graduate Committee, exclusive of any GRA audit hours.
10. *Graduate students must take all MSE Courses counting toward the degree requirements on a Letter Grade basis.*
11. The maximum allowable term load for employed students other than graduate assistants (GRA) is reduced based on the number of hours employed per week as shown below:

E.4. ALLOWABLE COURSE LOAD IF EMPLOYED

Students who are employed (on or off campus) are limited in the amount of course work they may take per term as shown below.

Hourly Employment Load Per Week (On or Off Campus)	Maximum Course Load Allowed (Credit Hours)
Full-Time (40 hours)	6
3/4 of Full-Time (30 hours)	9
2/3 of Full-Time (27 hours)	10
1/2 of Full-Time (20 hours)	12
1/3 of Full-Time (13 hours)	15
1/4 of Full-Time (10 hours)	18

These limitations can be overridden in a given term with the approval of the student's Graduate Advisor provided the average course load for the student's program does not exceed the figures shown. Exceptions to these maximum loads maybe made by the Dean of the Graduate Division with approval of the School Chair.

F. REGISTRATION INFORMATION

F.1. MSE GRADUATE REGISTRATION POLICIES & GUIDELINES

1. All graduate students are required to register on a Pass/Fail basis for the school seminar series (MSE 8801S) for as long as they are registered at Georgia Tech, except for Summer semester(s). At least fifty percent (50%) attendance will be required to obtain a passing grade in the School seminar series. Graduation hour credit is not given for the seminar. Exemptions may be requested from the Graduate coordinator in advance and granted only in specific cases, i.e. student is working in another institute for that semester, graduate course conflict, etc. Failure to obtain advance permission to not register for the seminar series will result in a 'Fail' being added to the students' transcript.
2. Incoming graduate students pursuing a graduate degree (M.S. or Ph.D.), who do not have the undergraduate prerequisite introductory materials science course MSE 2001 are recommended to take this course during the first Fall semester of their graduate program. And the graduate students pursuing their research in polymer materials, who do not have the undergraduate prerequisite courses MSE 4775 (Polymer Science & Engineering I) and MSE 4776 (Polymer Science & Engineering II), are recommended to take these courses.
3. M.S. students must take all MSE courses counting toward the core graduate degree requirements on a Letter Grade basis. This excludes Thesis, Special Problems, and School Seminar courses. However, up to three credit hours of elective course work may be taken Pass/Fail, and applied toward the degree hour requirements.

F.2. RESEARCH ASSISTANTSHIP

Graduate Research Assistantships are paid from funded research projects and are renewed every semester subject to satisfactory academic record and research performance. Lack of research progress jeopardizes future funding and can result in termination of the assistantship. For a Ph.D. student, assistantship will be limited to four years. Renewal beyond four years will require special justification and the approval of the thesis committee. Examples of justification includes change of research topic and/ or change of thesis advisor, unforeseen difficulty in research, undue delay in procuring or fixing instrument(s) that is essential for research, and the course work recommended by the advisor and/or the thesis committee beyond the minimum major/minor course work requirement. Lack of diligence, poor planning, normal difficulties encountered in research, and courses taken beyond the major/minor requirement without the express approval of the thesis advisor are not to be considered as justification for funding beyond four years. Students should consult with their advisors, if they anticipate a funding requirement beyond four years.

F.3. ADVISEMENT

It is expected that the student will maintain an open communication and good rapport with his/her advisor(s). To obtain full benefit of advisor's experience, students should feel free to seek their advisor's advice as frequently as practically possible.

If unresolved conflicts do occur, students should feel free to consult any member of the graduate committee, their thesis committee, and/or the School chair as appropriate. Alternatively, students can seek advice from the Graduate Student Ombudsman:

<http://www.provost.gatech.edu/reporting-units/faculty-graduate-student-ombuds-programs>

F.4. SAFETY AND ETHICS REQUIREMENTS

All incoming graduate students in the School of Materials Science and Engineering are required to fulfill the Safety and Ethics training specified by the Institute.

Ethics and Code of Conduct training is required by the Institute and has to be taken on-line:

Responsible Code of Conduct required by the Institute: <http://rcr.gatech.edu/>

Graduate students are required to familiarize themselves with the Institute Fire and Life Safety procedures and to abide by safety rules in the laboratory. Failure to follow agreed-upon safe practices may result in dismissal from the program.

Attendance at the safety training course which includes Right-to-Know Training, and Worker's Compensation and satisfactory completion of the exam is compulsory:

Safety course: <http://www.mse.gatech.edu/research/lab-safety>

F.5. AUDITING COURSES

When signing up to audit a course, the student must meet the requirements established by the course instructor at the beginning of the term. These requirements may include attending all classes, completion of the homework assignments and taking the quizzes. If the student does not satisfy the instructor's minimum criteria, the student's name will be deleted from the final class roll.

If this results in the number of hours scheduled dropping below 12 and the student is receiving financial aid, the aid will be terminated. For an international student, if deleting the audited course drops the number of hours registered to below 12, the student will no longer be considered a full-time student. This may affect the international student's visa status.

F.6. THE ACADEMIC YEAR & VACATIONS

Graduate students may take advantage of a **two-week** vacation and the ten University administrative holidays during each 12-month period of residency. Vacation and any special (unpaid) leaves must be approved well in advance by the thesis advisor and the research director

if the student is working on a separate project as a GRA.

Periods between semesters are not automatic vacation days. Furthermore, the long period of instructional recess in December is to be a time of working and studying; it is a particularly valuable time for first-year students for making headway on development of their research and presentation skills.

F.7. SCHOOL KEYS AND PROPERTY

The School of Materials Science and Engineering issues keys to offices and laboratories a student has been granted permission by the faculty responsible. The keys are issued by Frank Moss (frank.moss@mse.gatech.edu). Keys issued while enrolled as a student, as well as any other School property in the student's possession (research notebooks, equipment, etc.) must be returned to the School prior to graduation. **Failure to return all school/Institute property, including keys, will result in delay of the student's graduation.**

All personal items should be removed from all desks, laboratories and offices used by the student before their last official day. Unless official GT employment follows completion of the degree and/or enrollment waiver, students must vacate their office immediately. Georgia Tech policy does not allow anyone without an official affiliation on GT premises. This policy also applies to volunteers.

F.8. LABORATORY CLEAN-UP REQUIREMENT

Graduate students involved in any kind of research are required to clean up their area of responsibility and identify all materials before leaving the Institute. The Department of Environmental Safety will inspect the laboratory and ensure that all chemical substances are acceptable for disposal and that the area being vacated meets laboratory safety guidelines. Graduate students will not have their final grades released or final paychecks released until they have complied with this Institute policy. Failure to comply with this Institute policy will make the host department responsible for all costs involved with the required chemical analysis for identification of "unknowns" as well as any costs involved with the disposal of chemical waste, other substances and/or research apparatus. **Consequently, the School of Materials Science and Engineering will enforce this Institute policy and failure to follow proper procedures may jeopardize the student's graduation.**

G. GRADUATE CO-OP REQUIREMENTS

A student planning to co-op must meet the following requirements:

- Good academic standing (GPA of 2.7 for M. S. students and 3.0 for Ph.D. students)
- Ph.D. students should have been admitted to the candidacy of the Ph.D. degree.

- A letter from the student's advisor approving the Co-Op application

The student must complete the MSE Co-Op Permission Form and submit it to the MSE Graduate office with the advisor's approval by the second full week of the semester *preceding* the work semester. This will enable the student to explore opportunities with the Institute Graduate Co-Op office during the semester.

H. EMAIL

The official method of Institute and MSE communication to all faculty, staff, and students is through @gatech.edu e-mail address of record. E-mail accounts are assigned and maintained by OIT. Georgia Tech assumes no responsibility for the reliability of external e-mail services. The most straightforward way to insure that you are not missing official Georgia Tech electronic communications is to point your alias to your @gatech.edu e-mail address. If you chose to associate your alias with an address other than your @gatech.edu e-mail address, **you are assuming the responsibility of checking mail daily at both your @gatech.edu and alias destination addresses.**

Creating a non-GT personal email alias on passport.gatech.edu does not provide for receiving mail that is sent straight to your GT account, such as user@mail.gatech.edu.

If you choose not to use your GT account, you should access your MyGatech account via the web and place a forward to whatever email address that is desired. From within your account, choose Preferences, Mail Filters, and establish a new rule to forward your mail. Within that new rule, you can choose to optionally keep a copy of the mail in your MyGatech Inbox. Always leave the default rule in place as number 1, as it flags spam. In order not to receive the flagged spam, you should edit that number 1 default rule and make sure that the small box in the lower left corner is checked. That box, "Do not process additional filters," will prevent any further rules from processing mail once it has been identified as spam.

I. GT STUDENT POLICIES

There are a number of Georgia Tech policies that are relevant to students. It is the student's responsibility to familiarize him/her with these policies and abide by them. The policies can be found at: <http://studentlife.gatech.edu/>.

The policies regarding various types of standings such as special graduate student status can be found at: <http://www.catalog.gatech.edu/admissions/grad/standing/>.

J. DISMISSAL POLICY

All students receiving stipends must maintain minimum academic standards and must make good progress toward the degree goal to retain their stipends. Toward this end, the following is expected:

1. M.S. students receiving a stipend must complete all degree requirements in 5 semesters or less, including Summer term.
2. Students must not receive an unsatisfactory grade on thesis research more than once. With the first unsatisfactory grade, the student will receive a letter from the MSE Academic Office placing them on review, outlining the deficiencies and indicating corrective actions that must be taken to remove the deficiencies. The second unsatisfactory grade will result in losing their stipend and being dropped from the program. Ph.D. students without an advisor will be dropped from the program.
3. Ph.D. students without an advisor for more than one term will be dropped from the program.
4. Ph.D. students must complete all courses in the core with a minimum grade of B in each course. A maximum of one course can be repeated. A second grade below B will result in being dropped from the Ph.D. program.
5. All Ph.D. students are required to take the written Ph.D. qualification examination at the end of their first year in the Ph.D. program. Students failing to pass the written qualification examination in their first attempt must retake the written exam as described in the letter given to the student at the time he/she failed on the first attempt. If the student fails to pass the written exam on the second attempt, they will be dropped from the graduate program.
6. Students must pass the annual safety examination.
7. Students must make progress in their research as judged by their academic advisor.
8. Exceptions to the above conditions may be granted on demonstration of extraordinary circumstances by successful petition to the MSE Graduate Committee. The petition must include a letter of support from the student's thesis advisor and a demonstration of satisfactory progress toward his/her degree objective.

K. TRANSFER OF CREDIT

A student may not apply for transfer credit until after matriculation at Georgia Tech. The courses to be transferred would typically be those appearing on the approved program of study form for the master's degree. A doctoral student normally does not request transfer credit. The rules relative to and the process for obtaining transfer of credit for graduate-level courses are as follows:

1. A student in a master's degree program requiring fewer than 33 semester credit hours may receive up to 6 hours of transfer credit for graduate-level courses taken at an institution accredited by a Canadian or U.S. regional accrediting board, or at a foreign school or university that has a signed partner agreement with Georgia Tech, and not used for credit toward another degree. A student in a master's degree program requiring 33 semester credit hours or more may receive up to 9 hours of transfer credit for graduate-level courses taken

at an institution accredited by a Canadian or U.S. regional accrediting board, or at a foreign school or university that has a signed partner agreement with Georgia Tech, and not used for credit toward another degree. The student must supply a current transcript for this evaluation.

2. To obtain transfer of credit, the student must complete the following procedure:
 - The student will confer with the graduate advisor to ascertain whether the courses to be transferred are a logical part of the student's graduate program;
 - If the courses are appropriate, the student will deliver to the school that teaches such courses a copy of the current transcript, necessary descriptive materials including catalog descriptions, and textbooks used for evaluation. The faculty of the appropriate school will determine the equivalent Georgia Tech course and the number of credit hours accepted. The faculty member who prepares the transfer credit form should have the school chair cosign it. The school should then send the form directly to the registrar with a copy of the student's Approved Program of Study attached;
 - If the student wishes to transfer more than the number of hours permitted in paragraph 1), a petition must be submitted to the Institute Graduate Committee including statements of possible justification for the granting of such a petition, transfer credit forms, and the recommendation of the student's school chair.
3. A student may not receive transfer credit from universities outside the United States and Canada except if the courses were taken at a foreign school or university that is accredited by a Canadian or U.S. regional accrediting board or has a signed partner agreement with Georgia Tech. In any other case, an international student can obtain credit for courses previously taken but not applied toward another degree by filling out an Examination for Advanced Standing Authorization Request Form, paying the appropriate fee at the Cashier's Office, and passing the examination for advanced standing. The school or college that normally teaches the equivalent course will administer any necessary examinations.

L. STIPEND POLICY

Graduate Student Stipend Policy

School of Materials Science and Engineering

For the purposes of determining the stipend level, graduate students are classified as follows:

M.S. Thesis Option: Any student pursuing an M.S. degree under the thesis option with an offer of financial assistance from the School.

Ph.D : Any student admitted to the direct Ph.D. program. The minimum qualifications are a B.S. degree in Materials, Metallurgy, Ceramics or Polymers with a GPA of 3.5 or better and a high GRE score or a B.S. degree in another field of Engineering, Physics or Chemistry with a GPA of 3.7 or higher and a high GRE score. Or any student entering the Ph.D. program with an M.S. degree.

Level	Stipend Amounts*	Max. Duration**
M.S. with thesis	\$2,083/mo. (\$25,000)*	5 semesters
Ph.D.	\$2,100/mo. (\$25,200/yr.)*	4 years with M.S.; 5 years without M.S.

***Stipends for Ph.D. students will increase to \$26,200/yr. (\$2,183 month) at the beginning of the next semester after the student completes their Ph.D. thesis proposal.**

* These amounts are effective Fall 2016. Full-time graduate research assistants (GRA's) pay fees of \$1196 per semester (current rate).

** refers to the maximum period for which the students can receive a stipend

Students on external fellowships (from sources outside of Georgia Tech) are entitled to enhancement awards from the School. The amount of enhancement will vary depending on the value of the external fellowships. To be eligible for such enhancements, the student must disclose the amounts of all fellowships he/she receives from sources outside of Georgia Tech. For both MS and Ph.D. students receiving external funding, the total award (from MSE) must not normally exceed the rate shown in table above. In no case will the payment from the school exceed the stipend levels established for the level of the student. Presidential Fellowships are in addition to any other sources of funds.

For exceptional students supported entirely on research on research grants, enhancements of up to 50% over the normal level subject to the maximums in the table above may be possible solely at the discretion of the thesis advisor after the student has completed all requirements for Ph.D. other than completing the thesis defense. Such appointments will be entirely supported by the grant/contract that the student is supported on. No part of the student stipend can be paid from school funds.

M. PROPOSAL EVALUATION FORM

Materials Science and Engineering PhD and MS Evaluation and Assessment Form

Name of Candidate: _____
Date of Exam: _____
Name of Evaluator: _____
Presentation for: Proposal Defense
Academic Level: Masters PhD

Written Document

Outcome	Excellent	Good	Poor	Unsatisfactory
Statement of research objectives and motivation				
Knowledge of relevant literature				
Ability to critically analyze literature				
Ability to design and execute research project				
Ability to apply knowledge of relevant science and engineering to critically analyze data				
Evidence of independent thinking in research results and experimental plan				
Research conclusions				
Written communications skills				

Oral Presentation

Outcome	Excellent	Good	Poor	Unsatisfactory
Organization and structure of research presentation				
Delivery, speaking skills, and length				
Clarity/use of visual aids				
Ability to discuss/answer questions				
Oral communication skills				

Overall Assessment (*circle one – to be used for making awards*)

Excellent Good Average Poor Unsatisfactory

Student should provide this form to each committee member before the presentation.
The primary advisor will provide feedback to the student and return all forms to the academic office immediately following the presentation, with the exception of absentee committee members, which should be emailed.



For questions, comments, and suggestions on this graduate handbook, please send an email to academics@mse.gatech.edu