



# **MATERIALS SCIENCE AND ENGINEERING GRADUATE MANUAL**

**COLLEGE OF ENGINEERING  
UNIVERSITY OF CALIFORNIA AT BERKELEY**

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## **INTRODUCTION**

This document is a summary of the policies of the Department of Materials Science and Engineering with respect to graduate student academic matters. It is intended as a guideline for normal academic matters in the Department. For the program of study for graduate students, it provides a clear definition of what each student must accomplish, and the time frame to obtain a graduate degree.

The Department of Materials Science and Engineering encompasses programs in the practical and theoretical aspects of materials, their utilization, and their electronic, physical, mechanical, and chemical properties in relation to their structure.

Within this broad framework, students will focus research on one or more narrowly defined questions. This focus constitutes the major field. The students follow a program of study in the major field under the guidance of an appropriate major field advisor. The research interests of departmental faculty members continuously evolve in response to new developments in science as well as the changing needs of a technological society. The major field advisors for the current year are listed in the supplementary announcement issued to students each year. Incoming students will be assigned a major field advisor, who will serve in this capacity for the duration of the student's tenure.

It is anticipated that there will always be students who, through perfectly reasonable processes, find themselves at odds with departmental policies. In such cases, the Academic Affairs Committee (AAC) on behalf of the faculty has the authority to waive the policies in this manual and adopt a reasonable plan for the student.

It must be made clear, however, that it is the faculty of the Department that has the responsibility for the academic programs and hence the ultimate voice in authorizing courses of study for individual students. While every effort is made to accommodate the specific interests, backgrounds, or areas of creativity of students, there must also be a general set of standards in the form of course curricula, examination performance, and research, by which the student and the University will be judged when the student graduates. Further, it must be realized that with a very limited number of faculty, it simply may not be possible to offer a satisfactory program of study in a field that is not currently covered by the department. In such a case, a student may not be permitted to continue graduate work, not through lack of qualification, but because the department cannot offer an appropriate program to support that field of study. Students will then be asked to modify their program, or will not be permitted to continue graduate work in the Department unless a mutually acceptable program can be worked out with the major field advisor, the Academic Affairs Committee, and the research supervisor.

## **THE ACADEMIC AFFAIRS COMMITTEE, MAJOR FIELD ADVISERS, AND CHAIR OF GRADUATE ADVISORS**

Academic programs in the Department are formally supervised and approved by the AAC (Academic Affairs Committee). At a more immediate level, the student is guided and advised by a major field advisor and by a research supervisor. Each incoming class of graduate students, before enrollment, is assigned a major field advisor who assists the student in preparing the program of study and guides the selection of courses for each semester. In most research groups within the Department the student organizes a program of study with his/her research advisor and brings this program of study to the major field advisor for

formal approval. The Department Chair appoints the major field advisors. One of the major field advisors is designated by the Department Chair to be the Chair of Graduate Advisors, or the Head Graduate Advisor. The Chair of the Graduate Advisors signs or makes requests to the Graduate Division on matters concerning graduate enrollment, degrees, progress, and financial aid. The Head Graduate advisor will, as appropriate, act as an advocate of the student on matters dealing with the Graduate Division.

The AAC is normally made up of three faculty members. The Chair of the Department appoints the Chair of the AAC Committee and its members. The Committee changes every year. However, in the interest of maintaining continuity, no more than two members may be replaced each year.

The AAC may solicit input from the graduate student body whenever a need arises. The graduate student body too may bring matters for consideration by the AAC as appropriate. Student participation in the AAC is available consistent with student interest in participation.

The Academic Affairs Committee is responsible for all matters pertaining to the academic programs in the department. In addition, the committee is responsible for responding to faculty or student requests for modifications of policy, for bringing academic issues to the attention of the entire faculty and for formulating new policies for full faculty consideration. The AAC reviews each student's program of study, and approves student petitions to make changes in the program of study. It has the responsibility for ruling on student complaints or requests, should these not be resolvable at the level of the student research advisor or the major field advisor. Appeals procedures can be found on page 18.

In summary, the Academic Affairs Committee is responsible for overseeing and implementing the academic policies of the Department and for formulating new policies for faculty consideration.

As mentioned before, each student will be assigned a permanent major field advisor at the time of entrance into the graduate program. If the student's research supervisor is the same as his/her major field advisor, then he/she cannot serve as his/her major field advisor. The major field advisor has the practical responsibility of advising students about their academic programs and ensuring that they are aware of and are following the guidelines and policies of the Department, the College, and the University. In particular, the major field advisor has the following responsibilities:

- Reviews the student's course curriculum and insures that it includes the required or core courses and others that are appropriate to the student's interests and background;
- Approves the courses to be taken;
- Monitors compliance with the departmental regulations regarding scheduling of the preliminary and qualifying examinations;
- Assists in the preparation and approval of the formal program of study card that lists the course curriculum, the intended research topic, and the research advisor;
- Reviews and forwards any proposed changes in the program of study to the AAC.

In the normal course of events the major field advisor simply acts for the AAC in guiding the student. In cases where the student wishes to change fields or comes to what appears to be major differences of opinion with his or her major field advisor, the student has the right to request a review and decision from the AAC. The program of study itself has several major components that are addressed in detail below.

## GETTING STARTED

The qualifications required of students wishing to pursue graduate study in the Department of Materials Science and Engineering are detailed in the College of Engineering Bulletin. After being admitted and upon arrival, the student is required to contact those faculty members who have expressed interest in guiding the student's research and who have offered financial aid (research assistantship (RA) or fellowship). The student's decision to work with a professor is a commitment to undertake a research project and carry it to completion.

A student cannot change research projects without the express permission of the research advisor and notification of the change to the major field advisor and the AAC. Students accepting research assistantship are expected to satisfy certain performance criteria that include a regular schedule of work for the hours employed. A normal research assistantship appointment entails 20 hours of work per week on a specific research project. This commitment must be considered in planning course loads. More detailed description of the duties and responsibilities of a research assistantship can be found in the Graduate Student Research Assistantship section on page 16.

With satisfactory job performance and subject to availability of funds, a student can expect the research assistantship to be awarded on a yearly basis and renewed annually. Notice of unsatisfactory performance must be given to the student, and to the AAC, thirty days before termination. The student should use this period to discuss the situation with the major field advisor, and perhaps seek alternate support.

## GRADUATE DEGREES OFFERED

The department offers three different types of graduate degrees, as set forth in the Table below:

<b>Degree</b>	<b>Purpose</b>	<b>Emphasis</b>
Master's of Science, Engineering	For students with a B.S. in engineering, or physical, biological, earth science	Application of natural sciences to the analysis and solution of engineering problems.
Master's of Engineering	For students with a B.S. in engineering, or physical, biological, earth science	Technical, sociological, economic and environmental problems involved in the design, construction, and operation of engineering structures, processes and equipment
Ph.D., Engineering	For students with a B.S. in engineering, or physical, biological, earth science	Application of natural sciences to the analysis and solution of engineering problems

The program of study for each degree includes courses, the selection of a research advisor, examinations, research area, and thesis.

In MSE, students usually follow the programs of study for the Master of Science, Master of Engineering, or Doctor of Philosophy degrees. For these degrees, the Department has core requirements. The core courses required for MSE students are listed in the MSE Course Requirements section on page 7. In addition to these requirements, there are Graduate Division and/or College requirements in regard to the

number of units in the major field of study in the MS, ME, and Ph.D. programs, and in each of two minor fields of study for the PhD degree. For each of the core courses there are important prerequisites that entering students, especially those with an undergraduate degree not in materials science and engineering, must satisfy.

All graduate students must enroll in a minimum of 12 units per semester. These units should include core coursework requirements, one unit of the department seminar (MSE 298-001), one unit of the research group seminar (MSE 298 associated with their Research Advisor), and varying units in independent research (MSE 299 associated to their Research Advisor). Typically graduate students take approximately 2 core courses each semester until their coursework is completed, though the amount of coursework may vary depending on the specific graduate program and the student's program of study.

All MS and PhD students in their first two years of graduate work at Berkeley are required to enroll in one unit of the department seminar (MSE 298-001). Attendance policies are set by the instructor of record for MSE 298-001. MEng students are encouraged to enroll in the department seminar their Fall and Spring semesters but are not required to do so. All students performing research should also be enrolled in one unit of their advisor's research group seminar (MSE 298-0xx). After fulfilling the core coursework, department seminar, and research seminar requirements, the remaining units needed to meet the 12-unit minimum for MS and PhD students will be composed of research units under the supervision of their research advisor (MSE 299-0xx).

In composing the study list, the student should give careful thought to the entire program of study. Students planning to terminate with the MS degree may wish to specialize in certain subjects. Those planning to continue for the Ph.D. may wish to immediately select courses to satisfy minor requirements. All course work to satisfy the Program requirements for the Masters or Ph.D. programs must be graded work. Courses taken as Satisfactory/Unsatisfactory cannot be used to fulfill Program requirements, except the 299 course units considered acceptable in the Master's program of study. Units for courses numbered 298 shall not count toward the minimum unit requirements for master's degrees. Careful planning at this stage can shorten the time required for completing coursework and can avoid awkward conflicts of situations in which, for example, a required course cannot be taken because of the lack of a prerequisite. Deficiencies in background should be assessed at this time and the major field advisor should advise the student on how these deficiencies can be remedied (prior to the Preliminary Examination). In some cases, this may require taking undergraduate courses. In particular, the faculty expects graduate students to be adequately prepared in mathematics. Students may be advised to take upper division or graduate math courses to satisfy this requirement. Prior to meeting with the major field advisor, the student should review the details of the preliminary examination and course outlines for any proposed undergraduate classes.

The general requirements for the Master of Science and Doctor of Philosophy are described on page 8 and continue through page 11.

## **MSE CORE COURSE REQUIREMENTS**

The MSE department is implementing a new PhD graduate program beginning in the Fall of 2024. All students starting their PhD program in Fall of 2024 or after must use the 'New' program. All students who have started their PhD program prior to Fall of 2024 can choose to apply either the 'Old' or 'New' graduate program for their course requirements. The formal choice of program can be made via their program card ([white card](#)) submission.

**'Old' Course Requirements for PhD program:** A graduate degree program must include at least one course from each of the five following technical groups, which defines the minimum requirements for program approval:

- 1) Thermodynamics: MSE 201A;
- 2) Structure and Bonding: MSE 201B, MSE 202, MSE 215;
- 3) Materials Characterization: MSE 204 & MSE 204D, MSE 241, MSE 242, MSE 243;
- 4) Materials Properties: MSE 205, MSE C208, MSE C211, MSE C212, MSE 213, MSE C214, MSE 217, MSE 218, MSE 223, MSE 224, MSE C225, MSE 243, MSE C250, MSE 251, MSE 260, MSE C261;
- 5) Materials Processing: MSE 121, MSE C216, MSE 223, MSE C225, MSE C226, MSE 228, MSE 243, MSE C250, MSE 251;

One course may not be used to satisfy two cores; a student must have one course to satisfy each core requirement (5 cores; 5 total courses). If a room-shared 1xx/2xx course has been taken to fulfill the BS degree requirements, it cannot be re-taken to use the 2xx component to count toward any other MSE graduate degree. These requirements should be met within the graduate course program, with one exception. Students who have a BS degree or equivalent in MSE and plan to terminate with the MS degree may use courses from their upper division undergraduate program at the University of California at Berkeley or another University to satisfy the first two requirements. It is reasonable, and occasionally will be necessary, for graduate students to take courses outside of MSE as part of their program in the major. It may even be desirable for a student to fulfill some of the core requirements with courses from other Departments. Nonetheless, it is essential that the graduate program contain enough courses from this department. Hence, the graduate program for the MS must have at least 3 Berkeley MSE courses. The Ph.D. program in the major must contain at least 5 Berkeley MSE courses.

### ***New MSE PhD Graduate Curriculum Requirements (beginning Fall of 2024)***

1. **3 Core Courses** (3 classes x 4 units each =12 units)
  - Thermodynamics (201A) (Fall)
  - Kinetics/Phase Diagrams (201B) (Spring)
  - Structure and Bonding (202) (Spring)
2. **Minor 1:** (6 units required) 2 courses from two different areas among the following four categories within the MSE dept (courses can be cross-listed in more than one category)
  - Properties: 200A, 205, C208, C211, C212, 213, C214, 217, 218, 223, 224, C225, C250, 251, 260, C261;
  - Modeling/theory: 215; C286; C287;
  - Processing: C216; 223; C225, C226, C250; 251;
  - Characterization: 204, 204D, 241, 242, 243
3. **Minor 2:** 3 units (1 course either within or outside the MSE dept, can be graduate (200+) or upper-division undergrad (100+) level) that supports a student's program of study.

**Summary of differences between new and old graduate PhD program:** Total # of required MSE courses remains unchanged from 5 to 5; total # of courses goes down from 9~10 to 6; required core courses goes down from 5 to 3; fewer course units required overall from 16+6+6=28 to 12+6+3=21.



Students who started their PhD studies before 2024 have the option of choosing to use either the old MSE PhD curriculum or the new MSE PhD curriculum to complete their degree. If current students choose the new curriculum, we will accept the previous (or current) versions of MSE 201A, MSE 201B and MSE 202 as counting towards the new curriculum (including the 3 unit version of MSE 202). If a current student uses the 3 unit version of MSE 202 for the new graduate curriculum, then they would only need 20 units of classwork for their degree instead of 21.

## **REQUIREMENTS FOR ALL MASTER'S DEGREES**

***Program Cards.*** A form for the program of study for the Master's Degree must be filled out and approved by the major field advisor by the start of the second semester of study. The forms ([pink card](#)) are available [online](#). Pink cards are for the Masters of Science, Plan I, or Plan II.

***GPA Requirements for Master's Programs.*** All course work in the Master's Programs of Study must be graded work. Only the 299 course units considered acceptable in the Master's program can be taken on a Satisfactory/Unsatisfactory basis. Students must maintain a grade point average (GPA) of at least 3.0 in all subjects taken as a graduate student exclusive of individual study (299 or research seminar 298 courses, since these do not count towards the GPA. If the formal course GPA falls below 3.0 at the end of any semester, the student is subject to dismissal, but the Dean of Graduate Division may permit return on a probationary status upon recommendation of the AAC. If the grade point average is 2.99 or below, the student must complete additional work to bring the GPA up to 3.0 if the degree is to be awarded; no exceptions are made.

No credit towards unit requirements is given for courses in which the grade is below C-, but such courses are included in determining the GPA.

***Research Reports.*** Graduate students engaged in research, whether as research assistants, enrollees in 299 courses, or otherwise, may be required to submit a research report every semester. Requirements for these reports must be obtained from the research or project supervisors.

***Advancement to Candidacy.*** The student must apply to the Graduate Division for advancement to candidacy by the deadline announced in the calendar of the General Catalog.

## **MASTER OF SCIENCE**

There are two plans for the Master of Science Degree. Plan I requires a minimum of 20 semester units of coursework plus a thesis. Plan II requires a minimum of 24 semester units of coursework, and a comprehensive examination and a research project report. All course work in the Master of Science Program of Study must be graded work. Only the 299 course units considered acceptable in the Master's program can be taken on a Satisfactory/Unsatisfactory basis. Units for courses numbered 298 shall not count toward the minimum unit requirements for master's degrees. A form ([pink card](#)) for the program of study for the Master's Degree must be filled out and approved by the major field advisor by the start of the second semester of study. Obtain the forms from the Department Graduate Office.

The choice of Plan I or Plan II should be made by the student at the beginning of the first semester as a graduate student. Students planning on terminating with the MS degree would normally take the Plan I MS degree program. Students who plan to continue on to the PhD program are encouraged to take the Plan II MS degree program.

## PLAN I

**Unit Requirements.** A minimum of 20 semester units are required, of which 8 must be strictly graduate units in the major subject (University requirement), and of these 8, there shall be no more than 2 units of credit for individual study or research, while the remaining units must be graded course units. The remaining 12 units may be upper-division or graduate courses proposed by the student and research supervisor and approved by the Major Field Advisor. For materials science and engineering, the standard core curriculum is given in the MSE Course Requirements section on page 7.

**Thesis.** A thesis is required (University requirement). The research topic and research supervisor must be specified on the program of study form (pink form). This form must be approved by the major field advisor and submitted to the AAC by the start of the second semester of study.

The thesis committee is formally appointed by the Dean of the Graduate Division upon recommendation of the student's major field advisor and the AAC. It consists of three members: the research supervisor plus one other member from the Department, and one member either be from outside the College of Engineering or from a field of engineering not closely related to that of the candidate. Thesis committee members usually are members of the Academic Senate. Approval for committee members other than Academic Senate members must be obtained from the Graduate Division by a petition endorsed by the major field advisor and approved by the AAC. The student is encouraged to consult all committee members while the research is in progress.

The committee must approve the thesis and five final copies of the thesis (approved and signed by the Committee) must be filed by the deadline dates specified in the calendar in the General Catalog. Two copies of the thesis on approved archival paper must be filed with the Graduate Division (302 Sproul Hall), conforming to standards and specifications prescribed by the Graduate Division. Two copies of the thesis complete with signed title page and abstract must be filed in the Department-Office. Originals of photographs are not necessary, but may be copied as well. The fifth copy should be given to the research supervisor. Additional copies may be required by committee members and by the sponsoring agency.

Requirements concerning the form of the thesis are in “Instructions for Formatting & Filing Your Thesis” posted on the Graduate Division website: [http://grad.berkeley.edu/policies/pdf/thesis\\_guide.pdf](http://grad.berkeley.edu/policies/pdf/thesis_guide.pdf). A student cannot be admitted formally to the Ph.D. program until the MS thesis is filed or at least signed by the committee. The major field advisor may choose not to authorize the student to take more courses until the thesis is completed.

With the written agreement of the student and the research supervisor, and the approval of the AAC, the student may be permitted to change from Plan I to Plan II at any time, by submitting a petition to the Graduate Division.

## PLAN II

**Unit Requirements.** A minimum 24 semester units is required. Of the 24 units, at least 12 must be strictly graduate units in the major subject (University requirement), and of these 12 units, there shall be no more than a total of 2 units of credit for individual study or research (MSE 299). (Engineering requirement) while the remaining units must be graded course units. The remaining 12 units may be graded upper division or graduate courses approved by the major field advisor. For materials science and engineering, the standard core curriculum is given in the MSE Course Requirements section on page 7.

**Other Requirements.** In addition to the unit requirements, there are certain other requirements. These fall into the categories, as detailed below:

- Terminating with M. S. degree: Students who wish to terminate with an M. S. These students are required to prepare a project report. The guidelines are as follows.

If the student is a research assistant, the research supervisor will serve as project supervisor; otherwise, a project supervisor should be selected in the same way that a research supervisor is selected.

At the time the student submits the Program of study, the major field advisor should be asked to appoint a project committee consisting of the project supervisor and a suitable second member.

At least a month before the student intends to graduate, a project report based on the 299 work or on a phase of his/her work as a research assistant and approved by the project supervisor, must be submitted to the committee. It is the student's responsibility to see that the final corrected report is submitted and the examination taken by the last day of the semester.

When the committee members are satisfied that the student has satisfactorily completed the project requirement, they will sign an approval form. This form, and the report, must be submitted to the Department Graduate Office within the posted deadlines. Failure to file this report will be treated in the same manner as failure to file the MS thesis.

- Students continuing on to Ph. D.: Students who remain to continue with their Ph.D. Program have the option of either completing an M. S. degree by Plan I (thesis) or by Plan II. If they choose Plan II, they are required to submit a project report. A published paper or paper under submission to a journal may be substituted for the project report, provided that the student has played a major role in the work.

## **FIVE-YEAR BACHELOR OF SCIENCE/MASTER OF SCIENCE**

The UCB MSE Department offers a 5-year BS/MS degree for UCB MSE undergraduates. The existing four-year undergraduate program is augmented with a fifth year of graduate study that provides a professionally oriented component, preparing students for careers in engineering or engineering management within the business, government, and/or industrial sectors. In this program, students will earn their Bachelor's degree first and then their Master of Science degree under Plan II of the Academic Senate. It is not a concurrent program. Careful planning during the undergraduate program will allow motivated students to begin a research project and complete some Master's course requirements while still in undergraduate standing. Depending on how quickly a student progresses through the undergraduate program, the additional graduate year may come sooner than the fifth year at Berkeley. The 5-Year Program is not intended for those who wish to pursue a Ph.D.

The unit requirements for the 5-year BS/MS are:

- A minimum of 24 credits
- At least 12 must be strictly 200-level graduate units in the major subject (University requirement) and of these 12 units, there shall be at least 1 unit/semester (2 units total) and no more than 2 units/semester (4 units total) of credit for individual study or research (new MSE296A and B).
- The remaining 12 units may be letter-graded *upper-division* or *graduate courses* approved by the major field advisor.

- In order to complement the undergraduate curricula of the double majors, particular graduate courses are required. MSE/ME double majors must choose MSE 201A as one of their core courses. MSE/ChemE majors must choose MSE 201A and MSE 204 as two of their courses.
- No single course may be used to satisfy more than one of the three core categories.
- The balance of the coursework should establish a coherent program in the area of emphasis, approved by the BS/MS Academic Advisor. For the Engineering Management emphasis, these courses should include at least two from MBA 263, MBA 264, MBA 290A, MBA 290C/ EECS C201/ INFO C224, MBA 290E, MBA 290G, MBA 290I, MBA290N, MBA 290T.

Students must earn a grade of B or better in three of the five core course categories that include thermodynamics, structure or phase transformations, characterization, processing and properties at the 200 level, and also maintain a minimum cumulative GPA of 3.0, as required by the College. If a room-shared 1xx/2xx course has been taken to fulfill the BS degree requirements, it cannot be re-taken to use the 2xx component to count toward the 5-year BS/MS degree.

For the 5-year BS/MS degree an *independent project* will be performed as part of a required two course sequence, MSE 296A&B, under the supervision of a faculty member. Students are encouraged to identify faculty supervisors as soon as possible, but no later than the beginning of the first semester of their MS program. Students can have a research advisor from outside the MSE department, but must have an MSE faculty member as a co-supervisor. Students will be required to complete both a project report and an oral presentation. Possible independent projects may include, but are not limited to:

- Traditional independent research project
- In-depth follow-up to MSE 199 or H194 project
- Product development with business plan
- Materials Science and Engineering
- Industry collaborative project.

NOTE: Only course units taken in the FINAL undergraduate semester that are not applied towards the Bachelor's degree may be petitioned to fulfill the Master's degree requirements. Students therefore have at most three consecutive semesters to fulfill all Master's requirements.

## **MASTER OF ENGINEERING IN MSE**

The MSE M.Eng. degree brings together expertise in a technical specialization with leadership, business, marketing, finance, and management skills. Culminating in a hands-on team-oriented capstone design project, you will apply engineering and business acumen to real-world challenges. This degree is designed to provide students with a holistic understanding of engineering and business wherein they complete an integrative capstone design project. This degree provides a professionally oriented component, preparing students for careers in engineering or engineering management within the business, government, and/or industrial sectors. The M.Eng. degree falls under Plan II of the Academic Senate. The M.Eng. is not intended for those who wish to pursue a Ph.D. The degree may be completed through full- (9 months) or part-time (2-4 years) enrollment.

The unit requirements for the M.Eng. degree are:

- A minimum of 25 credits
- A minimum of 12 credits must be from MSE technical courses (must be 2XX series and letter graded)

- o Students are required to take MSE 200A. Students with degrees in Materials Science can request permission from the MSE M.Eng. advisor to replace this requirement.
- o If a room-shared 1xx/2xx course has been taken to fulfill the BS degree requirements, it cannot be re-taken to use the 2xx component to count toward the MEng degree.
- A minimum of 8 credits must be from Core Leadership Curriculum, including: 2 credits for Capstone Integration (taken S/U), 3 credits for Engineering Leadership I (taken for a letter grade), and 3 credits for Engineering Leadership II.
- Up to 5 credits can be from Capstone Projects (297M A-B) (typically 2 credits in the fall and 3 credits in the spring)

Students must maintain a minimum GPA of 3.0 in the program.

Additional degree requirements include:

- A *comprehensive exam* is required as part of a Master's Plan II. A written examination will be administered to satisfy this requirement. The exam should be taken at the end of the first semester of the program. The exam will be structured to cover the following five topics: (i) thermodynamics, (ii) phase transformations and kinetics, (iii) bonding, crystallography and defects, (iv) mechanical properties, (v) electrical properties (akin to coverage in MSE 200A). To pass the exam, the student must pass with a score of 60% or higher. For students who do not pass with a score of 60% or higher, a second exam will be offered at the end of the spring semester. The exam can only be given twice. If a student fails the exam for the second time, they will either be recommended to the Dean of Graduate Division for dismissal from the program (in consultation with Graduate Advisors) or opt to voluntarily leave the program.
- A *capstone report* for the team project will be a deliverable for the E296MB capstone course. A draft is also a deliverable for the E295 communications course, to provide editing support.

## DOCTOR OF PHILOSOPHY

Students who have passed the preliminary examination have two options in their progress to the Ph.D. degree. They may either choose to obtain a masters degree Plan I or Plan II. Students who chose not to obtain a Masters Plan I degree will do well to make this decision in consultation with their research supervisors. This is because the supervisors may be financially supporting the students from external funding sources that may encourage graduate dissertations. (See also the preceding section for the MS Plan II)

A student entering the Ph.D. program directly must identify a research supervisor. The student, in consultation with the research supervisor and major field advisor, must draw up a program of study listing the courses to be taken in both the major field and the minor fields, the research topic, and a proposed research guidance committee (normally chaired by the research supervisor). A form (the [blue card](#)) for this tentative program of study is available [online](#). The blue card must be endorsed by the major field advisor who submits it to the AAC during the second semester when the student registers for the preliminary examination. This program must be followed through to the Ph.D. qualifying examination. Any changes in proposed course work in the minor or major field require approval of the major field advisor and AAC. The [Blue card](#) must be properly approved and current before the [White card](#) can be submitted.

Changing research advisors after a research project has started is rare, but possible. It is imperative for all parties involved to communicate clearly and early during the process. In addition to discussing the potential change with their current and future advisors, students are also encouraged to discuss the decision with their major field advisor as soon as possible. In order to change their research advisor a

student is expected to submit a memo to the department student services advisor that includes the signatures of (1) their major field advisor,(2) their current research advisor and (3) their future research advisor. If the new research advisor is not a member of the MSE faculty, then the memo should also include the signature of their future MSE faculty academic advisor.

**Program Cards.** Two forms ([blue and white cards](#)) for the Ph.D. program must be filled out and approved by the major field advisor and the Academic Affairs Committee. A blue card is filled out at the beginning of the Ph.D. program to tentatively draw up a program of study listing the courses to be taken in both the major field and the minor fields, research topic, and a proposed research guidance committee (normally chaired by the research supervisor). Any changes to the blue card require approval of the major field advisor and AAC. A [white card](#) is filled out later in the Ph.D. program to finalize the program of study to be used for the Ph.D. Furthermore, a [white card](#) needs to be completed by the time the student submits his/her application for the Qualifying Exam.

**Unit Requirements:** The minimum number of semester units of formal course work (major and minors) is 28, of which 16 must be in graduate units in the major field. All course work in the Doctoral Program of Study must be graded work. Courses taken as Satisfactory/Unsatisfactory cannot be used to fulfill the requirements towards the degree. Any questions regarding this can be discussed with the major field advisor. In general, Ph.D. students holding a GSR appointment should sign up for 7 units of MSE 299 each semester if they are finishing coursework, and 12 units of MSE 299 each semester if they are finished with coursework.

**GPA Requirements for Ph.D. Programs:** The student is required to maintain a 3.0 GPA in courses taken at Berkeley in the major area as a graduate student, even if these do not appear in the proposed or final program of study.

**Graduate Student Instructor Requirement:** All graduate students enrolled for the PhD degree in MSE are required as part of their degree to act as a graduate student instructor (GSI) for at least one semester during their tenure as a student.

- This requirement must be satisfied with a UC Berkeley MSE course (this includes cross-listed courses). Being a GSI for a course in another department will not be considered to have fulfilled this requirement.
- All graduate students are advised to fulfill this obligation by their fourth semester in the Department. However, we understand that non-domestic students may wish to delay serving as a GSI until after they have advanced to candidacy due to the issue of non-resident tuition. Note that non-domestic students are additionally required to pass the Test of Spoken English (TSE). As described by the graduate division, teaching and resource center, students who do not speak English as a native language and do not hold a Bachelor's degree from an institution in the United States must demonstrate oral English proficiency to serve as a GSI. In those countries where the TOEFL Internet-based Test (TOEFL iBT) is administered, English language proficiency is determined by the speaking section score of the TOEFL iBT. In those countries where the TOEFL iBT is not available, students can demonstrate their proficiency by taking and passing the Test of Spoken English (TSE) before enrolling in Berkeley or the SPEAK test offered on the Berkeley campus. University policy calls for completion of the oral English proficiency screening requirement before the GSI appointment can be made. This must be completed one semester prior to their appointment as a GSI.

- In the event of an emergency where a GSI must be found to prevent the cancellation of a class or a section of a class, the Chair will appoint the most senior graduate student in the Department who has not fulfilled the GSI requirement. This will constitute a mandatory appointment.

**The Major:** The student's field of research will normally be in one or more of the faculty research specialties of the Department. The major will normally be a research program in Materials Science and Engineering. It is possible, however, to establish a major in an interdisciplinary area combining any of the departmental sub-disciplines with appropriate studies in other departments. The student must take 16 units of graduate level courses (exclusive of 299 or 298 units) in the major field. All courses within the major field must be graduate courses taken at Berkeley. Although these graduate courses need not be restricted to those offered by the Department, the program must include at least 5 courses from the MSE department. It is expected that these courses will include the core courses or equivalents indicated for the major field of study in the MSE Course Requirement section on page 8. Thus, the program must satisfy the content requirements with respect to thermodynamics, structure or phase transformation, materials characterization, materials properties, and materials processing. (Note: MSE 121 is an exception to the graduate courses only requirement, and may be used to satisfy the processing requirement.)

**The Minors:** In addition to a major field, each candidate must select two minor fields. The minor fields should serve to broaden the base of the studies and lend support to the major field. The student is required to maintain a 3.0 average in each of the Minors, and any other courses taken at Berkeley as a graduate student that are not in the major area of study, even if these do not appear in the proposed final program of study.

- Each minor program should be named and have an orientation different from the major program and the courses involved should be concerned with concepts not introduced in the major program.
- Each minor program will consist of at least 6 units of graded coursework.
- One minor program should consist of courses outside of the Department (Engineering requirement) and preferably outside of the College of Engineering.
- Graduate courses taken in a graduate program of another university may be used to satisfy at most one minor. The maximum number of units awarded for such a minor will be 8 units. The requirements in item 1 above must be satisfied. Students who transfer to Berkeley as a result of their research advisor's transferring from a different institution can apply for credit for more than one minor.
- Two courses represent a minimum program for a minor. In a few programs of study, a minor that consists only of a sequence of high-level upper division courses taken in a department outside of the College of Engineering may be acceptable. However, no more than two undergraduate courses will be allowed to fulfill the requirements for the minors. Thus, one minor may consist of a sequence of advanced undergraduate courses taken at Berkeley, or alternatively, there may be a combination of one advanced undergraduate and one graduate course in each minor, provided that the content of the minors is sufficiently different.

## **PRELIMINARY EXAMINATION**

The purpose of the Preliminary Examination is to ensure that students have a sufficiently strong foundation in Materials Science and Engineering to qualify for formal entrance to the Ph.D. program. The

preliminary exam is not open to students in the BS/MS program.

### ***Scheduling of the Preliminary Examination***

All first year graduate students beginning their MS/PhD or PhD program are required to take the Preliminary exam in the first January after they have started taking graduate classes. The exam will be held in the week immediately preceding the start of classes for the Spring semester, with the actual date to be scheduled by the chair and announced in the Fall. Students who fail the exam must make their second and final attempt during an exam that will be scheduled in the first week of the Fall semester immediately following. There are no partial passes for the preliminary examination, and failure the first time means the exam must be retaken the second time in its entirety.

### ***Preliminary Examination subject matter***

In this oral exam students must demonstrate (i) mastery of the essential components of a Materials Science and Engineering education at a level commensurate with the completion of an undergraduate MSE degree at Berkeley, and (ii) their ability to use this knowledge in ongoing research.

The examination is divided into 6 topics germane to ceramic, metallic, semiconducting, and soft materials, including their appropriate composites. Six faculty examiners are appointed each semester by the Department Chair, one examiner per topic, who conduct the exam in *individual oral interviews* lasting approximately 15 minutes. The examination topics are:

- 1) Thermodynamics;
- 2) Phase Transformations;
- 3) Bonding, Crystallography, and Crystal Defects;
- 4) Materials Characterization;
- 5) Mechanical Properties;
- 6) Electronic (Electrical, Optical, and Magnetic) Properties

In preparation for the Prelim, students should consult syllabi of the lower division and upper division courses required of undergraduate students in the MSE major at Berkeley to discern the expected level of topical coverage during the exam. Individual meetings with faculty examiners are also strongly advised.

### ***Outcome of the Preliminary Exam***

Each faculty member will rate the student on a scale of 0-4, with 4 representing A level performance, 3 representing B level performance, and so on. After the examination, the Examination Committee meets to evaluate the student's total performance and decide whether the student has passed the exam.

In order to pass the preliminary exam a student must: (1) score above 3.0 in 4 subjects; (2) score above 2.0 in all 6 subjects; and (3) average above 3.0 across all six subjects. If these criteria are not met, the examination committee will evaluate the student's performance to decide the outcome of the examination.

The student will be notified promptly in writing of the exam outcome.

The student may appeal the decision of the Examination Committee to the AAC, in the event that there is a basis for disagreement.



### ***Proceeding to the PhD Degree.***

The GPA in all formal courses is considered as one criterion for distinguished scholarship. The College of Engineering and the Academic Affairs Committee require a GPA of at least 3.0 in the major field of study and 3.0 in the minors. Performance in formal courses is, however, not the only criterion for permission to allow the student to continue in the Ph.D. program; satisfactory research performance is also required.

Students entering the Ph.D. program without an MS degree must first obtain the MS Plan I or Plan II degree. For students directly admitted into the PhD program, the MS Plan II degree requirements can be satisfied by passing the Preliminary Examination, and by documented satisfactory research progress. After successful completion of the MS program requirements, the student may petition to change to the Ph.D. program. The petition is made to the Graduate Division of the University and must be endorsed by the research supervisor, the graduate advisor chair and the AAC. This petition will not be approved until the following criteria has been met:

- 1) A research Advisor agrees to supervise the Ph.D. research.
- 2) Under Plan I, the MS thesis has been filed or at least signed by the thesis committee members.
- 3) Under Plan II, the various requirements described under M. S. Plan II, "unit requirements" and other requirements must be satisfied.
- 4) The Preliminary Exam must have been passed.
- 5) The Tentative Program of Study for the Ph.D. (blue card) has been filled out and approved by the AAC. (Note that this card should be submitted when the student first registers for the preliminary examination).
- 6) The academic standing is satisfactory.

### **THE QUALIFYING EXAMINATION**

There are three elements to an individual's qualification for the Ph.D.: knowledge of the field, the ability to identify and conduct significant original research, and the ability to communicate the results of that research to the scientific and engineering community. Each of these requirements should be tested at some stage in the student's career, and preferably at an early stage so that a student who is not qualified for the degree can be encouraged to seek a more suitable line of endeavor.

The student's general knowledge of the field is tested in two ways: in the preliminary examination and in the examinations given in the various courses in his or her academic program.

The Ph.D. qualifying exam tests the student's ability to identify a significant problem, to assemble the background information needed to grasp it in the context of the field, and to construct a technical approach that provides a plausible path to its solution. At the same time the qualifying exam will test the student's knowledge of the subject matter within the broad research field and his or her major field. The student's ability to actually bring research to a successful conclusion is tested by the Ph.D. thesis.

To take the examination, the student must complete the form Program of Study for Doctoral Candidates (the [white card](#)) that lists, again, the courses in the program of study, the four members of the oral

qualifying committee, the research topic, and the research advisors (thesis committee). This card has to be signed by the major field advisor and the AAC chairman. If the GPA in the major is less than 3.0 and/or in a minor is less than 3.0, the AAC will request a memorandum from the research supervisor which should state why the student should be permitted to take the Qualifying Examination and to continue his or her course of studies. The AAC will inform the student and Research Supervisor of its recommendation. The [white card](#) must be approved by the AAC before the student begins scheduling the qualifying examination.

After the qualifying examination, the Chair of the qualifying examination committee signs the examination card and the Report on the Qualifying Examination is sent to the Graduate Dean. The Application for Advancement to Candidacy for the Ph.D. Degree will be sent to the student when he/she has passed the Qualifying Examination and has completed all approved coursework. Students are strongly urged to take this examination as early as possible. However, it is customary and advisable for the student to have embarked on a Ph.D. thesis topic, and if changes in program have been made, this may justify some delay in scheduling the exam.

***The QE Committee.*** A committee of four members (at least two members from the major department, and at least one member from outside of the major field) gives the qualifying exam orally. In some groups, it is customary to have committee representatives from the minor fields if these have direct application to the research area. The student's research supervisor may not be a member of the qualifying examination committee. The examination lasts for about 3 hours.

The major field advisor nominates the committee at least four to five weeks before the expected examination date. The major field advisor may consult with the student in the selection process but ultimately it is the responsibility of the faculty to ensure that a competent and knowledgeable committee is assembled to administer a fair and quantitative test. The major field advisor's recommendation is approved by the Head Graduate Advisor and forwarded to the Dean of the Graduate Division, who actually approves the committee and the Qualifying Exam form.

Before the [white card](#) is submitted, the major field advisor (or his/her designee) should contact the proposed committee members to make sure that they are willing and able to serve. The [white card](#) must be approved by the AAC before the committee list is submitted to the Graduate Division for approval. After receiving approval from the Graduate Division, the student should consult directly with the committee to establish personal contact and to briefly discuss the research topic. The Dean of the Graduate Division sends formal notice of the exam to the committee.

***Scheduling QE the Exam:*** The qualifying exam must be taken by the end of the second semester following the semester in which the student formally began the Ph.D. program. For students who have entered the Ph.D. program with a MS, this formal beginning would be the date on which the Academic Affairs Committee formally approved continuation for the Ph.D., following the preliminary exam. For students who first obtain an MS degree in this Department, the formal start of the Ph.D. program coincides with the approval of the petition to change to the Ph.D. program of study, which usually occurs when you receive your MS.

***Preparing for the QE Exam:*** Meet with each member of the committee at least once before the exam. Candidates in Materials Science are required to present an account of the research that will be described in their Ph.D. thesis. This presentation will typically last for 20-30 minutes, if uninterrupted. The following guidelines are intended to help in preparing for the presentation:

- Research Topic

- a) Succinct and accurate
  - b) Goal of research
  - c) Significance and importance
  - d) Potential Impact of results (including reasonable speculation is)
  - e) Novelty of proposed research
- Research Plan
    - a. Plans to execute research: methods, techniques, tools, milestones, etc.
    - b. Details of proposed research techniques
    - c. Potential ability of approach to achieve research goal
    - d. Details of collaboration and reliance on active contributions from others
    - e. Presentation of preliminary results to date and acknowledgment of contributions of others
    - f. Alternate methods, choices and priorities
    - g. Time frame and expected targets
  - Expected results
    - a. Description of reasonably anticipated findings
    - b. Impact of expected results; expectations and speculations

Examiners have the tendency to be helpful and friendly. In general, they look forward to a good presentation. They most often (although not always) try to begin with some questions that are directly related to your research interests. Answer simple questions simply, clearly and precisely. Do not search for hidden sophistication or some traps!

Basics are most important and should be clearly understood. The minor field examiner (s) will obviously ask questions related to your minor field(s). Ability to "think on one's feet" and make connected reasoning makes a favorable impression on the examiners.

**The QE Examination:** The examination consists of two parts, namely, a written proposal, and the oral examination:

- 1) Written Proposal. The proposal describes intended Ph.D. research. At least two weeks before the examination date the student must submit a written research proposal to his/her committee. The proposal must include a one page abstract and be roughly five to ten pages long. It must contain a concise statement of the research problem and its significance, a discussion of the technical background, the technical approach (experimental and/or theoretical), the anticipated results, and a bibliography. This written proposal is to be prepared by the student without direct collaboration or assistance from the faculty.
- 2) The Examination. The student should prepare a 30-minute oral presentation of the research proposal(s). The committee will question the student on the material presented orally, the material contained in the written proposal, and on the general technical background to the research area. The student should be familiar with the relevant literature. The student must also defend the significance of the research problem and the viability of the technical approach. The second part of the examination consists of questions in the major and minor fields related to three broad subject areas of the student's choosing. These three broad subject areas should be (a) consistent with their coursework, (b) complement their research proposal, and (c) be selected in consultation with their research advisor and qualifying exam chair.

**Outcome for the QE.** The student's performance will be judged by a vote of the examining committee. The vote typically results in one of four outcomes: a pass, a failure, a partial failure, or a split vote. Refer to the Graduate Division's Degrees Policy for details. No student may take the qualifying exam more than twice. A student retaking the exam for the second time must do so within a time determined by the committee chairman.

### **ADVANCEMENT TO CANDIDACY**

After completing the major and minor course requirements and passing the qualifying examination, the Department Graduate office will send instructions on Advancing to Candidacy. The major field advisor provides the nominees for the student's thesis committee.

This committee consists of the research supervisor, a second departmental faculty member (normally one of the student's research guidance committee members), and one member from outside the Department. All must be members of the Berkeley Division Academic Senate (College Requirement). Changes in the thesis committee require the approval of the major field advisor, the AAC, the Graduate Adviser Chair and the Dean of the Graduate Division. Specially qualified non-senate members may be permitted to serve on the thesis committee with approval by the Graduate Division. For this, the research supervisor submits a petition to the AAC. The dissertation committee can be changed, should such a need arise. A form for this purpose is available from the departmental graduate office.

It is strongly recommended that the student meet periodically with the Committee members to brief them about research progress and get the benefit of the members' experience in furthering the quality of the thesis. In addition, students who have advanced to candidacy are required by the Graduate Council of the Academic Senate to update their annual progress report online on an annual basis. This can be done by accessing the Graduate Division's web-based system, GLOW (<https://gradlink.berkeley.edu/GLOW/>) to complete their annual Academic Progress Report.

The student is responsible for submitting drafts of the thesis to the committee by the dates specified by the Graduate Division for the semester in which the thesis is to be filed. The committee is not obliged to accommodate late submission. The thesis committee must approve the thesis before the degree can be granted.

The total time that a student may spend in the Ph.D. program is specified by the normative times described by the Graduate Division. It is the student's responsibility to ensure that the schedule is followed. Under exceptional circumstances, the Graduate Dean (upon the recommendation of the research supervisor, major field advisor, the AAC, and Department Chairman) may grant extensions of the normative time.

### **GRADUATE STUDENT RESEARCHER (GSR)**

In today's world there is no such thing as "uncommitted" research funds. Whether the funds come from the University, the Government, or from private enterprise, the research supervisor through a tough, competitive process obtains research support. The faculty member involved must prepare a detailed proposal outlining the research, and this document must convince his/her peer-reviewers that the research is timely and worthy of support.

Each agency receives many more proposals than it can support. Only the best are funded. It is important to note that every proposal states clearly what is expected to be accomplished and what is to be delivered at the end of the contract. Part of the review process by the agency includes consideration of how well the

faculty member has, in past contracts, delivered what he/she promised.

At the University of California, the faculty member's salary for the nine-month academic year is paid by the state. Support of faculty by research contracts takes place only during the summer months. As a result, a large portion of the budget of contracts obtained by the department is allocated to student support. In fact, the major motivation behind many research projects is to obtain student support.

These facts mean that the ultimate responsibility for proper performance of sponsored research remains with the faculty member in charge (usually called the Principal Investigator, or PI for short). Poor performance in this research reflects badly upon the faculty member and the department, and ultimately leads to a loss of support for future students. It is therefore imperative that the Research Assistant (or GSR), joins with the faculty to continue the fine tradition of research here at the University of California. The guidelines below should help the Graduate Student Research Assistant comprehend what his/her roles are in achieving this goal.

***Guidelines:***

1. During the school year the typical RA is committed to spend 50% of full time (20 hours per week) on the research project. It is important that the GSR discipline himself or herself to honor this commitment. We realize that exams and other academic pressures may prevent a student from putting in this required time during some weeks. However, it is expected that the 50% level of effort will be maintained on the average. If something occurs which will prevent this expenditure of time, the RA should inform the PI promptly.
2. One key to good research is frequent contact between the faculty member in charge and GSR's. It is the responsibility of both parties to arrange regular, scheduled contact. However, since the PI may be faced with inquiries from the sponsor at any time, or may be faced with other crises concerning the project that may need immediate attention, it is crucial that they be able to reach you. If you want to be away from the University (say, on vacation or personal business), policy requires that the GSR consult the PI prior to taking such leaves. The time of these leaves must be arranged so that progress of the research is not interrupted. For instance, the PI will justifiably be disturbed if a GSR takes an unannounced vacation during scheduled testing or data gathering.
3. Acceptance of a research assistantship implies a commitment on the part of the student to the project and the PI. The GSR should inform the PI of any competing jobs or projects they are involved with, which may even remotely influence the progress of the research (such as consulting, part-time jobs, etc.). It is insisted that GSR's give their project highest priority in case of any conflict with outside jobs or similar activities.
4. During the course of many projects, computer programs are developed. These programs are not the student's property, even though the student may have been the sole author of it, since this is part of the supported work. Ownership of or control of the programs may, under contract terms, rest with the University or with the sponsor. Use of or release of any such program for purposes other than the project requires the approval of the PI. (This procedure is to be followed even after the contract under which the program was developed has expired).
5. If the GSR decides to seek commercial employment for the summer, instead of working as a GSR, he/she must discuss the next year's RA status with the PI before leaving for the summer. Since continuity of personnel is important to the proper progress of research, the GSR should bear in mind that the PI may not be able to hold the position open until the Fall.

6. The GSR must clearly understand that the position of research assistant is a privilege and not a right. Since projects are subject to the vagaries of governmental funding, an RA reappointment cannot be guaranteed. In general, RA's are assigned on a one-year basis. Reassignment as a GSR, for the following year, will be made on the basis of previous performance as GSR, grades, nearness to degree goal, need, available research projects, area of interest, etc.
7. A Research Assistantship is not an ordinary job: it is a practical and important step in the GSR's educational process. In general, the graduate will have monetary needs to pursue work towards his/her advanced degree, which the research supervisor is fortunate in being able to support. It is hoped that GSR will share the enthusiasm of the PI for the research project and will benefit from the GSR's one on one interaction with the faculty PI. We also hope that you recognize that the deadlines, progress reports, and other reporting requirements that burden your PI are a necessary part of maintaining the GSR's support. Contribution to, and sharing of the PI's efforts to complete these tasks are in the GSR's best interests.
8. GSR appointments are now represented by the UAW union. For more details, please refer to the [union contract](#). Additional information can be found in the [Graduate Division's Appointments Handbook](#).

### **GRADUATE STUDENT INSTRUCTORS (GSI's)**

The faculty of the Department of Materials Science and Engineering considers teaching experience to be an important part of a doctoral student's program of study and requires that all graduate students pursuing a PhD serve at least one semester as a Graduate Student Instructor (GSI) in an MSE course (usually after the first year). The Chair of the department appoints the student's GSI appointments after consultation with course instructors. The following are some guidelines in this regard:

- Materials Science and Engineering undergraduates of UC Berkeley may serve as (GSI) on or after their first semester in graduate school.
- Materials Science and Engineering undergraduates from other schools may serve as GSI on or after their second semester in graduate school.
- Non-materials science and engineering undergraduates may serve as GSI on or after their third semester in graduate school.
- The standard GSI appointment level is 50%, but an appointment at a level between 24% and 50% time can be considered to satisfy the GSI requirement on the condition that all of the open MSE GSI slots for the same semester are already filled. Any appointment at a level below 24% will not be considered to have satisfied the GSI requirement.

Graduate students whose English is not their native language or who did not receive their BS in the United States must take and pass the Speak or OPT test. If the student takes the Speak/OPT test and passes it, the score is good for 2 years.

Foreign students should take their Speak test at least 1 year, but not more than 2 years (otherwise the passing score cannot be used) before they are advanced to candidacy. If the student does not pass the

Speak test and fails the OPT exam, he/she will need to take the English course LANGPRO 100A. Upon completion of 100A, the student will be given the opportunity to re-take the OPT exam.

Foreign students are recommended to serve their required service as a GSI after they have been advanced to candidacy. If a foreign student wishes to serve as a GSI before he/she has advanced to candidacy, then the student/faculty supervisor must cover the student's NRT with discretionary funds

### ***GSI Eligibility***

- 1) Students on filing fee status are not eligible to hold GSI appointments.
- 2) Minimum GPAs for holding academic appointments are:
  - 3.1 for GSIs
  - Academic appointees may have no more than **2 incomplete grades** in upper division or graduate courses.
- 3) International students must have advanced to candidacy.
- 4) If English is not the student's native language, he/she must pass his/her speak/OPT test prior to the start of the appointment.
- 5) Students must be enrolled in at least 12 units by the third week of classes.
- 6) GSI appointments are now represented by the UAW union. For more details, please refer to the [union contract](#). Additional information can be found in the [Graduate Division's Appointments Handbook](#).

### **LOANS**

Because of the relatively large expenses that often come due at the beginning of each semester and especially at the beginning of the school year, a student may find that he/she is unable to meet these expenses even though his/her overall income year for the year may be sufficient to cover his/her needs. Under such conditions, it is often possible to obtain a loan through the University that can be repaid more conveniently. For information about loans, the student should inquire at the [Financial Aid Office](#) or at the [Office of Foreign Student Advisor, International House](#).

### **NONRESIDENT TUITION WAIVERS**

Nonresident U.S. citizens and permanent resident students with outstanding academic records may receive a Nonresident Tuition waiver from the department for the first year of graduate work in the department. Nonresidents (U.S. citizens and permanent residents visa holders) must take the appropriate steps to apply to become residents of California after one year at the University. Awards will cover and be limited to a full academic year (2 semesters). Recipients must enroll in a full time program of student and/or research leading to a higher degree.

### **GRADUATE STUDENT APPEALS PROCEDURE**

***Purpose and Scope:*** The purpose of this procedure is to afford graduate students in the Materials Science and Engineering Department an opportunity to resolve complaints about dismissal from graduate standing, placement on probationary status, denial of readmission, and other administrative and academic decisions that terminate or otherwise impede progress toward academic or professional degree goals.

The scope of this procedure is limited to matters listed above, and excludes complaints regarding denial of admission, student records, grades in courses of instruction, student employment, student discipline, and auxiliary student services (such as housing, child care, etc.) This procedure may not be used for complaints regarding actions based solely on faculty evaluation of the academic quality of a student's performance, or the dean's evaluation of a student's appropriate academic progress, unless the complaint alleges that the actions may have been influenced by nonacademic criteria.

***Informal Resolution Procedures:*** A student may pursue informal resolution of a complaint by scheduling a meeting with the Head Graduate Adviser to discuss the complaint and explore possible avenues of resolution. If informal resolution is pursued, it must be initiated, and should be completed, within 30 days. At any point in this process, if a satisfactory solution cannot be reached, the student may initiate formal resolution by putting the complaint in writing.

If the complaint is about an action taken by the Head Graduate Adviser, the complainant may elect to take the complaint directly to the Academic Affairs Committee.

***Formal Resolution Procedures:*** A written complaint must include information regarding the action being complained of and the date it occurred, the grounds upon which the appeal is based, and the relief requested. The complaint must be based on one or more of the following grounds:

- Procedural error or violation of official policy by academic or administrative personnel;
- Judgments improperly based upon nonacademic criteria including, but not limited to, discrimination or harassment on the basis of sex, race, national origin, color, age, religion, sexual orientation, or disability;
- Specific mitigating circumstances beyond the student's control not properly taken into account in a decision affecting the student's academic progress.

A written complaint must be received by the Academic Affairs Committee of the department within thirty days from the time the student knew or could reasonably be expected to have known the action that is the subject of the complaint. The department should complete its investigation and notify the student of the outcome of the complaint within sixty days of the date it was received.

The time frame for filing a written complaint may be extended by the department if the student has been involved in continuing efforts toward informal resolution, and the informal resolution process was initiated within thirty days of the time the student knew or could reasonably be expected to have known of the action that is the subject of the complaint. All time frames referred to in this procedure refer to calendar days. Summer and inter-semester recesses are not included within these time frames.

Upon receipt of a written complaint, the Academic Affairs Committee will investigate the complaint and make a recommendation regarding the outcome of the complaint. Generally, the investigation will include an interview with the complainant, a review of any relevant written materials, and an effort to obtain information from available witnesses (i.e., interviews or written statements or documents). The Chairman of the Academic Affairs Committee will notify the student in writing of the outcome of the complaint. A written complaint under this procedure satisfies the requirement of a unit level resolution process pursuant to the Graduate Appeals Procedure.

***Appeal To The College of Engineering:*** If the matter cannot be resolved at the department level, then the case should be brought to the Associate Dean, Academic Affairs, College of Engineering.

***Appeal To The Graduate Division:*** Only after all of the above attempts fail, may a formal appeal be presented to the Dean of the Graduate Division. The student may then bring the complaint to the Formal Appeal Procedure of the Graduate Appeals Procedure. The formal appeal must be received in the Office of the Dean of the Graduate Division, 424 Sproul Hall within fifteen days of the date of the written notification of the result of the unit level procedure. Copies of the Graduate Appeals Procedure (updated



February 12, 1996) may be obtained from the Office of the Dean of the Graduation Division.

**Complaints Involving Discrimination:** If the complaint involves allegations of discrimination or harassment on the basis of sex, race, national origin, color, age, religion, sexual orientation, or disability, the department should consult the appropriate campus compliance officers prior to commencing informal or formal resolution. The names, phone numbers, and campus addresses of these individuals are listed in various campus publications and may be obtained from the Office of the Dean of the Graduate Division at (510)642-5472 or the Academic Compliance Office at (510)642-2795.

**Other Complaints Procedures:** Graduate students may contact the Office of the Ombudsman for Students, the Title IX Compliance Officer, or the 504/ADA Compliance Officer for assistance with complaint resolution. There also are other complaint resolution procedures listed in the Graduate Appeals Procedure for use regarding complaints that do not fall under this procedure.

### **STUDENT RECORD DISCLOSURE INFORMATION:**

The Berkeley Campus Policy Governing Disclosure of Information from Student Records, issued by the Office of the Chancellor, is available at the Office of the Registrar's website: <http://registrar.berkeley.edu/GeneralInfo/ferpa.html>. The Chair of the Department of Materials Science and Engineering is responsible for maintenance of all student records. Staff members, who need to access the records in the course of performing their duties, assist the chair. To implement the policy, the Department of Materials Science and Engineering has established the following procedures that apply to currently registered and former students.

**Public Records:** The following types of information kept in the Department of Materials Science and Engineering are considered matters of public record. The information is released, provided it is available in the office, if it is requested in writing. The information is not released if the student has requested in writing that it not be disclosed as a matter of public record:

- Name of student,
- Date of birth,
- Place of birth,
- Dates of attendance,
- Major field of study,
- Degrees granted at Berkeley and date,
- Name of the most recently attended institution (prior to Berkeley).

**Confidential Records:** All other records, such as general correspondence, Admission application, Educational Test Scores, are confidential.

The following persons have access to these records: The Office of the President of the University, the Ombudsperson, the academic and nonacademic staff of the Department of Materials Science and Engineering. Other campus personnel are granted access when such access is necessary for the normal performance of their assigned duties. The procedures by which students and persons or organizations outside the campus may gain access are described below.

Complete records of degree recipients, as well as those of inactive students who have not finished their degrees, are kept.

**Access by The Student:** Students have the right to inspect their own confidential records provided they present adequate identification. Letters of recommendation and statements of evaluation dated before

January 1, 1975, are not disclosed since these are not covered by congressional legislation.

Access to a student's record must be granted within 5 working days after the request. Copies of records that can be released will be made for 10 cents a copy.

***Access by a Third Party.*** Disclosure to a third party can be made only with the written consent of the student, naming the third party, the records to be released, and the reasons for the disclosure. There are certain exceptions under which information about confidential records is released by the Department of Materials Science and Engineering without the written consent of the student, for example, for judicial order, to accrediting organizations, for research purposes, because of health and safety emergencies, and under certain conditions in connection with financial aid.

***Challenge of Records and Hearing.*** The staff of the Department of Materials Science and Engineering will interpret and explain the information in a student's record at the student's request. If a student believes that his or her records include data which are inaccurate, misleading, inappropriate, or otherwise in violation of the student's right of privacy, an appointment should be made with the Graduate Advisor Chair to request that the records be amended.

If the student is not satisfied with the result of the appointment, he or she may use the College of Engineering Graduate Student Appeals Procedure outlined in the Department of Materials Science and Engineering Graduate Student Handbook. Only after all attempts through the Appeals procedure have failed, may a formal appeal be presented to the Dean of the Graduate Division. There will be a hearing, presided over by a campus official or other party who does not have direct interest in the outcome of the hearing. The hearing will be within a reasonable length of time and will provide an opportunity for the correction or deletion of any inaccurate, misleading, or inappropriate data and for the inclusion in the student's records of a written explanation. Note: Grading and other evaluations of students' work by course instructors do not fall within the scope of such a hearing. For information on Grade Appeals, see Regulation A207 of the Academic Senate Bylaws, Berkeley Division.

While complaints and questions which do have to do with student records should first be directed to the Department Graduate Advisor Chair, they may also be submitted to the Dean of Student Life, 403 Sproul Hall. Complaints regarding violations of the rights accorded students by the 1974 Federal Family Educational Rights and Privacy Act (Buckley) may also be filed with the U.S. Department of Education, 400 Maryland, S.W., Room 3021, Washington, D.C. 20202.

## **HEALTH**

### ***University Health Service (Tang Center)***

Students should familiarize themselves with the medical and hospital services available to them at the Tang Center (2222 Bancroft Way). Professional help is available not only for accidents and illnesses but also for mental fatigue, excessive nervousness before examinations, and other emotional or psychological difficulties.

***Adverse Personal/Medical Conditions:*** The Materials Science and Engineering Department recognizes that students might occasionally encounter nonacademic and adverse personal, medical, or other disruptive circumstances that would impair their performance in an exam, and that such circumstances are not always predictable well ahead of the exam. In such circumstances, students are strongly urged to declare their needs before the start of the exam. The Department will attempt to make reasonable adjustments in such matters, if necessary in consultation with campus offices well situated to advise.

## CHEMICAL WASTE DISPOSAL AND SAFETY

Extensive resources on safe laboratory practices required at UC Berkeley including detailed procedures for chemical storage, use and disposal can be found on the website of the office of Environmental Health and Safety: <http://www.ehs.berkeley.edu>.

**Safety:** It is important that all research be conducted in a safe manner to protect not only the researcher but also other individuals. Each researcher is responsible for the safe operation of their equipment. In each research group, there must be an established safety-training program to instruct new students in the proper use of the group's facilities. The Departmental Safety Coordinator (DSC) will document such training. The faculty advisor is ultimately responsible for the safety of his or her researchers.

In addition to their faculty advisor, the other safety resources available to the student include the group safety representative (student), the Departmental Safety Committee, the Departmental Safety Coordinator (Chris Kumai, 270 Hearst Memorial Mining Building, 642-3827), and the Office of Environmental Health and Safety ([ehs.berkeley.edu](http://ehs.berkeley.edu)).

The Departmental Safety Committee consists of the Chairman (a faculty member), Departmental Safety Coordinator, and student members from each of the research groups, which utilize departmental facilities. At the start of the fall semester, each faculty advisor will appoint a student representative to the safety committee. The safety committee meets every month during the school year (typically the first Thursday of each month) with a break during the summer. It is the job of the safety committee to establish safety procedures, discuss departmental safety issues, and disseminate information back to the research groups. The Departmental Safety Coordinator (DSC) is responsible for implementing departmental Injury and Illness Prevention Program including department wide safety programs and documenting the various department training programs. If you have any safety concerns, you can report these concerns to your safety committee representative, the DSC, your faculty advisor, or the Office of Environmental Health and Safety.

It is the responsibility of all students in the department to cooperate with the safety committee representatives and to follow established safety procedures in order to create a safe research environment. This committee has established the following procedures on safety matters:

1. A group seminar must be held during the second week of class of each semester. The organization of this seminar will be the responsibility of the faculty members in each group. This seminar will consist of:
  - a. Walking tour of the labs, pointing out the safety equipment and procedures, identifying safety hazards and establishing corrective measures.
  - b. A question and answer period to discuss any safety issues that the student may have.
  - c. A general pep talk on the importance of following safety regulations, enforcement, and responsibility.
  - d. A list of who attended should be accompanied by a brief statement indicating when the seminar was held, what was covered, and what instruction was provided for special hazards particular to certain areas. This is the responsibility of the faculty advisor or the group safety representative.
2. The Safety Committee feels that the enforcement of safety procedures should, for the time being, be left up to the individual groups (possible methods include fines, withdrawal of privileges, return of keys, etc.)

3. It is a university requirement that each department, and in turn, each research group, perform a yearly laboratory self-inspection (i.e. work station ergonomics, earthquake safety, clear egress routes, evacuation procedures). In addition, laboratories, which utilize chemicals, will perform a yearly chemical inventory.