University of California, Berkeley
Department of Nuclear Engineering

GUIDELINES AND PROCEDURES
GRADUATE STUDENTS
2022 - 2023

GUIDELINES AND PROCEDURES FOR GRADUATE STUDENTS: 2022-2023

Department Chair: Karl van Bibber
Head Graduate Advisor: Kai Vetter
Student Services Advisor: Kirsten Wimple Hall

FACULTY:

Rebecca Abergel
Lee Bernstein
Max Fratoni
Peter Hosemann
Dan Kammen
Edward C. Morse
Per F. Peterson
Raluca Scarlat
Carl Schroeder
Youngho Seo
Guanyu Su
Karl A. Van Bibber
Kai Vetter
Jasmina L. Vujic

About the Program

The Graduate Program in Nuclear Engineering at Berkeley offers instruction, research, and professional education in nuclear energy (fission and fusion), nuclear waste and materials management, and biomedical, bio-nuclear and radiological science. Established in 1958, the Department provides a graduate program consisting of the principal fields of reactor theory, reactor engineering, including thermal hydraulics and safety; nuclear materials; nuclear reactions and instrumentation; thermonuclear fusion; nuclear waste management; risk and systems analysis; biomedical imaging; and radiation physics and dosimetry. There are about 90 graduate students and 90 undergraduate majors in the Department. Graduates find opportunities for employment and professional careers in the United States and abroad. Recent graduates are employed in academia, industry, national laboratories, and state and federal agencies.

The Department has strong relations with the nearby Ernest Orlando Lawrence Berkeley National Laboratory, Lawrence Livermore National Laboratory, and Los Alamos National Laboratory. A number of faculty and students collaborate with researchers in these laboratories, and use the facilities of these laboratories in their research projects.

Advising

The Student Services Advisor counsels students on campus policies, regulations and procedures, helps monitor students' degree progress, and assists students with administrative problems related to the completion of degree requirements. The advisor also maintains graduate student records, schedules examinations, and assists students with finding funding and jobs.

The Head Graduate Advisor (HGA) is Kai Vetter. New graduate students should determine course enrollment and consult with the HGA at the start of the first semester.

Each student has an academic and research advisor. The academic advisor takes responsibility for general academic counseling, offers suggestions on programs of study and degree committees, and monitors the student's overall academic progress. The research advisor is responsible for the direct supervision of each student's work, and will become the chair of a student's M.S. thesis (Plan I students) and/or Ph.D. dissertation committee. The research advisor will meet with the student to help determine his or her major and minor fields, and to recommend a suitable program of study leading to the M.S. or Ph.D. degree. In most cases, the research advisor and academic advisor will be the same person.

Advisors meet with their students at least once a semester to review and approve the student's proposed course of study for the next semester, sign the student's program card and discuss the student's general progress through the program. Each term, after meeting with the advisor, the student is required to submit a signed program card to the Student Services Advisor.

Registration and Enrollment Requirements

All graduate students must enroll in 12 units each semester—these normally include a combination of coursework and independent study (NE 299) units and a one-unit NE 298 research seminar. Students who have advanced to Ph.D. candidacy usually enroll in 12 units of NE 299, and 1 unit of NE 298 with their research advisor. Additionally, all students are expected to enroll in NE 295, the department colloquium.

Students are required each semester to update their program card listing the courses they propose to take to complete their degree requirements. Program cards are available

on the NE website under the "Resources" tab. The list of courses on the program card must be approved, and the card must be signed by the student's Academic Advisor and the HGA, and then submitted to the Student Services Advisor for placement in the student's file.

There is no prescribed course of study for the NE program. The student's Academic Advisor generally makes recommendations for specific course work. Students are expected to enroll in courses and seminars relevant to their major and minor fields.

Courses in the 300 series or higher do not count toward the unit requirements for either Plan I or Plan II Master's degrees. 2XXM courses can be used toward PhD requirements, but only count as upper division courses (1XX**). Only one course can be used between an upper division and its equivalent M course (e.g., 210M would count as 101, 215M would count as 1, etc.).**

To view courses offered for a specific semester, visit the On-line Schedule of Courses at http://guide.berkeley.edu/.

First-Year Requirements

All first year students must:

- Take at least 2 letter-graded NE courses during the first year as a graduate student.
- Enroll in and attend the weekly colloquium meetings (NE 295) held on Friday afternoons to get acquainted with the various research topics in NE.
- If you are considering to engage in teaching, for example as reader or graduate student instructor, you need to take 375, the IEOR pedagogy course, during the first semester. This course covers not only teaching techniques but it also covers professional development for scientists and engineers.

International Students

The University defines full-time study for international students (required to meet the terms of a student visa) as 8-9 units if at least one unit is in a graduate course (200 or 600-level), or 12 units if no graduate course is included (all courses below 200-level). Generally, international students must take a full program of 12 units to meet the visa terms and to satisfy the Graduate Division rules.

International students should consult the Berkeley International Office (BIO) for further information on academic issues or personal counseling at 510-642-2818, or go to their website at http://internationaloffice.berkeley.edu/.

Graduate students who have advanced to candidacy for the doctorate are eligible for a full reduction of the nonresident tuition fee, subject to the understanding that: (a) a doctoral student may receive the zero nonresident tuition rate for a maximum calendar period of three years; and (b) any such student who continues to be enrolled or who re-enrolls after the three-year period will be charged the full nonresident tuition rate that is in effect at the time.

Master of Science Degree Program Requirements

Students pursing the MS Degree have two program options: Plan I, and Plan II.

Plan I requires at least 20 semester units of upper division (100 level) and graduate courses (200 level), plus a thesis. Plan II requires at least 24 semester units of upper division and graduate courses, followed by a comprehensive final examination administered by the department. In Nuclear Engineering, the "examination" takes the form of a project presentation, and a written report.

a. MS Plan I requirements

Complete a minimum of 20 units, and the following requirements must be meet:

i. A minimum 8 units of graduate level (200) courses in NE. No more than 2 units of 299 courses may count towards these 8 units. All 8 units must be taken for a letter grade (except for the 299 units).
ii. A minimum 12 units of graduate or upper division undergraduate (100) courses in NE or another department. No more than 2 units of 299 courses may count towards these 12 units.
iii. The major field advisor must approve all coursework each semester. iv. NE 298 (seminar) units do not count towards the 20-unit requirement.
v. Must have a cumulative GPA of 3.0 or higher to receive the degree.
vi. Two thirds of the total 20 units must be letter graded.

Thesis Requirement

The Master's Thesis is required for the MS Plan I program. Guidelines on "Thesis Writing and Filing" can be found at this link http://grad.berkeley.edu/academic-progress/thesis/.

Committee Requirement

Students must have a properly constituted thesis committee that includes three NE faculty members, all of which must be Academic Senate members. If a proposed committee member does not belong to the Academic Senate (i.e. LBL or LLNL), you are required to include a request for an exception (and the CV) together with the application for advancement to MS candidacy. Contact the Student Services Advisor if you require an exception request for a committee member, as you will be required to upload the exception memo and the committee members CV when applying using the eForm in Cal Central.

b. MS Plan II requirements

Complete a minimum of 24 units, and the following requirements must be meet:

i. A minimum 12 units of graduate level (200) courses in NE. No more than 2 units of 299 courses may count towards these 12 units. All 12 units must be taken for a letter grade (except for the 299 units).
ii. A minimum 12 units of graduate or upper division undergraduate (100) courses in NE or another department. No more than 2 units of 299 courses may count towards these 12 units.
iii. The major field advisor must approve all coursework each semester. iv. NE 298 (seminar) units do not count towards the 24-unit requirement.
v. Must have a cumulative GPA of 3.0 or higher to receive the degree. vi. Two thirds of the 24 units must be letter graded.

Comprehensive Exam and Committee

Completion of a project culminating in a written report (10-50 pages) and an oral presentation (30 minutes) before a committee of three faculty members or two faculty members and one approved non-university person. The written report must be submitted to the committee chair, and the Student Services Advisor at least one week prior to the oral presentation. Approval by the professor in charge of the research project and the HGA is required.

Transferring Coursework

Master's students may transfer up to 4 semester units or 6 quarter units of course work completed as a graduate student at another institution. The student must have received at least a B in the course(s) and have a GPA of at least 3.3 or higher at both Berkeley

and the other institution. Students cannot use units from another institution to satisfy the minimum unit requirement in 200 series courses.

Berkeley undergraduates who take graduate course work during their last undergraduate semester may petition to backdate graduate standing in order to receive graduate credit for that course work. Graduate standing may be backdated for only one semester, and students may petition for credit only for course work that was not required for the undergraduate degree.

All petitions require approval by the HGA, Peter Hosemann, before the request can be submitted to the Graduate Division's Associate Dean for review and final approval.

Doctor of Philosophy (Ph.D.)

In order to receive the Ph.D. in Nuclear Engineering, all students must successfully complete the following three milestones:

- Required coursework: major and minor requirements
- Departmental Exams: first year screening exams and the oral qualifying exam
- Dissertation

Major Field Requirement

The major field is always defined as "Nuclear Engineering", not the student's specific research area. All six courses required for this field must be NE courses in the department. Occasionally students may petition to include courses taught by NE faculty in other departments.

Major Field Requirements

- 6 NE courses, of which 4 must be graduate level (200) NE courses taken at UCB.
- Major courses must be taken for a letter grade.
- A minimum 3.0 GPA is required for all major courses.

Minor Requirements (two minors required)

In addition to a major field, each student must select two minor fields that serve to broaden the base of the studies and lend support to the major field. Each minor program field should have an orientation different from the major program. Typically, at least one minor field consists of regular courses taken outside the department (i.e., no 298 or 299 independent studies or non-graded courses). Each field must contain at least 6 units of course credit.

Outside Minor Requirements
• Should be in a distinct technical area and named (e.g., "Numeric Analysis", "Heat Transfer", "Plasma Physics", "Medical Physics").* • 3 upper division courses; or one graduate level course, and 1 upper division • Consist primarily of courses from outside of the department. • All outside minor courses must be taken for a letter grade. • 6 unit minimum. • Minimum 3.0 GPA required.
Second Minor Requirements
• Can be in Nuclear Engineering. • 2 courses, one of which must be a graduate level course. • Minor courses must be taken for a letter grade. • 6 unit minimum. • Minimum 3.0 GPA required

*Students intending to obtain the CAMPEP approved certificate in medical physics in order to meet the didactic requirements to enter a CAMPEP-accredited residency program are required to choose medical physics as one of the minors and to fulfill all requirements as described at the medical physics website. In addition students are required to have a strong foundation in basic physics. This shall be demonstrated either by an undergraduate or graduate degree in physics, or by a degree in an engineering discipline or another of the physical sciences and with coursework that is the equivalent of a minor in physics (i.e., one that includes at least three upper-level undergraduate physics courses that would be required for a physics major). If a student does not have these requirements fulfilled, it is the responsibility of the student to ensure the necessary classes are taken before the certification can be transferred.

Departmental Exams Required for the PhD

Screening Exams

During the first year in graduate study, students must pass the screening exams, consisting of four written exams in four different subject areas. Choose four subject from the following eight subject areas: (1) radiation detection, (2) heat transfer and fluid mechanics, (3) nuclear physics, (4) neutronics, (5) fusion theory, (6) nuclear materials, (7) radioactive waste management, and (8) Radio BioPhysics. All graduate students, whether MS, or PhD students, must pass four screening exams during their first year of study if they wish to be admitted to, or continue into the PhD program.

The exam is offered twice a year; prior to the start of classes in January and right after the end of the spring semester (the last two weeks of May, or the first week of June). Students can choose how to distribute the exams, but need to complete all of four exams within the first year. Each exam can be attempted twice. Upon failure of the first attempt, the exam must be retaken in the same subject area. Borderline exam results may require an oral exam within one week of the initial screening exam.

Towards the end of each semester, the Student Services Advisor will e-mail all eligible students and ask them to sign up for the subject area they wish to take. The exam is closed book, each section lasting 75 minutes.

Oral Qualifying Exam (QE)

After completing the required coursework for the PhD the student takes the oral qualifying (QE) exam.

Students must submit an application to the Graduate Division to take the qualifying exam no later than three weeks before the exam date. Students submit the application to apply for the QE using the eForm found on Cal Central. Students are required to list at least three subject areas that they will cover during the examination, as well as the members of their exam committee. The three subject areas should include the major (Nuclear Engineering), and both minors. Students may not take the exam before the Graduate Division sends notice that admission to the exam has been approved. The student must be registered for the semester in which the exam is taken (or, during winter or summer break, be registered in either the preceding or following semester); have completed at least one semester of academic residence; and must have no more than two courses on his or her record graded incomplete. Eligibility to take the qualifying exam is valid for 18 months. Once students have set a date for their qualifying exam with the NE Student Services Office, they should submit the Application for the Qualifying Exam via eForm on Cal Central.

The four-member committee conducting the QE must be approved by the Dean of the Graduate Division. The student determines the members of the QE exam committee in accordance with the examination fields. The exam committee is usually composed of three members from the department, and a non-departmental faculty member who represents an outside minor. The chair of the committee and the outside member must be members of the Berkeley Division of the Academic Senate. Under certain circumstances, a non-Senate member can serve on a QE committee as an additional member if they offer expertise not otherwise available among regular faculty. Students must include a CV for the non-Senate member, with a request for an exception explaining why a non-Senate member is being requested. Note: the Chair of the oral QE committee cannot also serve as Chair of the student's Dissertation Committee. The entire committee must be present for the entire QE exam.

The examination usually lasts three hours. A student should consult with his or her advisor about the form and content of the examination, which is usually a presentation of the student's research and questions relating to coursework in the outside minors. The intent of the oral examinations is to ascertain the breadth of a student's knowledge and preparation for writing his or her thesis. Students should be able to exhibit their knowledge and understanding of the fundamental facts and principles that apply to their work. The faculty examiners judge whether students have the ability to think incisively and critically about both the theoretical and the practical aspects of their subject areas, and whether students can, in all likelihood, design and produce acceptable dissertations.

Advancement to Candidacy

After passing the oral QE, students should submit the Application for Advancement to PhD Candidacy using the eForm found on Cal Central. Once submitted, the system routes the eForm application to the NE Student Services Advisor, and the Graduate Degrees Office for approval. You should submit the application for advancement to PhD candidacy no later than the end of the semester following the one in which the student passed the qualifying examination.

When a nonresident PhD student advances to PhD candidacy, they are eligible for a waiver of the nonresident tuition fee for a maximum calendar period of three years.

Candidacy for the doctorate is only valid for a limited time. The Graduate Division will inform students when they advance to candidacy the number of semesters they are eligible to be a PhD candidate. Students who do not file their dissertation within that time, plus a two-year grace period, will have their candidacy lapsed. The Graduate Division usually will not accept qualifying examinations more than five years old as representing current knowledge unless the student gives other evidence of continuing scholarly activity besides research for the dissertation.

Doctoral degrees are awarded in December, May, and August for summer degree conferral. The Graduate Division's deadline to file a dissertation is the last working day of the semester. However, students should submit the dissertation to his or her committee members at least two months before the Graduate Division deadline. In order to receive a degree in any given term, students must complete all degree requirements before the last day of the term. Students must be registered or on Filing Fee status the semester that they file their dissertation, and receive their degree. For summer degree conferral, the Graduate Division requires student registration the previous spring semester.

Ph.D. Dissertation

A dissertation on a subject chosen by the candidate, bearing on the principal subject of the student’s major study and demonstrating the candidate’s ability to carry out

independent investigation, must be completed and receive the approval of the dissertation committee and the dean of the Graduate Division. The committee consists of three members, including the instructor in charge of the dissertation and one member outside the candidate's department. This committee shall guide the candidate's research and shall arrange for such conferences as may be necessary for the complete elucidation of the subject treated in the dissertation. Students should consult "Guidelines for Submitting a Doctoral Dissertation or a Master's Thesis" at: http://grad.berkeley.edu/policies/guides/dissertation-filing/

Grading and Evaluation

Grades are awarded for courses at the discretion of the professor responsible for the course. Graduate students are required by University regulation to maintain at least a 3.0 grade point average. Students who fail to meet this standard, or who in other respects do not make normal progress toward the degree, are subject to dismissal after the first year or at the MS level.

Graduate students have no time limit for replacing incomplete ("I") grades. Students must replace incompletes with letter grades or S/U before they are advanced to candidacy, unless the Graduate Advisor specifies in writing for each incomplete that (1) the course work is neither necessary nor closely related to the degree and (2) removal of the I grade would only delay completion of the degree. Students are permitted a maximum of two "forgiven" incompletes at the time they apply for Ph.D. candidacy; any other incompletes must have been replaced by letter grades at that time. Graduate Policy on Grading can be found at this link https://registrar.berkeley.edu/tuition-fees-residency/residency-for-tuition-purposes/.

Appeals Procedure

The Nuclear Engineering Department handles problems of an academic nature through a process of discussion and decision-making identical to that followed in the discussion and settlement of any aspect of a given student's program. Should a problem develop, the student arranges to meet with his or her advisor to discuss the matter. Failing a resolution of the problem, the matter is referred to the Head Graduate Advisor, and Student Services Advisor. If the situation remains unresolved, it is then passed to the NE Chair for discussion. If the student is not satisfied with the outcome of this appeals procedure, he or she may consult with the Associate Dean for Graduate Degrees in the Graduate Division, 424 Sproul Hall. The student may also seek the advice of the Student Ombudsperson (642-5754).

Time to Degree and Residence Requirements

Students in Nuclear Engineering are subject to the University's Normative Time Policy and are required to (a) be registered each semester, and (b) satisfy all requirements for the Ph.D., from entrance with either a BS or an MS to completion of the dissertation, within a period of five years. An additional two semesters of "withdrawal" (i.e., semesters in which the student is not registered) may be added. The University defines Normative Time as "the elapsed time", calculated to the nearest semester that students would need to complete all requirements for the doctorate, assuming that they are engaged in full-time study and making adequate progress toward their degrees" Students are considered as making satisfactory progress if they complete the MS degree within two years after admission and complete all PhD requirements except the dissertation within five years of admission. This allows for two years, plus two semesters' non-registered (withdrawn) status, for the writing of the dissertation.

If a student withdraws, he or she must apply for readmission in order to register (contact Graduate Degrees, 642-7330). Applications for readmission are considered petitions that must be approved by the Head Graduate Advisor; approval of the petition is not necessarily automatic. The dissertation should be completed no more than five years after completion of the oral comprehensive exam.

Academic Residence Requirement

Graduate Division defines academic residence as enrollment in at least 4 units of 100 or 200 series courses per required semester of academic residence. MS students must complete a minimum of two semesters of academic residence at Berkeley. Doctoral students must complete a minimum of four semesters of academic residence at Berkeley. To complete both an MS and a Ph.D., graduate students must complete six semesters of academic residence at Berkeley.

California Residency

All non-resident students who are U.S. citizens or permanent residents should plan on becoming legal California residents as soon as possible, if they wish financial aid for non-resident tuition. Most University fellowships and awards will pay nonresident tuition for the first year of graduate study only.

Eligible students should begin the process, not always simple and straightforward, of establishing California residency as soon as they arrive on campus. See the Graduate Application for Admission and Fellowships for further information. Students should apply for residency through Residence Affairs. It is the student's responsibility to establish California Residency if eligible. If the student fails to do that within the first year, the student will be charged the difference between the resident and non-resident tuition.

Information on residency can be found at http://registrar.berkeley.edu/Residency/legalinfo.html.

Filing Fee

The Filing Fee permits eligible doctoral or master's students to pay only a small portion of the university registration fee instead of full in-state registration fees the semester they file their theses or dissertations or take a final examination required for the degree. International students are also eligible for the Filing Fee. Filing Fee status is approved only once per degree for eligible students. If the student does not complete the degree requirements during the Filing Fee eligibility period, the fee is forfeited and students must apply for readmission via the eForm found on Cal Central, and will be required to pay regular registration fees during the semester the degree requirements are completed, and or thesis or dissertation is submitted.

Students must apply to the Graduate Division for Filing Fee status. Applications are submitted using the eForm found on Cal Central. Filing Fee status is not equivalent to registration, and students on Filing Fee status are not registered students, and will no longer have access to use University facilities not available to the general public. The most important factor the Graduate Division considers in determining Filing Fee eligibility is the student's registration history: The Graduate Division expects students to have met the University's requirement for continuous registration (which includes a maximum of two semesters of approved withdrawal). If a student has more than two semesters of approved withdrawal, he or she is usually not eligible for Filing Fee status. Students on Filing Fee may not hold positions as GSR's, GSI's or readers.

Doctoral students may apply for the Filing Fee when all degree requirements have been completed except for the final reading and the filing of the dissertation. If students have not been registered while carrying out research and writing on the dissertation (except for the two semesters of approved withdrawal), detailed written justification from the dissertation chair, endorsed by the Graduate Advisor, must accompany the application.

Financial Assistance

The Nuclear Engineering Department makes every effort to fully support students during their first year of study by offering a financial package that covers tuition and fees and employment as a teaching or research assistant. The department has a limited amount of fellowship funding available to students. This is usually used to supplement teaching assistantships and pay tuition and fees for incoming students. The department will not provide support for non-resident tuition after the first year, as students are expected to establish residency. It is the student's responsibility to find a research position with one of the faculty to cover his or her financial support at Berkeley for subsequent years. Nuclear Engineering generally reserves teaching (GSI) positions for first year students but

often hires advanced students with specific expertise for some courses. Students may also teach in other departments.

The Graduate Division provides information on graduate student support at https://grad.berkeley.edu/financial/. You are also encouraged to research external fellowships.

The Graduate Division has an entire section on their website dedicated to Graduate Student Researcher (GSR) and Academic Student Employee (ASE) appointments, which includes Graduate Student Instructors (GSI) and Readers. You can find that site here: https://grad.berkeley.edu/financial/appointments/handbook/. GSI's and GSR's must be registered for a minimum of 8 units and may not be appointed for more than 50 percent time during academic semesters. They must meet minimum GPA requirements (3.0) and may have no more than two incomplete grades in upper division or graduate level courses. They are expected to make satisfactory progress toward their degrees within the Normative Time framework. Students may not serve as GSIs in courses for which they are enrolled, and only graduate students who are advanced to candidacy may evaluate the work of or offer formal instruction to other graduate students. There is a limit of eight semesters of service as a GSI. By exception a student may be appointed beyond the eighth semester if he or she has been advanced to candidacy for the Ph.D.; under NO circumstances may a student serve as a GSI for more than six years. A student may not hold concurrent appointments as a GSI and Reader for the same course, nor may a student serve as a Reader in a course in which he or she is enrolled. Readers must be advanced to doctoral candidacy to be appointed to a graduate course.

GSI positions are covered by a collective bargaining agreement between the University and the United Automobile Workers. Graduate students who are registered, enrolled, and in good academic standing are may be entitled to fee remission, a partial remission of the Educational Fee and the Registration Fee, and other applicable benefits as set forth in the Agreement.

GSI and Reader Pay scales can be found here:
https://hr.berkeley.edu/labor/contracts/BX/current-rates

Your step level will depend on prior service as a GSI. This is calculated at the time of appointment.

Graduate Student Researcher Policy

NE graduate student minimum support is the equivalent of a 46.4% Step X appointment for pre-candidacy students and 49.9% appointment for post-candidacy students. (You can find the GSR pay scale here: https://www.ucop.edu/academic-personnel-

programs/_files/2022/oct-2021-scales/t22.pdf). Appointment as a GSR also includes full payment of tuition and fees.

This salary level is a commitment made by the department to the students of the incoming class. As most students advance, their funding will be provided through the mechanism of research appointments and their Research Advisor's resources. It is expected that future appointments will adhere to these minimum support (stipend/fee) guidelines. Support is dependent on the student maintaining good academic standing, and continued academic progress including satisfactory progress towards the degree goal.

Students with other primary funding sources, such as fellowships, will not require an appointment at the percentage listed below. In fact, the terms and conditions of some fellowship and traineeship awards may limit and/or prohibit a student from holding a payroll appointment or from receiving a supplement. However, when a student's monthly fellowship stipend is less than the minimum as determined by the percentages detailed above, the Research Advisor should supplement the shortfall by providing an additional award or an appointment with a small percentage or a short duration of time, i.e., a 50-100% appointment for one month over winter break or during the summer, or a 10% appointment during the academic year.