



# GRADUATE STUDENT MANUAL



Fall 2019

# TABLE OF CONTENTS

<b>WHO'S WHO IN THE MATERIALS DEPARTMENT .....</b>	<b>4</b>
FACULTY .....	4
TECHNICAL STAFF .....	6
ADMINISTRATIVE STAFF.....	6
<b>INTRODUCTION .....</b>	<b>8</b>
THE UC SYSTEM.....	8
THE UCSB CAMPUS .....	8
THE COLLEGE OF ENGINEERING.....	8
THE MATERIALS DEPARTMENT .....	9
<b>GETTING STARTED.....</b>	<b>10</b>
REGISTRATION.....	10
FEES .....	10
<b>UPON ARRIVAL .....</b>	<b>10</b>
ENTRANCE FORM .....	10
OFFICES .....	10
MAILBOXES .....	10
EMPLOYMENT.....	10
ESTABLISHING RESIDENCY (INTENT).....	10
<b>GRADUATE PROGRAM .....</b>	<b>11</b>
AREAS OF RESEARCH.....	11
SELECTING A RESEARCH ADVISOR.....	11
PROGRAM STUDY PLAN .....	11
ACADEMIC AFFAIRS COMMITTEE .....	12
<b>DEGREE REQUIREMENTS, POLICIES, AND PROCEDURES .....</b>	<b>13</b>
M.S. PROGRAM .....	13
PLAN I (THESIS).....	13
PLAN II (NON-THESIS).....	14
PH.D. PROGRAM .....	15
NORMATIVE TIME.....	15
COURSEWORK .....	15
CORE COURSE SEQUENCE .....	16
PRIMER COURSES.....	16
TEACHING ASSISTANTSHIP .....	16
RESEARCH GROUP STUDIES.....	16
DEVELOPING YOUR PROGRAM STUDY PLAN .....	16
PETITIONING FOR COURSE CREDIT .....	17
SPECIAL PROGRAMS .....	17
FOREIGN LANGUAGE.....	18
<b>REGISTRATION &amp; COURSEWORK.....</b>	<b>19</b>
MATRL 290.....	19
MATRL 598 & 599.....	19
CROSS-LISTED COURSES .....	19
FULL-TIME STATUS.....	19
PAYMENT OF FEES .....	19
SCHEDULE ADJUSTMENTS.....	19

<b>MAJOR COURSE TRACKS .....</b>	<b>20</b>
ELECTRONIC/PHOTONIC MATERIALS .....	20
INORGANIC MATERIALS.....	21
MACROMOLECULAR/BIOMOLECULAR MATERIALS.....	22
STRUCTURAL MATERIALS.....	23
<b>GUIDELINES FOR THE TIMING OF PH.D. REQUIREMENTS.....</b>	<b>24</b>
ACADEMIC GOOD STANDING.....	24
NORMATIVE TIME-TO-DEGREE FOR DOCTORAL STUDENTS.....	24
UCSB GRADING SYSTEM .....	24
A SUMMARY OF GUIDELINES & MILESTONES.....	25
<b>MONITORING PROGRESS THROUGH THE PHD PROGRAM .....</b>	<b>26</b>
TIME OF COMPLETION .....	26
GENERAL REPORT FORMATTING GUIDELINES .....	26
<b>PRELIMINARY EXAMINATION .....</b>	<b>27</b>
TIME OF COMPLETION .....	27
COMMITTEE NOMINATION .....	27
GPA ELIGIBILITY .....	27
MONITORING STATUS .....	27
PRELIMINARY PAPER .....	28
PRESENTATION .....	28
COMMITTEE DECISION .....	28
<b>QUALIFYING EXAMINATION (ADVANCEMENT TO CANDIDACY).....</b>	<b>29</b>
TIME OF COMPLETION .....	29
ELIGIBILITY .....	29
COMMITTEE NOMINATION .....	29
DISSERTATION PROPOSAL.....	29
PRESENTATION .....	30
COMMITTEE DECISION .....	30
<b>ANNUAL PROGRESS ASSESSMENTS.....</b>	<b>31</b>
PROGRESS REPORT .....	31
ASSESSMENT BY COMMITTEE.....	31
FAILURE TO COMPLETE.....	31
<b>DISSERTATION DEFENSE .....</b>	<b>32</b>
PREPARING FOR DEFENSE .....	32
FILING PROCESS .....	32
DEGREE CONFERRAL .....	33
DISSERTATION BINDING.....	33
DIPLOMAS & TRANSCRIPTS.....	33
<b>STIPEND PAYMENTS AND FELLOWSHIP SUPPLEMENTS .....</b>	<b>34</b>
MAJOR FELLOWSHIP RATE.....	34
SUMMER QUARTER 7.5% MANDATORY PRE-TAX DEDUCTIONS (SAFE HARBOR).....	34
<b>LAB SAFETY POLICY.....</b>	<b>35</b>
<b>OTHER IMPORTANT PROCEDURES .....</b>	<b>36</b>
ELECTRONIC KEY CARD ACCESS.....	36
COMPUTING FACILITIES.....	36
ON-LINE RESOURCES.....	36
<b>ACKNOWLEDGEMENT OF HAVING READ THE GRADUATE STUDENT MANUAL .....</b>	<b>37</b>

## WHO'S WHO IN THE MATERIALS DEPARTMENT

### FACULTY

	<b>Professor</b>	<b>Joint Appt.</b>	<b>Area</b>
*	Michael L. Chabynec (Chair)	—	Macro/Bio/Electr./Photonic
*	Christopher M. Bates	—	Macro/Biomolecular
*	Guillermo C. Bazan (CPOS Director)	Chem	Macro/Biomolecular
	Matthew R. Begley	ME	Structural
	Irene J. Beyerlein	ME	Structural
	John Bowers (IEE Director, AIM Photonics)	ECE	Electronic/Photonic
*	Raphaële Clément		Inorganic
*	Steven P. DenBaars (SSLEEC Co-director)	ECE	Electronic/Photonic
*	Daniel S. Gianola	—	Structural
*	John W. Harter	—	Inorganic
*	Craig Hawker (CNSI/DMI Director)	Chem	Macro/Biomolecular
*	Carlos G. Levi	ME	Structural/Inorganic
*	Robert M. McMeeking	ME	Structural
*	Kunal Mukherjee	ECE	Electronic/Photonic
*	Shuji Nakamura (SSLEEC Co-director)	ECE	Electronic/Photonic
	Chris Palmstrøm	ECE	Electronic/Photonic
*	Angela Pitenis		Macro/Biomolecular
	Philip A. Pincus	Phys/BMSE	Macro/Biomolecular
*	Tresa M. Pollock	—	Structural
*	Cyrus R. Safinya	Phys/BMSE	Macro/Biomolecular
*	Omar Saleh	BMSE	Macro/Biomolecular
*	Ram Seshadri (MRL Director)	Chem	Inorganic
	Rachel A. Segalman	Chem E	Macro/Biomolecular
*	James S. Speck (ICWBS Director)	—	Electronic/Photonic
*	Susanne Stemmer	—	Inorganic/Electr./Photonic
	Galen D. Stucky	Chem	Inorganic/Electronic
*	Chris Van de Walle	—	Electronic/Photonic
*	Anton Van der Ven (Dept. Grad. Advisor)	—	Structural/Inorganic
	Claude Weisbuch	—	Electronic/Photonic
*	Stephen D. Wilson (Associate Chair)	—	Inorganic
*	Frank W. Zok (COEC Director)	—	Structural

*\* Majority appointment in Materials*

Please see Departmental Website ([www.materials.ucsb.edu](http://www.materials.ucsb.edu)) for Emeriti and Affiliated Faculty.

### **TECHNICAL STAFF**

Rachel Behrens	Polymer Lab Manager
Brian Carralejo	Metal Organic Chemical Vapor Deposition Laboratory
Claire Chisholm	Microscopy (SEM)/ Specimen Preparation
Mike Edwards	Computer Consultant
John English	Molecular Beam Epitaxy (MBE) Laboratory (Part-time)
Jerry Hu	Spectroscopy Lab Manager
Michael Iza	Metal Organic Chemical Vapor Deposition Laboratory
Budd Jamieson	Computer Consultant
Youli Li	X-ray Lab Manager
Tom Mates	SIMS, XPS and Atom Probe
Peter Maxwell	Composites and Nanoindentation Labs
Kurt Olsson	Molecular Beam Epitaxy (MBE) Laboratory
Deryck Stave	Structural Materials Processing Laboratory Ceramics Processing Lab/Sample Preparation
Amanda Strom	TEMPO Lab Manager
Aidan Taylor	FIB, TEM and Microscopy
David Whitlatch	MOCVD

### **ADMINISTRATIVE STAFF**

Mary Cummings	Associate Manager
Jocelyn Guzman	Student Affairs Officer/Graduate Program Coordinator (GPC)*
Tawny Hernandez	Financial Analyst
Dawn Holden	Management Services Officer
Alex Huddleston	Assistant to Professors Gianola, Levi, Pollock, Van der Ven and Zok
Max McCumber	Contracts & Grants/Payroll Personnel
Joanne McNie	Assistant to Professors Chabinye, Pincus, Safinya, Saleh, Stemmer and Seshadri
Jennifer Nguyen	Purchasing Coordinator
Tara Owens	Financial Manager, SSLEC
Elena Rossi	Academic Personnel Analyst
Emi Sautot	Assistant to Professors Denbaars, Nakamura, Speck, Van de Walle and Weisbuch
Jennifer Suh	Front Desk Receptionist/Administrative Coordinator
Yukina Warner	Corporate Programs Manager, SSLEC

\*Please note the Graduate Program Coordinator is referred to in the Graduate Division literature as the Graduate Program Assistant.

# **INTRODUCTION**

## **THE UC SYSTEM**

The University of California was chartered as a land-grant college in 1868. Ten UC campuses are now situated throughout the state, in Berkeley, Davis, Irvine, Los Angeles, Merced, Riverside, San Diego, San Francisco, Santa Barbara, and Santa Cruz. Together, the campuses have over 190,000 faculty and staff members and a current enrollment of about 233,000 students. About one-fourth of UC students are studying at the graduate and professional level. The University also operates a variety of laboratories, agricultural field stations, extension offices, and other facilities. The University is the primary state-supported academic agency for research, and the pre-eminent system of public higher education in the country.

The UC system is governed by the Regents of the University of California, a corporate board of 26 members. The Regents in turn, delegate authority to the President, the Chancellor of each campus, and to the Academic Senate, which represents the faculty.

## **THE UCSB CAMPUS**

The UCSB campus was established in 1944 and moved to its present location on the site of a former US Marine base in 1953. The 989 acre grounds include the main campus, the San Clemente, Santa Ynez and Storke apartments and the West campus. The student community of Isla Vista is surrounded by the UCSB campus and the Pacific Ocean.

Within its beautiful setting, the University of California, Santa Barbara is a major research institution offering undergraduate and graduate education in the arts, humanities, the social sciences, and science and technology. Large enough to have excellent facilities for study, research, and other creative activities, the campus is also small enough to foster close relationships among faculty and students. The total student population is about 21,700 of whom 3,000 are at the graduate level. The UCSB faculty numbers over 1,200 and includes 6 Nobel laureates, recipients of the National Medal of Science, members of the National Academy of Sciences, the National Academy of Engineering, the American Academy of Arts and Sciences, Fellows of the Royal Society of London and the Royal Academy of Engineering, numerous Guggenheim fellows, Fulbright scholars, and fellows of the National Endowments for the Arts and for the Humanities.

The UCSB campus has 6 academic units: the College of Creative Studies, the College of Engineering, the College of Letters and Sciences, the Gevirtz Graduate School of Education, the Donald Bren School of Environmental Science & Management and the Graduate Division.

## **THE COLLEGE OF ENGINEERING**

The College of Engineering is the second largest undergraduate college at UCSB, including approximately 1320 undergraduate students and 680 graduate students. In recent years, the College has become one of the most dynamic engineering schools in the nation. It currently has a full-time, permanent faculty of 130 and consists of five degree-granting departments:

- Chemical Engineering
- Computer Science
- Electrical and Computer Engineering
- Materials (Graduate Only)
- Mechanical Engineering

Graduate students may also benefit from participating in the following multidisciplinary educational



programs. (Please note that credit for courses taken under these programs toward the academic programs in Materials is limited. Consult with the Graduate Office in Materials before taking any of these courses.):

- Biomolecular Science and Engineering (BMSE)
- Computer Engineering Program (CE)
- Media Arts and Technology (MATP)
- Technology Management Program (TMP)

The College of Engineering is home to major funded Research Centers and Institutes, focused on Materials, some international in scope, including:

- California NanoSystems Institute (CNSI)
- Center for Multifunctional Materials and Structures (CMMS)
- Center for Polymers and Organic Solids (CPOS)
- Dow Materials Institute (DMI)
- Institute for Collaborative Biotechnologies (ICB)
- Institute for Energy Efficiency (IEE)
- Institute for Multiscale Materials Science (IMMS)
- Interdisciplinary Center for Wide Band-Gap Semiconductors (ICWBGS)
- International Center for Materials Research (ICMR) – an NSF-funded IMI
- Materials Research Laboratory (MRL) — an NSF-funded MRSEC
- Mitsubishi Chemical Center for Advanced Materials (MCCAM)
- Optoelectronics Technology Center (OTC)
- Solid State Lighting and Energy Electronics Center (SSLEEC)
- SRC Nonclassical CMOS Research Center
- UCSB Nanofabrication Research Center
  - UCSB Node of the National Nanofabrication Infrastructure Network (NNIN)

## **THE MATERIALS DEPARTMENT**

The Materials Department at UCSB was established as a Graduate Program in 1985, and as an independent department in early 1987, building on existing research programs in the College of Engineering as well as the Physics and Chemistry Departments. The Department was conceptualized and built under two basic guidelines:

- to educate graduate students in advanced materials and
- to introduce them to novel ways of doing research in a collaborative, multidisciplinary environment.

For the purposes of the academic program the Department is organized into four distinct but interconnected areas specializing in Electronic/Photonic materials, Macro-/Bio-molecular materials, Structural materials and Inorganic materials. Faculty, postdoctoral researchers, and students in the various specialties collaborate within and across these areas. Currently, the Materials Department has approximately 150 graduate students and 31 faculty members, many of who have joint appointments with other departments (page 4). In addition, approximately 40 postdoctoral associates and visiting researchers are affiliated with the department in any given year.

## GETTING STARTED

### REGISTRATION

Registration is completed online via the GOLD system. Complete instructions on this process can be found in [Registration & Enrollment](#). The Office of the Registrar will assess a \$50 *late registration fee* to students who register after the deadline. (*The department will not cover this fee.*). Instructions for registering for classes and registration deadlines are published on GOLD. Students register for the upcoming quarter during the current quarter. Graduate students have until the 15<sup>th</sup> day of instruction to add classes to their schedule without approval from the Graduate Division.

### FEES

The Department pays for registration, tuition, and health insurance fees for the first quarter. After the first quarter, the student's advisor pays the fees. Students are responsible for all other fees and charges incurred on their BARC account. It is the student's responsibility to make sure that their fees are paid by the fee deadline. A \$50 late fee will be charged if there is an outstanding balance after the fee deadline. A fee deadline for all charges will appear on your BARC statement at the beginning of each quarter.

## UPON ARRIVAL

### ENTRANCE FORM

See the receptionist at the front desk of the Materials Department, Engineering II 1355 to complete entrance paperwork.

### OFFICES

Every incoming student will be assigned an office space. Where you sit will depend on your advisor. The front desk receptionist will give you the information in regards to your office space at the time you fill out an entrance form.

### MAILBOXES

Every student is assigned one mailbox, which should be checked daily. Mail is delivered daily after 9:00 a.m. The collection box in the mailroom is for official university use only. The campus mail service will not process personal mail. Not every student will have a mailbox in the Materials mailroom; it depends on the location of your office space.

### EMPLOYMENT

Graduate students may be employed by the University as Graduate Student Researchers (GSRs), Teaching Assistants (TAs) or Readers effective January 1, 2020 Please complete an employment worksheet with Jocelyn Guzman in Engineering II 1355D.

### ESTABLISHING RESIDENCY (INTENT)

Out-of-state domestic graduate students must take the necessary steps to establish California residency (for non-resident tuition purposes) **immediately upon the first quarter of matriculation**. Students must immediately establish legal ties to California through acquisition of all applicable governmental evidence of intent by December 15, 2019 (End of Fall 2019). The campus Residency Deputy is the person to contact for more information about establishing California residency. He may be reached at Residency@sa.ucsb.edu or (805)893-3692. To learn more, visit the [UC Residency Requirements](#) page.

## GRADUATE PROGRAM

The Materials Graduate Program is designed primarily for doctoral students. However, there are two plans for a terminal master's degree available to graduate students including those originally admitted to the doctoral program. This document focuses on the specific degree requirements for the Ph.D. program. A brief description of the M.S. Program is given in this document for students interested in terminating at this level.

### AREAS OF RESEARCH

The Materials Department offers programs leading to the Ph.D. degree with specializations in the following major areas: **Electronic/Photonic Materials** (compound semiconductors, electronic oxides, quantum structures and optoelectronic materials); **Inorganic Materials** (ferroelectrics, thermoelectrics, battery/energy storage, optical, magnetic and strongly correlated materials); **Macro/Biomolecular Materials** (self-assembling polymers, biopolymers, biomembranes, and organic photovoltaics); and **Structural Materials** (materials for advanced energy and transportation systems, lightweight and threat protection structures, mechanics of functional and biological systems).

The curriculum in each area has the flexibility needed to provide multidisciplinary educational opportunities in the field of advanced materials, encompassing topics such as optoelectronic devices, semiconductor oxides, biomolecular systems and high temperature composites. Materials synthesis, processing and characterization feature prominently with courses in the processing of semiconductor materials, polymers and organic materials, alloys, ceramics, composites, as well as advanced topics in electron microscopy, spectroscopy and structural tomography.

### SELECTING A RESEARCH ADVISOR

Each student must select a research advisor *within the first quarter of enrollment*; preferably earlier, based on mutual research interests and availability of research assistantships. Joint research advising by two faculty members is encouraged to ensure that research programs have a strong multidisciplinary character. Selecting a co-advisor can be done at any time, depending on the research topic selected by the student. Students must notify the Graduate Program Coordinator (GPC) of their research advisor(s).

### PROGRAM STUDY PLAN

Incoming students are required to prepare a program study plan suitable to their interests and research field in consultation with their research advisor, and submit it for approval to the Academic Affairs Committee (AAC) via the Graduate Program Coordinator, *by the end of the first quarter of residence*. The study plan may be modified during the course of the student's program. (Modifications may be subject to approval by the AAC. The student should consult the Graduate Program Coordinator in the Materials Department Graduate Office for questions in that regard.)

Programs of study and research are individually tailored to accommodate research needs and student interest. Multidisciplinary education is strongly encouraged by means of joint faculty supervision of research and by the selection of courses. Students are also encouraged to cross over traditional boundaries into other departments on campus (for example, Electrical and Computer Engineering, Mechanical Engineering, Chemical Engineering, Biological Sciences, Chemistry and Biochemistry, and Physics) through collaboration and taking courses in those departments as appropriate. However, there are limitations to the number of courses that can be taken outside the department and counted for credit toward the Ph.D. in Materials (see *Coursework* under "Ph.D.

Program”). Please check with the GPC when you file your program study plan.

### **ACADEMIC AFFAIRS COMMITTEE**

Decisions regarding the M.S./Ph.D. program and graduate student affairs reside with the Academic Affairs Committee (AAC). This committee consists of four faculty members, including the Departmental Graduate Advisor and the Department Chair. The committee is responsible for approving study plans as well as examination and dissertation committees upon consultation with the student and research advisor(s). The committee is also responsible for reviewing all petitions regarding examinations and credit for courses taken elsewhere. It is also the focus for discussions and recommendations concerning improvements in the graduate curriculum and examination procedures.

## DEGREE REQUIREMENTS, POLICIES, AND PROCEDURES

A brief description of the M.S. Program is given below for doctoral students interested in terminating at this level. Students wishing to terminate their graduate studies with a Master's Degree may choose from the two Plans of Study below, in consultation with their research advisor.

### M.S. PROGRAM

Completion of an M.S. degree on the way to the Ph.D. is not required unless there are special circumstances like a change in research topic. Students who elect this path must follow Plan 1 (below), achieve a 3.5 grade-point average in their coursework, and pass the preliminary examination as described in the "Ph.D. Program" section below.

#### PLAN I (THESIS)

Students in this plan are required to:

- 1) complete 42 units including **27** units of formal coursework, of which
  - a) a minimum of 21 units must be approved 200 level courses (200-289),
  - b) at most 6 units of approved advanced undergraduate courses not used already for credit toward a previous degree (*optional*),
  - c) 3 units of Matrl 290 (Research Group Studies<sup>1</sup>) and
  - d) 12 units of Matrl 598 (thesis research), and
- 2) submit an acceptable thesis based on original research. There is no oral defense of the M.S. thesis, but the thesis must be approved by a committee of three faculty members,<sup>2</sup> including the student's advisor. At least one committee member must have a majority appointment in Materials, and one must have a non-zero appointment in Materials.

<b>MS Plan1 Completion Requirements</b>	<b>Required</b>	<b>Optional</b>
Total units to be completed	42	
Graduate coursework units	21-27	
Undergraduate coursework units		6
Research Group Studies units	3	
Thesis Research units	12	
Final degree requirement	Thesis approved by 3 faculty	

---

<sup>1</sup> The spirit of this course is for students to develop the ability to communicate their research to an interdisciplinary audience, beyond their own research group, and also learn about research from other groups. Examples include the Structural Materials Seminar Series and the MRL IRG group meetings.

<sup>2</sup> Please be aware that committee members must be academic senate members and any exceptions must be submitted to the Academic Affairs Committee and then to the UCSB Graduate Council for approval.

## PLAN II (NON-THESIS)

Students in this plan are required to:

- (1) complete 42 units of coursework including
  - (a) a minimum of **27** units from approved 200 level courses (200-289),
  - (b) at most 6 units of approved advanced undergraduate courses not used already for credit toward a previous or concurrent<sup>3</sup> degree (*optional*),
  - (c) no fewer than 3 and no more than 6 units of Matrl 596 (Directed Reading and Research) or Matrl 598<sup>4</sup> (M.S. Thesis Research), and
  - (d) 3 units of Matrl 290 (Research Group Studies<sup>1</sup>), and
- (2) submit an acceptable engineering report based on the independent studies. The report must be approved by a committee of two faculty members,<sup>2</sup> including the student's advisor. At least one member of the committee must have a majority appointment in Materials.

<b>MS Plan 2 Completion Requirements</b>	<b>Required</b>	<b>Optional</b>
Total units to be completed	42	
Graduate units	27-33	
Upper Division UG units		6
Research Group Studies units	3	
Thesis Research units	12	
Final degree requirement	Paper approved by 2 faculty	

Appropriate course tracks for use in planning a program study plan are presented in a subsequent section. Further details are also available from the Materials Graduate Affairs Office.

---

<sup>3</sup> Students in the BS/MS programs cannot use any courses toward both the BS and the MS degree.

<sup>4</sup> Not available to students in the BS/MS program.

## PH.D. PROGRAM

### NORMATIVE TIME

Students are expected to complete the Ph.D. program within five years after entry at the Bachelor's level and within four years after entry at the Master's level.

### COURSEWORK

Students admitted with a Bachelor's degree are required to complete a minimum of 72 units of coursework and a minimum of 2 units of Matrl 501 (Teaching Assistant Practicum – See Teaching Assistantships). The 72 units of coursework are structured in the following manner:

- 42 units of 200-level courses (excluding 290 and 500 series)
  - Of the required 42 units of 200-level courses, students are recommended to complete a minimum of 27 units within the Materials Department.
  - Up to 8 units of upper division undergraduate courses may be taken for credit toward the 200 level course requirements with prior approval of the student's advisor and the AAC.
- 15 units of Matrl 290 (Research Group Studies<sup>1</sup>)
  - Students are required to enroll in one (and only one) unit of Matrl 290 for every quarter of residence they spend at UCSB, even if they have exceeded the unit requirement.
- 15 units combined of Matrl 598 (M.S. Thesis Research) and 599 (Ph.D. Dissertation Research)
  - Students must register in 598 prior to advancing to candidacy and in 599 afterward. Both courses count toward the research unit requirements. Students must continue to register for 598 or 599 units every quarter (except Summer) even if they have exceeded the unit requirement.

Students entering with a M.S. degree may petition to waive certain unit requirements for the Ph.D. (up to 15 units of 200-level courses and a maximum of six units of matrl 290) deemed to have been fulfilled by Master's studies elsewhere. Please refer to the "Petitioning for Course Credit" section below for more information.

<b>PhD Completion Requirements</b>	<b>Required</b>	<b>Optional</b>
Total units to be completed	72	
Graduate units	34-42	
Upper Division UG units		8
Research Group Studies units	15	
Thesis Research units	15	
Final degree requirement	Defend & file dissertation	

## CORE COURSE SEQUENCE

All Ph.D. students are required to complete the following series of core courses in the appropriate sequence:

- **Matrl 200A** – Thermodynamic Foundation of Materials
- **Matrl 200B** – Electronic & Atomic Structure of Materials
- **Matrl 200C** – Structure Evolution

In preparation for more advanced and specialized courses within their area of specialization, students are strongly encouraged to complete this core course sequence during their *first year of study*. (These courses may not be waived). A minimum grade of **B** in each of these courses is required prior to taking the Qualifying Examination.

## PRIMER COURSES

There are two optional primer courses in the fall to prepare students who may lack the needed background for the 200A, 200B, and 200C core course sequence. These two courses will consist of (1) a quantum mechanics for materials introductory course which will be listed as MATRL 200Q and (2) an introduction to structure and phase stability primer course which will be listed as MATRL 200S. This is significant as the core 200B course (taught in the winter) will begin to present material assuming some basic knowledge of quantum mechanics and the core 200C course (taught in the spring) will assume some basic knowledge of structure.

## TEACHING ASSISTANTSHIP

All Materials Ph.D. students are required to act as Teaching Assistants for *at least one quarter* while in residence at UCSB (usually during the first year), in either Materials courses or within departments providing courses consistent with the student's undergraduate background. **To receive credit for the required teaching, students must register for MATRL 501 under the instructor in charge of the class while serving as Teaching Assistants.** (2 units for 25% TA, 4 units for 50% TA. These units are not counted towards the 72 units of academic work required for graduation). Teaching Assistants supervise labs, conduct recitation, tutor undergraduate students and give seminars. Because this is an academic requirement of the program, students' stipends will remain *unchanged* while serving as Teaching Assistants.

## RESEARCH GROUP STUDIES

Students are also required to present research seminars as part of Matrl 290 (Research Group Studies), thereby ensuring that they gain experience in organizing and presenting lectures. Seminars are expected at both the group level (about one per quarter) and the program level (one per year). Presentations at conferences are strongly recommended after the first year of study. Such activities enable students to improve the skills necessary for the subsequent pursuit of opportunities in teaching or research.

## DEVELOPING YOUR PROGRAM STUDY PLAN

In developing an appropriate interdisciplinary program study plan, Ph.D. students are recommended to:

- Take 3 courses selected from those listed under "Main Sequence Courses" on the Course Tracks found on pages 20-23.
- Take both specialized courses in their major field as well as any general courses deemed necessary or recommended.



- Take courses designed to broaden their knowledge of other materials as well as selected courses in other departments that may enhance their education.
- Complete a minimum of 27 units of Materials courses out of the required 42 units of 200-level courses.

Main sequence courses are typically offered every year and students typically take a number of these courses in their first year. However, students with interests in more than one area may take main sequence courses in another area. Specialized electives and general courses are taken during the second year, and often on the third year since some specialized courses are only offered on alternate years or less regularly. Students should consult the appropriate Course Track for guidance in planning a program study plan.

### **PETITIONING FOR COURSE CREDIT**

Students entering with a M.S. degree may petition to have course credit from another graduate program to count toward the requirements for the Ph.D.:

- Up to 15 units of 200-level courses, 8 units of which may be upper-division undergraduate courses.
- A maximum of six units of Matrl 290 deemed to have been fulfilled by Master's studies elsewhere.
- Only accept courses with a grade of B or better.
- The core course sequence (Matrl 200A, B, C) cannot be waived.

Petitions will be granted only if the student can demonstrate satisfactory performance in courses taken while enrolled in another graduate program that are substantially similar in content and level to the courses offered at UCSB. A list of Materials courses may be found on the department website. The [General Catalog](#) is a good resource for all UCSB courses.

It is the responsibility of the student to supply sufficient information about any proposed course credit to judge its similarity in subject matter and level to the corresponding course at UCSB. The GPC will use the information provided and pass it along to the instructor of the course at UCSB for approval.

The petition may be found on the [Materials website](#).

### **SPECIAL PROGRAMS**

There are no formal requirements regarding special programs. However, Ph.D. students are encouraged to incorporate courses from outside their area of specialization into their curriculum in order to broaden their knowledge of the materials field. They are also encouraged to take advantage of courses offered under specialized emphases, as appropriate to their major (e.g. Bioengineering), or certificate programs such as the Technology Management Program.

Note, however, the courses used toward an emphasis or a certificate may not be counted toward the course requirements for the Materials Ph.D. or M.S. The student may petition to have **one** course from these programs, e.g. the Technology Management Program or the Bioengineering Emphasis, count toward their Ph.D. requirement as long as it is compatible with the study plan (and approved by their advisor and the AAC).

## **FOREIGN LANGUAGE**

There is not a formal foreign language requirement, but all students are encouraged to explore opportunities for international research experiences at one of our collaborating institutions. Students having a particular interest in strengthening their background in foreign languages may pursue the necessary coursework to fulfill that interest, but these units may not be used to satisfy the course requirements for the Ph.D. It is strongly recommended you consult with the Graduate Program Coordinator (GPC) before you take courses not included in your study plan to ascertain whether they would count toward your unit requirements, and file an amended study plan as appropriate.

## REGISTRATION & COURSEWORK

In addition to required or elective courses needed for their program of study, students must register for the following:

### **MATRL 290**

Register for 1 unit of Matrl 290 (under their academic advisor's code) every academic quarter in residency in order to receive credit for attending research group meetings and interdisciplinary seminars. Students must check with their academic advisor the appropriate requirements for earning the credit in Matrl 290 – see additional information under Research Group Studies)

### **MATRL 598 & 599**

Register for at least 1 unit of either Matrl 598 (prior to candidacy) or Matrl 599 (while in candidacy) every academic quarter after having selected an advisor and having begun research. The number of units in Matrl 598 or Matrl 599 should be selected to bring the quarter total to at least 12 units.

### **CROSS-LISTED COURSES**

When taking cross-listed courses, enroll under the Matrl course number; for example, students should take Matrl 215A instead of the equivalent ECE 220A. All courses with Matrl course numbers are listed on the department website each quarter. If the course is “full”, obtain an enrollment approval code for the Matrl course from the instructor (contact the Graduate Program Coordinator) rather than enrolling in the equivalent cross-listed course.

### **FULL-TIME STATUS**

The Graduate Division considers graduate students to have full-time status if they enroll in 8 units each quarter. However, Materials students are required to enroll in 12 units per quarter, which includes Matrl 290, Matrl 598/599, and Matrl 501 (when holding a Teaching Assistant position). Materials students do not enroll in summer units. Detailed course requirements are outlined in the Degree Requirements section.

### **PAYMENT OF FEES**

Students must be registered for a minimum of 8 units in order for their fees to be paid by the fee payment deadline, which varies by quarter. Graduate students in good academic standing will have their fees paid by their advisor or the department. It is the student's responsibility to make sure that their fees are paid by the deadline. Failure to register and or pay fees (unless on an approved leave of absence) will result in lapse graduate status. The Office of the Registrar will assess a *\$50 late registration fee* to students who register after the deadline. (*The department will not cover this fee.*). A student who allows their status to lapse may petition to reinstate. Students must check their registration deadlines on GOLD well before the start of every quarter so that late fees are not assessed onto their BARC accounts.

### **SCHEDULE ADJUSTMENTS**

Schedule adjustments can take place during the first week of the quarter. Students may add and drop courses without a fee. After this period each schedule change incurs a fee. Graduate students have until the 15<sup>th</sup> day of instruction to add classes to their schedules without approval from the Graduate Division. After this deadline, a schedule adjustment petition and justification must be sent to the Graduate Division. Graduate students may drop classes up to the last day of instruction.

## MAJOR COURSE TRACKS

### ELECTRONIC/PHOTONIC MATERIALS

*Please note course offerings may change from year to year.*

Course Number	Course Title	Units
<b>Main Sequence Courses:</b>		
206A-B	Fundamentals of Electronic Solids I, II	4
209A	Crystallography and Diffraction Fundamentals	3
211A	Engineering Quantum Mechanics	4
215A-B-C	Semiconductor Device Processing (215A is <i>required for authorization to work independently in clean room.</i> )	4
268A-B	Semiconductor Lasers I, II	4
<b>General Courses:</b>		
209B	X-Ray Diffraction	3
209C	Electron Microscopy	3
219	Phase Transformations	3
228	Computational Materials	3
279	First-Principles Calculations for Materials	3
281	Technical Communication and Presentation Design	3
<b>Specialized Courses:</b>		
204	Introduction to Magnetism and Magnetic Materials	3
211B	Engineering Quantum Mechanics II	4
216	Defects in Semiconductors	3
217	Molecular Beam Epitaxy & Band Gap Engineering	3
226	Symmetry and Tensor Properties of Materials	3
227	Metal Organic Chemical Vapor Deposition	3
263	Thin Films and Multilayers	3
288AA-ZZ	Special Topics in Electronic Materials	3
<b>Background Courses</b>		
162A	Quantum Description of Electronic Materials	4
162B	Fundamentals of Solid State	4
ECE 162C	Optoelectrical Materials and Devices	4

## INORGANIC MATERIALS

*Please note course offerings may change from year to year.*

Course Number	Course Title	Units
<b>Main Sequence Courses:</b>		
209A	Crystallography and Diffraction Fundamentals	3
218	Introduction to Inorganic Materials	3
274	Solid State Inorganic Materials	3
<b>General Courses:</b>		
209B	X-Ray Diffraction	3
209C	Electron Microscopy	3
211A	Engineering Quantum Mechanics	4
219	Phase Transformations	3
222A	Colloids & Interfaces	3
228	Computational Materials	3
241	Structural Inorganic Chemistry	3
281	Technical Communication and Presentation Design	3
<b>Specialized Courses:</b>		
204	Introduction to Magnetism and Magnetic Materials	3
226	Symmetry and Tensor Properties of Materials	3
242	Symmetries and Group Theory	3
251	Processing of Inorganic Materials	3
286AA-ZZ	Special Topics in Inorganic Materials	3
<b>Background Courses</b>		
Chem 175	Physical Inorganic Chemistry	3

## MACROMOLECULAR/BIOMOLECULAR MATERIALS

*Please note course offerings may change from year to year.*

Course Number	Course Title	Units
<b>Main Sequence Courses:</b>		
271A	Synthesis of Macromolecules	3
271B	Structure and Characterization of Complex Fluids	3
271C	Properties of Macromolecules	3
<b>General Courses:</b>		
214	Advanced Topics in Equilibrium Statistical Mechanics	3
222A	Colloids and Interfaces	3
228	Computational Materials	3
253	Liquid Crystal Materials	4
273	Experimental Techniques in Macromolecular Materials	3
281	Technical Communication and Presentation Design	3
<b>Specialized Courses:</b>		
272	Mechanical Forces and Biomolecules	3
276A	Biomolecular Materials I: Structure & Function	3
276B	Biomolecular Materials II: Applications	3
278	Interactions in Biomolecular Complexes	3
280A	Synthesis and Electronic Structures of Conjugated Polymers	3
280B	Organic Electronic Devices	3
287AA-ZZ	Special Topics in Macromolecular Materials	3
<b>Background Courses</b>		
ChE 102	Biomaterials and Biosurfaces	3
135	Biophysics and Biomolecular Materials	3
160	Introduction to Polymer Science	3

## STRUCTURAL MATERIALS

*Please note course offerings may change from year to year.*

<b>Course Number</b>	<b>Course Title</b>	<b>Units</b>
<b>Main Sequence Courses:</b>		
207	Mechanics of Materials	3
220	Mechanical Behavior of Materials	3
234	Fracture Mechanics	3
<b>General Courses:</b>		
209A	Crystallography and Diffraction Fundamentals	3
209B	X-Ray Diffraction	3
209C	Electron Microscopy	3
219	Phase Transformations	3
228	Computational Materials	3
281	Technical Communication and Presentation Design	3
<b>Specialized Courses:</b>		
230	Elasticity and Plasticity	3
232	Plasticity	3
240	Finite Element Structural Analysis	3
251	Processing of Inorganic Materials	3
261	Composite Materials	3
263	Thin Films and Multilayers	3
289AA-ZZ	Special Topics in Structural Materials	3
<b>Background Courses</b>		

## GUIDELINES FOR THE TIMING OF PH.D. REQUIREMENTS

Year 1	Year 2	Year 3	Year 4-5	Year 5-6
Select research advisor before the end of first quarter in residence	Preliminary Exam	Qualifying Exam	Annual Progress Assessments	Dissertation Defense

The timeline on the next page is intended to summarize the year-to-year requirements for the Ph.D. degree. Details regarding specific requirements and procedures are given in subsequent sections in this document; all students are advised to read the entire student manual to understand them.

As a Ph.D. candidate, *successful completion of the requirements in the program is solely your responsibility*. Neither your advisor nor the program administration and staff are responsible for informing you of and ensuring compliance with deadlines; reminders are a courtesy only. Therefore, you should not wait to be prompted for any particular requirement due.

### ACADEMIC GOOD STANDING

To remain in good academic standing, a graduate student must make timely progress toward degree completion and meet the following standards of scholarship established by the Academic Senate and the Graduate Council:

- **Establish a GPA** by taking courses for letter grades
- Maintain a minimum **cumulative grade point average of 3.0**
- **Complete course work**. The standard will not be met if the student has 12 or more units of unfinished coursework: Incomplete (I), No Grade (NG), or No Record (NR)
- Meet all **departmental degree requirements**
- **Doctoral students** must meet departmental specific time-to-degree standards

### NORMATIVE TIME-TO-DEGREE FOR DOCTORAL STUDENTS

College of Engineering	Years to Advance	Years to Complete
Materials Program	<b>3*</b>	<b>5</b>

\*If the student does not advance to candidacy by the end of their third year, the Graduate Division will place the student on monitoring for the remainder of the academic year or until the milestone is completed.

### UCSB GRADING SYSTEM

A+ = 4.0	A = 4.0	A- = 3.7
B+ = 3.3	B = 3.0	B- = 2.7
C+ = 2.3	C = 2.0	C- = 1.7
D+ = 1.3	D = 1.0	D- = 0.7



## A SUMMARY OF GUIDELINES & MILESTONES

It is recommended that you print a copy of this page and keep it for reference on your desk. If you have questions or need clarification please consult with the Graduate Program Coordinator.

### Before the end of your first quarter in residence you must:

- Select a research advisor who has a funded position and is willing to accept you into his/her group.
- Prepare a program of study in consultation with your research advisor and submit it for approval to the Academic Affairs Committee via the Graduate Program Coordinator. You must clearly specify your selected major sequence.

### Every quarter in residence:

- Take 12 units of academic credit comprising the following: 200 level coursework (until course requirements are satisfied), one unit of Matrl 290, and as many units of 598 or 599 needed to reach the total of 12 units.

### On the quarter in which you are a teaching assistant

- Enroll in 2 (or 4) units of Matrl 501 (or the equivalent course if you TA in another department).

### 1st year in residence:

- Take one of the core departmental courses (Matrl 200A, B, C) per quarter and one of the primer courses if needed. Take one unit of 290 and as many units of 598 to make up for 12 units per quarter.
- Take one of the courses from your main course sequence per quarter. This may be extended into the second year for students with interests in more than one area, e.g. inorganic and structural, or macro and electronic/photonics materials. Discuss with your advisor what the proper sequence of courses should be to optimize your educational experience.
- Attend Orientation for Preliminary Examination in the Spring Quarter.
- Prepare for your preliminary examination during the Summer, concurrently with advancing your research work.

### 2nd year in residence

- Take two courses per quarter, including any remaining major sequence courses and elective courses. Take one unit of 290 and as many units of 598 to make up for 12 units per quarter.
- Review your program of study prior to your preliminary examination. Submit for approval to the AAC if you have made changes from the previous version.
- Take your preliminary examination during the first quarter of your second year.
- Attend orientation for your Qualifying Examination in the Spring Quarter.
- Prepare for your Qualifying Examination during the Summer, concurrently with advancing your research work.

### 3<sup>rd</sup> – 5<sup>th</sup> years in residence

- Take any remaining courses needed to satisfy your 200 level unit requirements. Take one unit of 290 and as many units of 599 per to make up for 12 units per quarter.
- Schedule and take your annual assessment with your committee.
- Prepare and schedule your dissertation defense in agreement with your advisor. Please check with the Graduate Program Coordinator that all other requirements have been satisfied before scheduling your defense.

## **MONITORING PROGRESS THROUGH THE PHD PROGRAM**

The Materials Department has the following system of annual assessments to monitor the student's progress through the Ph.D. program.

- Start of Year 2                      Preliminary Examination
- Start of Year 3                      Qualifying Examination (Advancement to Candidacy)
- Start of Years 4, 5, ...          Annual Progress Assessments
- End of Program                      Dissertation defense

### **TIME OF COMPLETION**

With the exception of the Dissertation defense, all assessments are to be performed by a faculty committee within  $\pm 2$  months of each anniversary of the student's entrance into the Department (typically between August and November of each year).

Students must complete the following for all assessments:

- A written document (described below for each case)
- An oral presentation and a period of questions and discussion, after which the committee will render its assessment of the student's progress and make recommendations for future actions.
- Send an electronic copy of their written document to the Graduate Program Coordinator (GPC) for the departmental records at the same time the document is delivered to the committee
- Consult with the GPC regarding the filing of any necessary paperwork for each stage.

### **GENERAL REPORT FORMATTING GUIDELINES**

The general guidelines for all written documents prepared by the students for the assessments are:

- 12 pt font with 1" margins on all sides, and single or 1.5 lines spacing.
- A cover page including the title, type of assessment, name of student, names of the committee members, date, time and place of the exam and an abstract.
- The text should comprise 10 pages maximum, not counting the cover.
- References and figures are to be placed after the text and are not included in the number of pages of text specified for the corresponding document.

## **PRELIMINARY EXAMINATION**

The Preliminary examination is intended to assess whether the student has the fundamental knowledge, intellectual maturity and degree of understanding of his/her major field and prospective research topic to be able to write a dissertation proposal successfully over the course of the following year. It is also expected that by this point in time the student should have had some initial research experiences and be able to relate those to the literature he/she has researched. *However, the preliminary examination is not intended to focus on the student's preliminary research.*

### **TIME OF COMPLETION**

The Preliminary Examination is administered 10-14 months after the student's entrance into the program. Students who do not meet this deadline and do not petition for an extension based on a justifiable reason (e.g. extended absence of their advisor or co-advisor due to sabbatical) may be placed on academic probation and may become ineligible for financial support. Students entering with a M.S. may petition to take the examination earlier if they feel prepared for it.

Each student may have two opportunities to pass the Preliminary Examination. Students who fail the examination in the first opportunity must take it again within a 2-4 month period from the first exam.

### **COMMITTEE NOMINATION**

The examination committee consists of three ladder faculty members<sup>5</sup> from the student's major field, including the student's advisor:

- At least two should have a non-zero percent appointment in Materials, and preferably at least one should have a majority appointment.
- One member of the committee, other than the advisor, will serve as Chair of the Preliminary Examination committee.

The committee members are selected by the student in consultation with his/her advisor and are subject to approval by the AAC. The names of the committee members should be submitted to the AAC via the GPC at least 3 months prior to the examination. If the committee changes because of scheduling conflicts the student must notify the Graduate Program Coordinator immediately and ensure the new committee is approved before the examination.

On the day of the examination the Graduate Program Coordinator will bring the documentation for the exam to the examination room and ascertain the committee is properly constituted.

### **GPA ELIGIBILITY**

Students with a GPA of 3.5 or better in the graduate program are automatically eligible to take the examination. Students with a GPA above 3.2 may petition for a waiver of the 3.5 GPA requirement. The petition must be filed with the Graduate Program Coordinator and is evaluated by the Department Graduate Advisor (and the Academic Affairs Committee, if the circumstances require it) in consultation with the student's advisor.

### **MONITORING STATUS**

---

<sup>5</sup> The University requires committee members to be Academic Senate members. Non-senate members with established affiliation with UCSB may be included, but a petition must be filed with the Graduate Division before the committee is approved. Please consult the Graduate Program Coordinator to determine if any of your committee members is not considered a Senate member.

Students with a GPA less than 3.2 at the end of their first year are ineligible to take the Preliminary Examination and will be placed on monitoring by the Graduate Division. Students may remove the monitoring status if they increase their GPA to above 3.2 within the next academic quarter, at which point they may petition the Department for an opportunity to take the exam, with prior consent of their academic/research advisor.

### **PRELIMINARY PAPER**

At least 3 months prior to the examination date the student's advisor will assign the student a specific topic relevant to his/her intended research project. The student will research the literature on the assigned topic, identify key outstanding issues and/or research opportunities, propose ideas on how to address these issues and/or exploit the opportunities, and outline a tentative research plan.

The student is expected to prepare a short document (10 pages of text maximum, plus figures and suitable references after the text) summarizing his/her findings and ideas. Refer to the section above for formatting guidelines. The document must be submitted to the committee and the GPC *at least one week before the examination date*.

### **PRESENTATION**

The student will present a 30-40 minute seminar outlining his/her findings, ideas and prospective research plan. After the presentation, the committee will probe the student's understanding of the subject, his/her knowledge of the fundamentals of materials science relevant to the problem, and his/her ability to think soundly and creatively.

### **COMMITTEE DECISION**

After the examination the committee may render one of the following decisions, with recommendations for future action or corrective measures as appropriate:

- (i) Advance to the Qualifying Examination without reservations.
- (ii) Advance to the Qualifying Examination with a warning of deficiencies in the student's background or understanding that need to be corrected (e.g. by taking additional courses, independent reading, etc.) by the time of the Qualifying Examination. This is normally identified as a "provisional pass".
- (iii) Requirement that the student takes the Preliminary Examination again before he/she is allowed to advance to the Qualifying Examination. This second exam must take place within a 2-4 month period following the first one. *Failure to advance after the second exam requires the student to leave the program, with the option of completing an MS degree*. During the time that the student has not passed the preliminary examination he/she will be placed on monitoring by the Graduate Division. If the student fails for the second time he/she will have to comply with the conditions in the next paragraph.
- (iv) Recommendation that the student finishes at the MS level under Plan II, which should be completed within two years of the student's first enrollment quarter. In exceptional cases the student may petition for an additional quarter, subject to approval by his/her advisor and the AAC. The student will be placed on monitoring by the Graduate Division and, if progress toward the MS degree is not deemed satisfactory, the student may be placed on probation. Students finishing at the MS level are not required to satisfy the TA requirement but the Graduate Division will enforce the B minimum requirement in the core courses.

## QUALIFYING EXAMINATION (ADVANCEMENT TO CANDIDACY)

The purpose of the qualifying examination is to assess whether the individual has acquired the requisite understanding of their research topic and critical thinking ability to elaborate and execute a sound research plan for their dissertation. Some preliminary research is required to elaborate the dissertation proposal, but the exam is not intended to evaluate a project that is well past the planning point.

### TIME OF COMPLETION

The Qualifying Examination is administered 22-26 months after the student's entrance into the program. Students who do not meet this deadline and do not petition for an extension based on a justifiable reason (e.g. extended absence of their advisor or co-advisor due to sabbatical) may be placed on academic probation and may become ineligible for financial support.

### ELIGIBILITY

Pre-requisites for the Qualifying Examination include:

- Successful completion of the Preliminary Examination;
- Completion of the Materials Department core courses (200A, B, C) with a minimum of B in each of the courses; and
- A minimum 3.5 GPA in the graduate program. Students with a GPA above 3.2 may petition with the Academic Affairs Committee for a waiver of the 3.5 GPA requirement. Students with a GPA below 3.2 are not eligible to advance to candidacy and will be placed on monitoring by the Graduate Division.

### COMMITTEE NOMINATION

The examination committee consists of at least four faculty<sup>6</sup>, including the student's advisor:

- At least three need to have more than a 0% appointment in the Materials Department, and preferably at least one of them should have a majority appointment in Materials
- One member with no more than a 0% appointment in the Materials Department
- One member of the committee, other than the advisor, will serve as Chair of the Qualifying Examination committee.

Members of the examination committee are nominated by the student and research advisor at least 3 months prior to the examination and must be approved by the Academic Affairs Committee. The examination committee typically becomes the dissertation committee.

### DISSERTATION PROPOSAL

The examinee must submit a formal dissertation proposal (maximum 10 pages of text plus a sensible number of figures and a substantial list of references both placed after the text) that summarizes the intended research problem, the research approach, results to date, and future directions. This proposal should be submitted to the examination committee and the GPC *at least two weeks before the examination*. (Failure to deliver the thesis proposal to the committee on time may result in postponement of the examination.)

---

<sup>6</sup> Committee members must be Academic Senate members but exceptions can be made by petition to the Graduate Division as noted in footnote 5 in the Preliminary Examination section.

## **PRESENTATION**

The format of the examination includes a 40-45 minute presentation of the dissertation proposal by the student, during which time only questions of clarification will be allowed. The presentation will be followed by questions from the committee for a total period of approximately 60 minutes.

## **COMMITTEE DECISION**

A decision will be rendered by the committee at the end of the examination, with one of the following recommendations:

- (i) Advance to Candidacy without reservations.
- (ii) Advance to Candidacy with reservations, which should be re-evaluated in the subsequent annual assessment.
- (iii) Requirement that the student takes the examination again before he/she is allowed to advance to Candidacy. This second exam must take place within a 6-month period following the first one. The Graduate Division will place the student on monitoring status during this period. *Failure to advance to candidacy after the second exam requires the student to leave the program, with the option of completing an MS degree.* Please see details for finishing with an MS in the MS program section above.
- (iv) Failure to meet the standards for advancement to candidacy, which requires the student to leave the program with an option to finish at the MS level under plan I or II. It is assumed that at this stage the student would have finished all the coursework and may have up to an additional 6 months after the exam, but no more than 3 years after his/her first enrollment in the program, to finish his/her requirements for the MS degree. The student will be placed on monitoring status and, if progress toward the MS is not deemed satisfactory within the first quarter after the exam, he/she may be placed on probation.

## **ANNUAL PROGRESS ASSESSMENTS**

After advancement to candidacy, each student is required to report his/her progress to the dissertation committee at least once a year on a formal basis (*i.e.* 36±2, 48±2 and, if needed, 60±2 months after the student's entrance into the program). Students who do not meet this deadline and do not petition for an extension based on a justifiable reason (e.g. extended absence of their advisor or co-advisor due to sabbatical) may be placed on academic probation and may become ineligible for financial support. *The annual requirement is generally waived for students defending during the academic year.*

### **PROGRESS REPORT**

- The student is expected to prepare a short written progress report for the committee, deliver it to the members and meet with them for an oral presentation of the progress report and discussion of his/her progress, research findings and ideas for the remaining work.
- Alternatively, the student may provide a draft of a paper submitted for publication in lieu of the document, as example of his/her progress, with a brief summary of accomplishments during the previous year.

### **ASSESSMENT BY COMMITTEE**

Students are expected to meet with their committee members collectively. The committee will assess the progress and provide advice to the student on problems that may hinder the completion of the dissertation on a timely basis. If the student is not progressing satisfactorily toward completing his/her degree, the committee may give incomplete or unsatisfactory grades in the thesis units, and recommend that the student be put on monitoring status or probation. If the problem is not corrected, it may be recommended that the student finish with an MS degree after completing the appropriate requirements.

### **FAILURE TO COMPLETE**

It is the student's responsibility to ensure that the annual progress assessments are being completed once a year after completion of the candidacy exam. Failure to meet the annual requirement will result in a grade of "U" in Matrl 290 and may lead to a recommendation that the Dean of the Graduate Division place the student on monitoring status or probation.

## DISSERTATION DEFENSE

The purpose of the dissertation defense is to ascertain that the student has completed a coherent, original body of research on his/her chosen topic that represents a significant contribution to the literature, and is able to defend the results and conclusions in front of a knowledgeable public.

The committee must ascertain the suitability of the dissertation draft and provide comments and recommendations for amendments to the dissertation. In cases where concerns are identified, the committee may request the candidate to address these issues and submit a revised draft of the dissertation prior to the date of the defense or before the final version of the dissertation is approved for filing. Once the dissertation draft is deemed suitable by the committee permission is granted for the candidate to present a formal defense of the dissertation, which should be done in a public seminar.

Any attendee at the defense can question the candidate. However, the committee chair has the authority to terminate inappropriate questioning. After public discussion is concluded, the audience will be asked to leave the room and the committee will continue the examination of the candidate in private. After the examination, the committee will deliberate and render a decision on whether the candidate has earned the Ph.D. degree. As noted earlier, the committee may require amendments to the dissertation before signing the signature page.

### PREPARING FOR DEFENSE

Students must use the following timeline to properly prepare for the defense:

- Verify with the GPC that all University and Departmental degree requirements have been met. This must be done 2 months in advance of the proposed defense date.
- Verify with the GPC that your dissertation committee has not changed since your Qualifying Examination. If so, a [Committee I-A form](#) will need to be submitted to the Graduate Division.
- Submit an electronic copy of your dissertation draft to the committee and the Department via the GPC, four weeks prior to the scheduled defense to allow sufficient time for the dissertation committee to read it and comment on it. Individual committee members may require the student to submit a paper copy. (Failure to deliver the dissertation draft to the committee or the Department on time may result in postponement of the defense).
- Two weeks prior to the defense send Stefani Juarez at [materials@engineering.ucsb.edu](mailto:materials@engineering.ucsb.edu), your abstract. Please provide her with the dissertation title and name of the Chair of the committee, along with the details of the defense (ie. time, date, and location). Every defense must be advertised officially by the Department to ensure opportunity for attendance by interested people
- Remind your dissertation committee about the defense; the entire dissertation committee must attend. Arrangements for electronic participation of a committee member absent from campus because of travel are allowed, but the Department must be notified in advance of such arrangements.
- Take your dissertation signature page to the defense.

### FILING PROCESS

Once the candidate has passed his/her dissertation defense and made the amendments requested by the committee, the last requirement is to file the dissertation with the Graduate Division:

- Information on how to complete the filing process may be found on the [Doctoral Degree Filing Checklist](#).



- Figure out which [filing deadline](#) you intend to meet.
- Review and use the thesis and dissertation resources, templates, and tutorials provide by the [Graduate Division](#).
- Check the [Grad Post](#) for upcoming Filing Workshops, Dissertation Writer's Room hours, and Dissertation Writing Retreats.
- When you are ready to file, the Graduate Division recommends that you stop by to have a Pre-Check with one of their advisors. You only need to print out your preliminary pages and a chapter for the advisor to review.

## **DEGREE CONFERRAL**

Degrees are granted four times a year, on the last day of each quarter including summer session. Students must have finished all requirements by the final day of the quarter in order to receive a degree dated that quarter. A dissertation filed between quarters will not cost the student additional fees if s/he was enrolled during the previous quarter; however, the degree will be dated the end of the next quarter.

## **DISSERTATION BINDING**

The department will cover the cost to have three (3) copies printed and bound. One copy will be kept in the departmental collection, the second stays with you, and the third will be given to your advisor. Any additional copies may be purchased via ProQuest at the time you file. Another option is to order additional dissertation copies directly from the [UC Bindery](#). For more detailed information, please visit the department [website](#).

## **DIPLOMAS & TRANSCRIPTS**

After the Graduate Division finishes a degree check, it notifies the Office of the Registrar, who posts the degree to the transcript and orders diplomas. Degree checks and posting take 6-8 weeks after the end of the quarter. Students wishing to order transcripts that show the degree awarded should request to hold for posting of degree.

Students should notify the Graduate Division if a letter of completion is needed. Once the Graduate Division has confirmed the degree, a letter of completion may be issued to you via email.

You may find more helpful resources on defending, filing, and binding on the [Materials Department website](#).

## **STIPEND PAYMENTS AND FELLOWSHIP SUPPLEMENTS**

The policy of the Materials Department is that all Ph.D. students who are making satisfactory progress toward the completion of their degree receive a stipend and have their fees paid by their advisor.

The Materials Department establishes a standard stipend level for Ph.D. students. If the department proposes a stipend raise, it will take effect in fall quarter for students making satisfactory progress toward degree requirements. Students who have incomplete requirements (i.e. annual progress assessments) will not receive a raise until the quarter after all requirements are met.

The standard GSR rates are as follows (effective 10/01/2019):

- Pre-Candidacy Status: \$34,443 per year (\$2,870 per month)
- Advanced to Candidacy status: \$36,906 per year (\$,3075 per month)

### **MAJOR FELLOWSHIP RATE**

Students who are fully supported by major, academically competitive fellowships may have their stipends augmented to the department major fellowship rate:

- Awardees of a 3+ year fellowship\*:

For 3+ year fellowships that provide funding support for more than 50% of the full annual graduate student fees and stipend, the graduate student researcher should be supplemented up to \$38,400 per year for all 5 years. The supplement is not guaranteed for students enrolled after their fifth year of residence. Therefore, it is under the research advisor's discretion to support students beyond their fifth year, at the standard post-candidacy rate. \*Note, this fellowship rate does not apply to NDSEG awardees. Due to the new terms and conditions of the NDSEG fellowship, no funding support is allowed during the term of the NDSEG fellowship.

- Awardees of a 1-2 year fellowship:

For 1-2 year fellowships that provide funding support for more than 50% of the full annual graduate student fees and stipend, the graduate student researcher should be supplemented up to \$38,400 per year for fellowship year(s) only.

### **SUMMER QUARTER 7.5% MANDATORY PRE-TAX DEDUCTIONS (SAFE HARBOR)**

Non-exempt students who are not eligible for the Retirement Choice Program or membership in UCRP) make mandatory contributions of 7.5 percent to the Defined Contribution Plan (DCP) Pretax Account. This pre-tax deduction is placed into a Defined Contribution Plan (DCP) called Safe Harbor.. When you leave UC employment permanently, you need to provide the Plan with instructions on what to do with the money in your account to avoid an automatic payout that may be subject to early distribution penalties. A summary description of the plan may be found [here](#). Money accumulated in the Pretax Account remains in the Plan until the participant leaves employment and takes a distribution (see "Distributions: Former Employees," on page 11).

## LAB SAFETY POLICY

Safety is the first priority in all laboratories at UCSB. As UCSB students, you are responsible to observe safe practices per faculty, Teaching Assistant, and University policies and regulations. Environmental Health & Safety (EH&S) provides safety training and maintains updated information related to safety practices and policies on their website: <http://www.ehs.ucsb.edu/>

It is **mandatory** that all new Graduate Students attend the EH&S *Fundamentals of Laboratory Safety* LIVE course that is typically scheduled on the Wednesday before instruction begins.

If you arrive on campus before attending the live lab safety course, you must take the online lab safety course before entering any UCSB lab and/or office space located in a lab building.

The *Fundamentals of Laboratory Safety* – *ONLINE* course is described here:

<http://www.ehs.ucsb.edu/training/fundamentals-laboratory-safety-online> and it can be taken through the UCSB Learning Center at <http://www.learningcenter.ucsb.edu>

It is also mandated by the Materials Department that you retake the EH&S *Fundamentals of Laboratory Safety* course once per year at <https://www.learningcenter.ucsb.edu/>

Individual laboratories require additional safety training procedures that must be completed before the student is allowed access to the lab and use of the equipment. Students should consult with the technical staff person in charge of the lab (or the faculty advisor for individual labs) to ensure they have met all the safety training requirements.

Access to laboratories not only requires lab safety training, but also personal protective equipment (PPE). Please see: <http://www.ehs.ucsb.edu/ppe>

You will be issued PPE, e.g. laboratory coats, eye protection, and other items, based on the specific needs for the laboratories for which you have been approved to access. The safety officer for a particular lab will direct you to the Laboratory Hazard Assessment Tool (LHAT), which will determine what PPE is required for a given lab and provide information about where to pick-up the equipment on campus.

## OTHER IMPORTANT PROCEDURES

### ELECTRONIC KEY CARD ACCESS

Access cards are required for several Materials/SSLEC office spaces and labs. If it is determined that students will need access to these spaces, an order form can be obtained from the Materials Office Receptionist in Engineering II 1355. Once a student has been issued a card from the UCEN, they will need to return to the reception area to begin the access approval process. Access is determined individually based on research discipline and office location. Students must meet all the training and safety requirements before they are allowed use of the labs, even if they have been issued a key card.

### COMPUTING FACILITIES

Incoming students are allowed to bring in personal laptops and workstations for use on Materials Networks or the Campus Wireless Network. To use the Campus Wireless you will need a UCSB NetID to authenticate. To use the Materials Physical Network please send an email with your computer's Network Hardware Address to:

[enmt-support@engineering.ucsb.edu](mailto:enmt-support@engineering.ucsb.edu)

Please be aware that system and network security is strictly enforced. The department's Computing and Network Security Policy can be found at:

<https://materials.ucsb.edu/resources/computer-support/computer-network-security-policy>

All students are eligible for College of Engineering email accounts through the Engineering Computing Infrastructure (ECI). To open an account, please follow the link below:

<https://accounts.engr.ucsb.edu/invites/login>

The Department employs a full-time System Administrator, Budd Jamieson, who is available to answer questions concerning computing services and other technical needs. If you have questions concerning the Department's computing and resources please send an email to:

[enmt-support@engineering.ucsb.edu](mailto:enmt-support@engineering.ucsb.edu)

### ON-LINE RESOURCES

The Materials Department web site (<http://www.materials.ucsb.edu>) is a valuable source of departmental and university information. On the web site, you will find:

- Quarterly schedule of Materials courses
- Listings of Materials personnel (faculty, staff and students) with email addresses
- Links to faculty web pages
- List of available facilities within the department
- List of related research centers and groups (with links to their web pages)
- Procedures to be approved for Electronic Lab Access via your Access Card
- Health & safety information, including links to EH&S and UCSB Emergency information.
- Travel policies and procedures manual

Please note that some facilities and other useful information are available under one of the various materials research centers with which the Department faculty are affiliated, e.g. MRL, CNSI, SSLEC, etc. Check those pages online for specific information on facilities and support available there.

## **ACKNOWLEDGEMENT OF HAVING READ THE GRADUATE STUDENT MANUAL**

(Print this page, sign it after reading the manual and turn it in to the Graduate Program Coordinator\* by the end of the first full week of classes following the orientation session for new students.)

I, \_\_\_\_\_ acknowledge that I have carefully read and understood the contents of the Graduate Student Manual for the Materials Department (Edition Fall 2019). I understand my first point of contact for any questions regarding the Graduate Manual or the Materials Graduate Program is the Graduate Program Coordinator\* in the Materials Department, who may refer me to the Graduate Advisor\*\* in the Materials Department.

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Date

\* The current Graduate Program Coordinator is Ms. Jocelyn Guzman. Please note this person is referred to as Graduate Program Assistant in the Graduate Division literature.

\*\* The current Graduate Advisor is Prof. Anton Van der Ven