

**Department of Mechanical Engineering
University of California, Santa Barbara**

GRADUATE STUDENT HANDBOOK

2006 - 2007

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Employment Information & Forms Graduate Student Researchers (GSR's).....	Julie Dunson
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E-Mail accounts.....	Front Desk Asst. or Maureen Turner
Financial Contract & Grant accounts..... Department accounts..... Purchase Orders..... Travel Advances.....	Lee Baboolal Deanna Hearth Josie Castagnola Josie Castagnola

Graduate Division Faculty & Staff

Information (805) 893-2277

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Associate Dean, TBA	2013
Assistant Dean, Mary E. McMahon	7109
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Getting Started!

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 a full-time faculty of almost 12,300 and a current enrollment of about 171,000 students, 90% of whom are California residents. 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 system of public higher education in the country.

The ten UC campuses are 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 University of California, Santa Barbara is a major research institution offering undergraduate and graduate education in the arts, humanities, science and technology, and the social sciences. 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 20,000, with 17,500 undergraduates and 2,500 graduate students. The UCSB faculty numbers 998 which includes five Nobel Prize winners, recipients of the National Medal of Science, members of the National Academy of Science and the National Academy of Engineering, numerous Guggenheim fellows, Fulbright scholars, and fellows of the National Endowments of the Arts and for the Humanities.

The UCSB campus has 5 academic units: The Colleges of Creative Studies, Engineering, Letters and Sciences, the Graduate School of Education, and a new professional school of Environmental Science and Management.

The UCSB campus was established in 1944 and moved to its present location on the site of a former marine base in 1953. The 815-acre grounds include the main campus, the Santa Ynez and Storke apartments, the West Campus, and the North Campus. The student community of Isla Vista is surrounded by the UCSB campus and the Pacific Ocean.

The College of Engineering

The College of Engineering is the second largest undergraduate college at UCSB. The college has become in recent years one of the most dynamic in the nation and consists of five degree-granting departments:

- Chemical Engineering
- Computer Science
- Electrical and Computer Engineering
- Materials (graduate degrees only)
- Mechanical Engineering

The college facilities are contained mainly in 4 buildings on campus (Engineering I, II, III, and the Materials Processing Laboratory) and the Engineering Research Centers Building off campus. In addition to its academic departments, the college has nearly 20 organized research centers in a variety of multidisciplinary activities. For more information about the centers listed below, visit <http://www.engineering.ucsb.edu/centers>.

- [CCDC: Center for Control Dynamical Systems and Computation](#)
- [CIPR: Center for Information Processing Research](#)
- [CITS: Center for Information Technology and Society](#)
- [CRSS: Center for Risk Studies and Safety](#)
- [Center for Robust Control of Aeroengines](#)
- [CO-SEARCH: Compound Semiconductor Research Laboratories](#)
- [HPCC: High-Performance Composites Center](#)
- [IMPACT: ONR MURI Innovative Microwave Power Amplifier Consortium Center](#)
- [Interdisciplinary Center for Wide Band-Gap Semiconductors](#)
- [iQUEST: Institute For Quantum Engineering, Science and Technology](#)
- [Materials Research Laboratory](#)
- [MOST: Multidisciplinary Optical Switching Technology](#)
- [NNUN: National Nanofabrication Users' Network](#)
- [Ocean Engineering Laboratory](#)
- [OTC: Optoelectronics Technology Center](#)
- [PRET Center for Non-Stoichiometric Semiconductors](#)
- ["Thunder and Lightning Project:" Center for Optical Communications](#)
- [California NanoSystems Institute](#)
- [ICMR – International Center for Materials Research](#)
- [MC-CAM – Mitsubishi Center for Advanced Materials](#)

Department of Mechanical Engineering

The Mechanical Engineering Department at UCSB is at the forefront of current research and technology. Its outstanding quality is reflected by the large number of our senior faculty who are members in the National Academy of Engineering, and by the NSF Career Awards won by our young faculty members. The Department offers one of the most exciting, challenging, and rewarding graduate research and education programs in the country. Our graduate program is focused in the following areas: Computational Science and Engineering (supported by prestigious NSF/IGERT fellowships); Dynamics, Control and Robotics; Microscale Engineering including MicroElectroMechanical Systems (MEMS), Bio-MEMS, and Microfluidics; Fluids and Thermal Transport; Environmental and Ocean Engineering; and Solid Mechanics, Materials and Structures.

Graduate study in our Department is complemented by outstanding programs in related departments, such as Materials, Chemical Engineering, and Computer Science. Furthermore, close ties exist with other research centers on campus, including the Materials Research Laboratory, the Bren School of Environmental Science and Management, and the Kavli Institute for Theoretical Physics. We pride ourselves on the strength and vitality of our interdisciplinary research activities, which provide a cross fertilization that contributes significantly to the strength and productivity of our research groups.

The Mechanical Engineering Department ranks #1 in citations per faculty and #4 in publications per faculty by a recent National Research Council review of graduate programs.

Orientation

Planning for arrival Students should plan to arrive at least two weeks prior to the beginning of the quarter.

Housing The first priority is to secure housing. Visit the housing office near Storke Tower for information on available community housing. The department may know of a few roommate openings from students finishing and leaving before the new quarter begins. You should expect to pay first and last month's rent plus a cleaning deposit.

New Graduate Student Orientation Meeting This meeting will be held during the week before classes begin for all new students on campus. Attendance is mandatory.

Advising Upon arrival, temporary advisors will be appointed in each research area to help you with any questions you may have about your Fall quarter schedule. As described later, the department has a formal procedure for selecting a faculty member to serve as your supervisor/advisor for the remainder of your degree. That selection procedure begins during the end of Fall quarter, with the assignments being made by the middle of Winter quarter (for students beginning Winter and Spring, this takes place their first quarter).

Fees If you have received a letter of financial aid, the amount of support offered for registration fees, health insurance and tuition (for non-residents) will be paid by the department. You are responsible for all other fees incurred. It is essential that you review your Billing-Accounts Receivable or BARC statement each month for other charges incurred that you will be responsible for at <http://www.barc.ucsb.edu>. There is a fee deadline for all "now due" charges on your statement at the beginning of each quarter (the deadline date is printed in the Schedule of Classes). If you have any questions regarding your statement, please see the Staff Graduate Advisor or contact the Billing Office prior to this deadline. **NOTE:** A \$50.00 late fee will be charged to your account if there is a balance of \$2.00 or more after the deadline.

Fee Deferral For an additional \$25, you may defer your fees and pay over the course of the quarter. This is done through the Billing Office in SAAS building. **NOTE:** This may be necessary if your fees are paid to you as a stipend from a fellowship.

Registration All students must register for a minimum of **12 units** every quarter. Registering for classes is done on-line on GOLD, <https://gnet.ucsb.edu/gold/index.asp>. Instructions for registering for classes are located in the Schedule of Classes. When you receive your registration material, check the deadline date, as you will be registering for next quarter's classes during the current quarter. If you do not register for classes by the deadline, you will be assessed a \$50.00 late fee. **NOTE:** your Research Advisor (Temporary Advisors in Fall quarter of your first year) **must** approve your class schedule prior to registering for classes. Graduate students have until the **15th day of instruction** to add classes to their schedule without approval from the Graduate Division. After this deadline, schedule adjustment petitions, along with a letter of justification for approval, are required to be sent to the Graduate Division. Graduate Students have until the last day of instruction to drop classes.

Laboratory Safety Course All incoming graduate students are required to attend the Laboratory Safety Course, sponsored by the Environmental Health and Safety Department, which is held prior to the beginning of Fall classes. This course is mandatory for all personnel prior to working in any mechanical engineering laboratory.

Computer Accounts Each student *must* have an engineering email account. Please visit the following link to sign up for an engineering account: www.engineering.ucsb.edu/%7eci-web/. It is suggested that you forward your umail account to your engineering account.

Mailboxes Each student has a mailbox for messages and mail. This should be checked daily. Mail is delivered each morning after 9:00 a.m. Incidentally, the mailboxes in the copier room are for departmental use only. The campus mail service **will not** take personal mail.

CAD Lab The CAD Lab room features a large number of PC's and work stations networked to printers, plotters, and other peripherals.

International Students

Your first stop when you arrive should be the Office of International Students and Scholars (OISS). You will receive specific information there.

TA Language Evaluations Graduate Council policy requires all potential TAs whose first language is not English, be tested for language proficiency before being allowed to head a section. A faculty member from the Mechanical Engineering department and the Director of the English as a Second Language (ESL) program will evaluate the prospective TA, who will make a 5 to 10 minute presentation on an academic topic assigned in advance by the department. The evaluators will assess the student's ability to explain academic concepts, and ability to understand and answer questions of the type undergraduates pose in class. This exam is coordinated by the Staff Graduate Advisor, who will notify you of the details prior to the exam.

Only students who demonstrate acceptable spoken proficiency in the English language evaluation will be eligible for classroom teaching responsibilities. TA's who fail the language evaluation will be assigned to alternate, non-teaching responsibilities, as well as to the appropriate ESL class(es). You **MUST REGISTER FOR AND ATTEND** the ESL course that you are placed in after the English Language Placement Exam (ELPE).

ESL Policies — An Overview: The Graduate Council's policy for students for whom English is not the native language states that they must satisfy proficiency requirements in spoken and written English for the purposes of research and communication with colleagues before they will be awarded a degree at UCSB.

Departmental Cooperation and ESL Compliance: Academic departments help the Graduate Dean in monitoring these aspects of ESL policy:

- All new international graduate students are required to take the English Language Placement Exam (ELPE) at the beginning of the quarter they first enroll at UCSB. Based on their performance on the ELPE, they will be placed in the appropriate Linguistics class or exempted out of ESL.
- Students who fail to take the ELPE are considered delinquent and will have their registration blocked for future quarters until they take the ELPE.
- Continuing international students who need additional ESL coursework will be pre-registered in the appropriate ESL classes.
- Attendance in ESL classes is **compulsory**. Students not attending their assigned ESL classes during the first week of classes (and the remainder of the quarter) will be considered delinquent. Students who are delinquent will have their registration blocked for future quarters until it is proven they are attending their assigned classes.
- Students are expected to complete the ESL course progression within three quarters.
- Only students who demonstrate acceptable spoken English proficiency in the TA language evaluation will be eligible for classroom teaching responsibilities. TA's who fail the TA Language evaluation will be assigned to alternate, non-teaching responsibilities, as well as to the appropriate ESL classes.

- If university ESL requirements are not met, Graduate Division will enforce one or more of the following options: withholding of RAships; withholding of degrees; blocking of registration for future quarters and/or blocking advancement to candidacy.

Office of International Students and Scholars

It is essential that students keep abreast of matters pertaining to their visa. The Office of International Students and Scholars (<http://www.oiss.ucsb.edu/>) has counselors available to assist and advise international students in many areas, including: housing, visas and immigration matters, financial aid, cross-cultural programs and English conversation classes.

Financial Aid

Non-immigrant students may apply for President's Work Study through the Office of International Students after three quarters of enrollment on campus.

Registration and Coursework

Graduate Status/GPA Requirement

Maintaining graduate status involves paying fees, registering for 12 units each quarter, and maintaining an overall GPA of **3.0 or better**. Failure to maintain academic standards results in probation or dismissal; failure to pay fees and register (unless on approved leave of absence) results in lapse of status as a graduate student. Only work taken when a student is in graduate status may be counted toward a graduate degree.

Students who fail to pay fees and register for classes by the third week of classes each quarter lapse status as graduate students and must either petition for reinstatement (\$15) or reapply for admission (\$60). For details, see the section on petitions below.

Registration as a graduate student in the spring quarter maintains graduate status until the beginning of the next fall quarter. A student who registered in spring may therefore take examinations or file a thesis or dissertation during summer without additional fees. A student who does not register spring quarter will owe a filing fee to take Master's examinations, file a thesis or dissertation, or take the PhD qualifying exam over the summer.

Registration and Full Time Status

For purposes of reporting graduate enrollment to UC system wide, 12 units is considered full time status. Since resources come to the campus based on the 12-unit formula, *students are required to be enrolled for a minimum of 12 units each quarter*. There is not an upper limit on the number of units a graduate student may take in their graduate career.

Part-Time Graduate Status

At present, there is no provision for part-time graduate status: *all graduate students are assessed full fees no matter how many units they take*. Students who are physically elsewhere are considered "in residence" at UCSB if they pay fees and register for classes. Students doing research outside the state of California may be eligible for fee reductions through "in absentia registration".

Leaves of Absence

Continuous registration is expected of all graduate students. Leaves of Absence may be granted under extraordinary circumstances, and must be approved by the Graduate Advisor prior to petitioning Graduate Division.

Registration Information

All information, including deadlines, is on-line at <http://www.registrar.ucsb.edu> and listed in the front of the Schedule of Classes available from the bookstore; *please refer to it often.*

- Continuing students register using GOLD, <http://gnet.ucsb.edu/gold/>, in the middle of the current quarter for the following quarter (including Fall).
- New students and those returning from a Leave of Absence register when the quarter begins.
- Fees need to be paid by the first day of instruction.
- Schedule adjustments take place during the first week of the quarter. Students may add and drop courses without a fee. After this time, schedule changes are \$3 each. Graduate students have until the **15th day of instruction** to add classes to their schedule without approval from the Graduate Division. After this deadline, schedule adjustment petitions, along with a letter of justification for approval, are required to be sent to the Graduate Division.
- Classes can be dropped until the last day of instruction via GOLD at <http://gnet.ucsb.edu/gold>. Most classes can be added using add approval codes that are issued by the Staff Graduate Advisor. If approval codes are not available, add petitions can be picked up from the department office. Petitions are to be taken to the Registrar's Office once approval has been given by the instructor and the Graduate Advisor.

Employment, Financial Aid and Fellowships

Student Employment

Academic employment is the single largest source of graduate student support at UCSB. Graduate Student Researchers (GSR), Teaching Assistants (TA), and Tutors must be registered graduate students in good standing (i.e. 3.0 GPA or better and less than 12 units of incomplete grades) to be employed. (Students on approved leaves of absence may be employed as a Tutor). TA's may apply for a **TA loan** prior to or at the beginning of the quarter up to the amount of their first month's salary through the Office of Financial Aid.

With the 1986 revision of the tax code, all wages (including stipends and those earned as a TA or GSR) are fully taxable. (See section on Taxes)

Student academic appointments, in general, are limited to 50% time (20 hours per week) during the academic year but can be 100% over summer. If this time limitation works an undue hardship on either the student or the department, the chair or Graduate Advisor may ask for an exception up to a maximum of 75% time for total combined UC employment.

It is expected that graduate students will not have a job away from the university.

The Defined Contribution Plan is a qualified retirement plan established and maintained under section 401(a) of the Internal Revenue Code. The plan is administered by University of California Employee Benefits in the Office of the President, located in Oakland. The required 7.50% Plan contribution is deducted from gross salary each pay period and income taxes are calculated on remaining pay, thus reducing your taxable income. Taxes on the contributions and any earnings are deferred (i.e. postponed until you withdraw the money, which can only occur upon termination of UC employment, or retirement). To help you keep track of account activity, UC Benefits will send you personalized quarterly statements showing contributions and earnings, losses, and a summary of quarterly transactions. It is important to keep your address current with the Accounting Office.

If you are to be appointed as either a Graduate Student Researcher (GSR) or Teaching Assistant (TA), there are several forms that need to be filled out, including eligibility for employment, which requires that you present proof in the form of two identifications – Driver's License or Passport, Birth Certificate or Social Security Card. Foreign students must also provide visa information. Employment forms are available in the department office.

Your first paycheck will arrive the month following that for which your employment began. In Fall, that will be the first of November.

Teaching Assistantships (TAs)

A TA is chosen for excellent scholarship and promise as a teacher, and serves an apprenticeship under the active tutelage and supervision of a regular faculty member. The department vice-chair, acting upon nominations made by department members, is authorized to appoint TAs. However, the Dean of the Graduate Division must approve all exceptions to appointment criteria.

The TA is not responsible for the instructional content of a course, for selection of student assignments, for planning of examinations, or for determining the term grade for students. Neither is a TA to be assigned responsibility for instructing the entire enrollment of a course nor for providing the entire instruction of a group of students enrolled in a course. The TA is responsible for the conduct of recitation, laboratory, or quiz sections under the active direction and supervision of a regular member of the faculty to whom final responsibility for the course's entire instruction, including the performance of TAs, has been assigned.

TA Policies All Ph.D. students starting Fall 2004 or later are *required* to TA a minimum of 2 quarters after they advance to candidacy. TA responsibilities begin on the first day of the quarter and end when grades are due to the Registrar. TAs must gain instructor approval for planned absences well in advance of any leave.

TA Fee Remission Teaching Assistants whose appointment is at least 25% time qualify for partial fee remission and payment of health insurance. Not covered by partial fee remission is tuition and lock-in fees (about \$200 per quarter for 04/05). *These remaining fees are the sole responsibility of the students unless the department or an advisor has promised to cover these costs.*

NOTE: The remissions quoted are consistent with the terms of the current contract. Please be aware that future wages, terms, and conditions are subject to modification based on the collective bargaining process.

TA Loan If you are appointed as a TA, you may apply for a TA loan up to the amount of your first month's salary beginning two weeks before classes start through the Office of Financial Aid. The loan will then be repayable in three installments by the end of the quarter (1/3 per month).

Graduate Student Researchers (GSRs)

A GSR is a graduate student who is involved in the research project of faculty members. GSRs are selected for high achievement and promise as creative scholars; they may collaborate in the publication of research results as determined by supervising faculty members. GSRs may not be assigned teaching, administrative, or general assistance duties. The Dean of the Graduate Division must approve all exceptions to appointment criteria. A graduate student must be registered in the previous spring quarter to be eligible for a summer GSR appointment. New students whose first quarter of registration will be fall may not be GSRs prior to that quarter. *GSRs must submit signed timecards to the Personnel Assistant by the 18th of each month.*

Fee and Tuition Remission for GSRs

Graduate Student Researchers (GSRs) qualify for full fee and tuition remission if they meet the following criteria: a) they are appointed for at least 35% (all GSR appointments combined) over the three months of the quarter, or who work at least 140 hours during the 10 weeks of instruction, b) have appointments that begin within the first three weeks of the quarter. Full fee and tuition remission includes the payment of fees, health insurance for all eligible students, nonresident tuition for international students, and nonresident tuition for domestic students during their first year only. Please refer to the [fee structure tables](http://www.graddiv.ucsb.edu/academic/handbook/appendix/fees.shtml) at <http://www.graddiv.ucsb.edu/academic/handbook/appendix/fees.shtml> illustrating fee remissions.

Need-Based Financial Support

Graduate students may apply for need-based grants, loans, and work-study awards through the Financial Aid Office, <http://www.finaid.ucsb.edu/>. The programs are based entirely on demonstrated financial need and require a separate application.

Only U.S. citizens and permanent residents may apply for funds administered by the Financial Aid Office. Students' eligibility for aid is determined by comparing the "Estimated Student Budget" with the individual student's actual resources. Financial Aid has calculated specific estimated student budgets for both single and married students, residents, and non-residents.

Assistance from Financial Aid is usually offered as a combination package of the following types of aid:

Grants As with fellowships, grants are non-repayable awards.

Work-Study In this program, student salaries are paid partly by the Federal Government and partly by the hiring department (usually a 60%/40% split). ***Any on-campus job may employ students with work-study funding.***

Loans The Federal Direct Loan is provided by the Federal Government and is administered directly by UCSB. The loan proceeds can be applied to a student's BARC account. The interest rate is variable but is capped at a maximum of 8.25%. Students who demonstrate financial need may qualify for the subsidized Direct Loan program. The Federal Government pays the interest that accrues while the student is enrolled in school. Repayment begins six months after the student graduates. The annual loan limit is \$8,500 for independent graduate students. Students who do not demonstrate financial need may qualify for the unsubsidized Direct Loan program. Interest begins accruing immediately. Students are responsible for the payment of interest while in school. Payment of interest may be deferred until after the student graduates. The annual loan limit is \$18,500 for graduate students.

To apply for financial aid, students submit a Free Application for Federal Student Aid (FAFSA) and tax certification forms along with copies of their (and in some cases their parents') previous year's income tax documents.

The deadline for application for financial aid is March 3.

The Financial Aid Office evaluates on-time applications and mails out offers of aid in April. Students who apply after the deadline are rarely funded.

Fellowships and Other Funding

Graduate Opportunity Fellowships (GOF):

Eligibility Both new and continuing domestic MS and PhD students who are either ethnic minorities or women in fields where they are severely under-represented.

Criteria for Award Academic promise as demonstrated by the standard measures plus degree of under-representation nationwide in faculty positions and in graduate programs on the UCSB campus. Second priority is given to those minorities most under-represented in faculty positions nationally, regardless of discipline.

Support Package Stipend of \$12,000, plus fees and health insurance. This one-year fellowship may be renewed once but renewal is not guaranteed. Second year applicants will be judged on academic promise and degree of under-representation along with all other applicants.

Deadline Student applies to the department by January 15. Department forwards nomination packet by February 8.

President's Dissertation-Year Fellowships:

Eligibility Highly promising PhD candidates who are ethnic minorities or non-minority women in severely under-represented fields. Applicants must have advanced to candidacy and have an approved dissertation topic and a functioning dissertation committee.

Criteria for Award Awards are made on the basis of the quality of the dissertation proposal, letters of recommendation from the student's committee, the student's previous academic performance, and promise of finishing the dissertation within one year.

Support Package A \$12,000 stipend, payment of fees and health insurance and \$500 for research expenses in the student's final year of study. Students are also required to present their research at another UC campus; travel funds are provided for this purpose.

Nomination Procedure Students must be advanced to candidacy at the time they are nominated, and they are expected to complete their degrees within the

fellowship period. The dissertation advisor nominates the student with a letter that details the student's ability to set and meet a reasonable timetable for completing the dissertation and the overall attributes, which make the candidate worthy of this award. The nomination should contain:

- A dissertation abstract approved and signed by the entire committee
- A 3-4 page lucid narrative describing the dissertation research for a general audience. This should include a detailed plan of work or timetable
- The student's updated curriculum vitae
- Three letters of recommendation from faculty other than the dissertation advisor

Deadline The deadline for submission of nominations is mid March; awards are announced in May.

Patent Funds Grants from patent funds are available to PhD candidates for specific estimated needs vital to dissertation research. The grant is generally awarded to cover relatively inexpensive equipment or field expenses that are directly related to the student's dissertation project. Applications are available from the Academic Senate and are turned in to the department for ranking with other applicants before the Research Committee considers them. The deadline is May 1 each year.

Graduate Student Travel Grants PhD students who have advanced to candidacy and have been invited to present a paper at a scholarly meeting or to present results before a distinguished audience are eligible to receive support for one trip during their graduate career. Funds are available for transportation costs in the following areas: East Coast, Alaska, Hawaii, Canada, Mexico, Midwest, West Coast, California, overseas. Amounts are determined at the time of application.

The only allowable expenses are the actual costs of airline tickets and shared use of transportation (original receipts required) to connect airport and hotel up to the total amount of the grant.

There is no deadline; funds will be given out until expended.

California Residency

All eligible students must become California residents before the beginning of their second year as a graduate student. The office of the Registrar, using information provided by the student, decides the residency of new students. Information and applications are available on-line at <http://www.registrar.ucsb.edu>. There are four basic components of the residency rules:

1. **Citizenship** Students must be an adult U.S. citizen, an adult immigrant, or an adult non-immigrant on an A, E, G, I, or K visa. *Foreign students on student visas never qualify as California residents.*
2. **Continuing Presence** Students must be able to prove that they have been present in California for one full year prior to the residency determination date published each quarter in the Schedule of Classes.

3. Financial Independence For purposes of residency determination, financial independence means a student's ability to meet his or her own expenses from self-generated funds under his or her control. A student will generally be considered financially independent if any of these conditions apply: 1) is at least 24 years of age by December 31 of the calendar year for which he or she is requesting residency; 2) is a veteran of the U.S. Armed Forces; 3) is a ward of the court OR both parents are deceased; 4) has legal dependents other than a spouse; 5) is married, or a graduate student and was not claimed as an income tax deduction by both parents or any other individual for the tax year immediately preceding the term for which he or she is requesting residency.

NOTE: TEACHING ASSISTANTS AND GRADUATE STUDENT RESEARCHERS EMPLOYED AT LEAST 49% TIME ARE EXEMPT FROM THE FINANCIAL INDEPENDENCE CRITERION. ALL OTHER CRITERIA APPLY.

4. Intent Documented intent to make California the permanent residence is the final component in the residency rules. Relevant proof of intent might include: *registering to vote and voting in California; using a California permanent address; possessing a California driver's license and vehicle registration; paying or filing California taxes; having a lease or rental agreement for more than an academic year; having a savings and/or checking account; California employment, etc.* These steps should be taken immediately on arrival, before the beginning of classes.

During the Spring quarter of your first year, you will need to complete a Statement of Legal Residency and submit it to the Registrar's Office along with documentation proving that California residency has been established. It could take several weeks to process these forms; therefore, this should be taken care of several weeks prior to the beginning of fall quarter.

Contact the Office of the Registrar (x3033) for counseling on residency questions. The final authority on residency matters rest with the Registrar. Students who leave the state, either on leave of absence or with lapsed status, will have to file a residency statement when they return or reapply. Therefore, it is important to maintain as many of the aforementioned indications of residency as possible while away.

Tax Information

A determination by the Internal Revenue Service affects domestic UC student employees (this will not affect foreign students, who are exempt from paying Social Security taxes) whose wages have previously been exempt from Federal Insurance Contribution Act (FICA or Social Security) taxes. Effective **April 1, 1995**, graduate students employed by UCSB must meet both of the following criteria to maintain their exemption from Social Security taxes:

- 1) Must have an employment appointment of 50% time or less,
and
- 2) Be enrolled for a minimum of 12 units during the academic year
(4 during summer)

This will affect students during the summer (July-September) because MEE students generally do not enroll for summer session and, therefore, do not meet the course load requirement. When you lose your exemption because you do not satisfy the work and course load requirements, you will contribute 7.50% of your UC salary to an individual account in the University's Defined Contribution Plan as an alternative to paying Social Security taxes. In addition, you are required to pay the 1.45% tax for Medicare.

The 1986 Tax Reform Act eliminated the tax-exempt status of nearly all graduate student awards and earnings.

The new law separates the major categories of graduate student support:

1. Fellowships, scholarships, and grants are now fully taxable except for that portion that is used for the payment of tuition and "course required fees, books, supplies and equipment". Thus, a student receiving a fellowship, which includes a stipend, the payment of fees and tuition, will pay taxes only on the stipend. A student receiving only a stipend will subtract the amounts used from the stipend to pay fees and tuition and pay taxes on the remainder. Nonresident tuition fellowships, fee payment fellowships, and DOCFO payments will not be taxable. The university neither withholds taxes on fellowships nor reports fellowship payments to the Federal Government. Students are responsible for reporting fellowship income and arranging for estimated quarterly tax payments through the IRS office.
2. Any earnings received in return for any expectation of work on the part of the student are now fully taxable. The exemption formerly allowing exclusion from taxes of stipends earned while pursuing a degree requirement for teaching or research was repealed effective January 1, 1987. The amount the student pays from these earnings for fees, tuition, books, etc. may not be excluded. All earnings are fully taxable.

Plans of Study

GOALS OF THE GRADUATE PROGRAM

The goals of the graduate program are to

- provide students with solid knowledge in the fundamentals of the discipline,
- provide students with skills and tools in the mathematical and physical sciences necessary to carry out advanced research in the discipline,
- provide students with the state-of-the-art knowledge in their research field of interest, develop graduate students' critical thinking and analysis skills, and their ability to carry out significant independent research in the chosen field

GRADUATE STUDENT ACADEMIC ADVISOR SELECTION PROCEDURE

The following is the procedure by which a new graduate student selects a faculty advisor to supervise his/her graduate education. The procedure allows a new graduate student to become acquainted with faculty research activities across the entire department before making a choice of advisor. Some new students may have already developed a relationship, either formally or informally, with a particular faculty member even before arriving on campus. However, selection of a permanent advisor is not completed until Winter quarter to allow each student opportunity to review all possible working relationships in the department.

1. New graduate students attend the Faculty Research Presentations (ME 207) at the beginning of each Fall quarter. These are scheduled in the late afternoon, 2 days a week. Attendance for new graduate students is compulsory and is considered part of their responsibilities as graduate students, teaching assistants, fellows, research assistants, etc.
2. At the end of the Faculty Research Presentations, new students are asked to select one or two areas of emphasis in which they are most interested and to identify possible choices of advisor. Students would be encouraged to select at least two possible advisors.
3. Students make appointments with those faculty they possibly would like to work with.
4. Faculty in each area review the files of all the new students who expressed an interest in their research area and in them.
5. Students meet with faculty and, thereafter, submit to the Staff Graduate Program Advisor a list of their preferred choices of faculty advisors in rank order. This list must be given to the Graduate Program Assistant by the end of the Fall Quarter. Students would be encouraged to select at least two choices in case their first choice does not work out.
6. The student choices are reviewed by an *ad hoc* faculty committee consisting of the Graduate Advising Committee and the Graduate Admissions Chair. The committee will recommend advisors giving strong preference to the wishes of the student and the willingness of a faculty member to supervise the student.
7. When a student's preference cannot be met and the student is unwilling to accept the supervisor assigned to him/her, the Departmental Graduate Advisor will discuss the matter with the student and faculty members involved and seek an agreement that is acceptable to all parties.

8. Until a student is matched with an advisor, the Departmental Graduate Advisor will have the responsibility of advising the student.
9. The target date for completion of this procedure will be the beginning of Winter Quarter each year to ensure the proper advising of the students. The student/faculty selection will be made known to the faculty at the beginning of the Winter Quarter. Some students may take longer than this to select an advisor and they will remain as advisees of the Graduate Advisor until they complete the above process.

Requirements for the Masters Degree

The candidate for an MS Degree in Mechanical Engineering must fulfill all University requirements for the degree. These requirements are listed in the UCSB Catalog and include 3 quarters of residency at UCSB, coursework requirements and the successful completion of a thesis or a project in lieu of passing a comprehensive examination. These requirements must all be fulfilled in a timely manner as discussed in the Catalog. In addition, the student must fulfill the following departmental requirements for the MS Degree in Mechanical Engineering.

Two MS plans are available **Plan I** (thesis) and **Plan II** (project). After the permanent advisor has been assigned, the student should consult with them to establish a plan of study (Appendix A). If for some reason a permanent advisor has not been assigned, this study plan can be formulated in consultation with the Graduate Advisor. The study plan must be filed two quarters before the student plans to graduate (i.e., if the student plans to graduate in the Spring 2007 quarter, he/she should submit the study plan during Fall of 2006). The student should keep a copy of the study plan to consult. The student will be responsible for initiating the final degree check during the first two weeks of the quarter in which the student anticipates completing the requirements outlined on the plan (Appendix C). The final degree check is performed by the Graduate Program Assistant, using the MS Degree Check form upon notification by the student.

All courses included on the student's study plan must be taken for a letter grade (when letter grades are an option). Students must earn a B- or better in these courses. An overall GPA of 3.0 or better is required.

MS Plan I (Thesis) Students who intend to complete a thesis must formally establish a committee of three ladder faculty. At least two of members must be from the ME department. A Nomination of Thesis Committee Form (Master's Form I, Appendix B) must be completed and filed with the Graduate Division and the ME Graduate Program Advisor no later than one month prior to filling.

This plan requires the completion of 42 units, including a written thesis, which describes the results of original research conducted under the supervision of a faculty advisor. **No more than 12 of these 42 units can be undergraduate upper-division level.** The minimum requirements for Plan I are as follows.

18 units of coursework in Mechanical Engineering and related fields selected from the core courses in a specific major area from Table I. Courses used to satisfy requirements of a previous degree are not acceptable.

9 units of Science & Engineering courses:

- Courses must be at the graduate or upper-division undergraduate level (500

level courses, seminars, projects and research group studies as well as courses used to satisfy requirements for a previous degree are not acceptable). Course selection is subject to the approval of the Graduate Advisor. Once a student has selected a faculty advisor, these courses will be chosen in consultation with the faculty advisor.

3 units of Graduate Seminar

- ME 200 (1 unit/quarter for 1 year)

12 units of Thesis Research

- ME 598 (MS Thesis Research)

MS Plan II (Project) This plan requires the completion of 42 units including the completion of an MS project under the supervision of a faculty advisor. No more than 12 of these 42 units can be undergraduate upper-division level. The minimum requirements for Plan II are as follows:

18 units of coursework in Mechanical Engineering and related fields selected from the core courses in a specific major area from Table I. Courses used to satisfy requirements for a previous degree are not acceptable.

18 units of Science & Engineering courses:

- Courses must be at the graduate or upper-division undergraduate level (500 level courses, seminars, projects and research group studies as well as courses used to satisfy requirements for a previous degree are not acceptable). Course selection is subject to the approval of the Graduate Advisor. Once a student has selected a faculty advisor, these courses will be chosen in consultation with the faculty advisor.

3 units Graduate Seminar

- ME 200A (1 unit/quarter for 1 year)

3 units for Completion of MS Project

- ME 200P – Research project dealing with a topic approved by the faculty advisor. This project is subject to comprehensive examination, to be carried out by the faculty advisor.

TABLE I

CORE COURSES

COMPUTATIONAL SCIENCE AND ENGINEERING

(See information on page 26 regarding adding the CSE emphasis to your diploma.)

FACULTY IN CHARGE:

Bamieh, Banerjee, Gibou, Homsy, McMeeking, Meiburg,
Petzold, Theofanous

CORE COURSES:

NUMERICAL METHODS

ME 210A	Matrix Analysis and Computation
ME 210B	Numerical Simulation
ME 210C	Numerical Solution of PDEs-Finite Difference Methods
ME 210D	Numerical Solution of PDEs-Finite Element Methods

PARALLEL COMPUTING

CS 240A or B	Parallel Computing and Program Parallelization
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APPLIED MATHEMATICS

ME 244A,B	Advanced Theoretical Methods in Engineering
Math 214A	Ordinary Differential Equations
Math 214B	Chaotic Dynamics and Bifurcation Theory
Math 215A	Partial Differential Equations
Math 215B	Fourier Series and Numerical Methods

Credit will not be given for more than one of the above applied mathematics sequences.
Advanced courses may be substituted, with approval, as follows:

Instead of Math 214:

Math 243A,B	Ordinary Differential Equations
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Instead of Math 215:

Math 246A,B	Partial Differential Equations
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DYNAMIC SYSTEMS, CONTROL AND ROBOTICS

FACULTY IN CHARGE:

Astrom, Bamieh, Bullo, Khammash, Mezić, Moehlis,
Paden, Soh, Turner, Yang

CORE COURSES:

ME 201	Advanced Dynamics
ME 202	Advanced Dynamics
ME 215A	Applied Dynamical Systems I
ME 215B	Applied Dynamical Systems II
ME 225AQ	Introduction to Robust Control
ME 236	Nonlinear Control Systems
ME 237	Nonlinear Control Design
ME 243A	Linear Systems I
ME 243B	Linear Systems II

ENVIRONMENTAL/OCEAN ENGINEERING

FACULTY IN CHARGE:

Banerjee, Holden, Keller, McLean, Theofanous

CORE COURSES:

ME 209	Contaminant Transport and Fate
ME 212	Risk Assessment and Management
ME 218	Intro to Multiphase Flows
ME 220A,B	Fundamentals of Fluid Mechanics
ME 223	Turbulent Flow
ME 283A	Waves in Fluids
ME 285	Geophysical Fluid Dynamics
ME 286	Nearshore Processes
ESM 222	Fate & Transport of Pollutants in the Environment

SOLID MECHANICS, STRUCTURES AND MATERIALS

FACULTY IN CHARGE:

Beltz, Clarke, Evans, Kedward, Levi, Lucas, MacDonald, McMeeking, Milstein,
Odette, Soh, Turner, Yang

CORE COURSES:

ME 219	Continuum Mechanics
ME 230	Elasticity
ME 232	Plasticity
ME 233A,B	Design of Composite Structures
ME 234A	Structural Dynamics
ME 260A	Material Structures and Bonding
ME 262	Thermodynamics of Materials
ME 264	Mechanical Behavior of Materials
ME 265	Composite Materials
ME 271	Finite Element Structural Analysis
ME 273	Dislocation Mechanics
ME 275	Fracture Mechanics

THERMOFLUID SCIENCES

FACULTY IN CHARGE:

Banerjee, Bennett, Homsy, Matthys, McLean, Meiburg, Meinhart,
Moehlis, Theofanous, Yuen

CORE COURSES:

ME 218	Introduction to Multiphase Flows
ME 220A,B	Fundamentals of Fluid Mechanics
ME 221	Advanced Viscous Flow
ME 223	Turbulent Flow
ME 239	Conduction Heat Transfer
ME 240	Convective Heat Transfer
ME 241	Radiative Energy Transfer
ME 250	Advanced Thermodynamics
ME 251	Statistical Thermodynamics
ME 252 A,B,C	Computational Fluid Dynamics

MICRO/NANOSCALE SYSTEMS

FACULTY IN CHARGE:

Beltz, Clarke, MacDonald, Meinhart, Soh, Turner

CORE COURSES:

ME 253	Analytical Biotechnology
ME 291	Physics of Transducers
ME 292	Design of Transducers
ECE 220A	Semiconductor Manufacturing

Specialization Areas

(see the other core areas for course lists)

Dynamics & Control	Solids, Structures & Materials	Fluid Mechanics
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As micro/nanoscale science is an interdisciplinary area, courses may also be found in other departments (200 level and above). These should be chosen with the approval of your faculty advisor once you have identified a research area. Final approval for these courses is given by the Graduate Advisor.

Optional Graduate Degree Emphasis in Computational Science and Engineering

The Departments of Chemical Engineering, Computer Science, Electrical and Computer Engineering, Mathematics, and Mechanical Engineering offer an interdisciplinary master's and Ph.D. degree emphasis in computational science and engineering (CSE).

CSE is a rapidly growing multidisciplinary area with connections to the sciences, engineering, mathematics, and computer science. Computer models and simulations have become an important part of the research repertoire, supplementing (and in some cases replacing) experimentation. Going from application area to computational results requires domain expertise, mathematical modeling, numerical analysis, algorithm development, software implementation, program execution, analysis, validation, and visualization of results. CSE addresses these issues.

Requirements for the PhD Degree

Candidates for the PhD Degree in Mechanical Engineering must fulfill all University requirements for the degree. These requirements are listed in the UCSB Catalog and include 6 quarters of residency at UCSB, passing a doctoral screening examination, completion of original research under the supervision of a faculty committee, a successful dissertation defense, and filing the completed dissertation with the UCSB Library. These requirements must all be fulfilled in a timely manner as discussed in the Catalog.

In addition, the following departmental requirements must be satisfied for the PhD Degree in Mechanical Engineering.

1. Completion of 36 units of approved courses. A minimum GPA of 3.5 must be maintained in these courses throughout the period of study for the PhD. Students must earn a B- or better in these courses. These classes must be completed prior to the Dissertation Defense Examination. These classes can be used simultaneously to meet the requirements of a Master's Degree. A student who has completed a Master's Degree or a degree recognized by the Graduate Division as equivalent to the Master's Degree, will be credited with 27 units. Otherwise, classes used to satisfy the requirements of a previous degree are not acceptable.

The 36 units of approved courses is to consist of:

- 18 units of coursework within a single specified major area in Mechanical Engineering and related fields. These classes must be chosen from the list of core classes for each major area given in Table II.
- 9 units of approved coursework in Mechanical Engineering and related fields. Approved courses include all 200-level classes in Mechanical Engineering except seminars, projects and research group studies. In addition, the classes listed in Table III are approved courses.
- 9 units of Science, Engineering, or Mathematics courses. Courses must be at the graduate or upper-division undergraduate level in the form of lecture/discussion classes (i.e. not seminars, projects or research group studies). 500 level courses are not acceptable.

Choice of courses is subject to approval by the student's faculty advisor.

A student who enters the PhD program with a Master's Degree in Mechanical Engineering (or recognized equivalent) and who is credited with 27 of the above 36 units must take the additional 9 course units only at the 200-level, as well as 3 units of ME 200. These units must be taken after the MS is conferred. Approved courses for these 9 units include all 200 level classes in Mechanical Engineering except seminars, projects and research group studies. In addition, the classes listed in Table III are approved courses for these additional 9 units. The classes selected to fulfill the required 9 units are subject to the approval of the Graduate Advisor to ensure depth and avoid duplication in conjunction with the student's prior coursework at UCSB or elsewhere.

2. Submission of an approved PhD study plan prior to taking the PhD Oral Candidacy Examination. (Appendix D) The plan must be submitted to the Departmental Graduate Program Assistant and approved by the student's faculty advisor and the Departmental Graduate Advisor. If the original is outdated, a revised version of the study plan must be approved and submitted prior to the PhD Candidacy Examination.

3. Passing the PhD Oral Screening Examination within 6 months of entering the PhD program with a Master's Degree or within 15 months of entering the PhD program with a Bachelor's Degree or no degree. A student admitted to the MS/PhD program must pass the examination within 15 months. Normally, a student without an MS degree will have taken at least 15 units of approved course work prior to taking the PhD Oral Screening Examination.

4. Passing the PhD Candidacy Examination within 12 months after passing the PhD Oral Screening Examination.

5. The student is required to attend ME 200A, Graduate Seminar, for at least 3 quarters.

6. Publication and Presentation Student must either present research material at a national conference or submit a paper on their research to a referred journal prior to completing the dissertation. Students needs to provide the Graduate Program Assistant with a copy of the abstract of the presentation/paper, and the information needs to be noted on the PhD study plan.

7. Seminar Requirement Students must enroll in and attend ME 200A for 3 quarters after being admitted into the PhD program.

8. TA Requirement Students must TA twice after they advance to Doctoral Candidacy (for entering class of 04/05).

Departmental Degree Check

Students must initiate a final degree check at the beginning of the final quarter of study (and no later than 2 weeks prior to the Dissertation Defense). The student should submit a request for the degree check in writing via email to the Staff Graduate Advisor (Appendix E).

Exams and Defense

PhD Oral Screening Examination

Objectives

- a) To determine if the student has a basic knowledge of at least two areas of emphasis in mechanical engineering.
- b) To determine if the students possesses the mathematical skills necessary for a deep understanding of the basic knowledge in the two areas of emphasis that are tested.
- c) To assess if the students has the analytical ability and critical thinking skills required to embark on independent research in one area of emphasis

Scope

The screening process is a series of two 45-minute oral examinations covering two areas of emphasis, chosen by the student in advance from the following areas (dynamics and controls; solid mechanics, materials and structures; thermofluids/ocean engineering; micro/nanoscale physics; computational science and engineering). The material covered by the exam is at the first year graduate

level. In each area, a list of topics and suggested textbook(s) covering the basic knowledge the student is expected to know in that area will be made available to student in advance.

Timing

The exam is administered twice per year, once in the two week period around the beginning of the Fall quarter and once around the beginning of the Spring quarter. Students entering with an MS must take the exam within their first year; students entering with only a BS must take the exam no later than the first time it is offered in their second year.

Exam Committee

All students are examined by the same faculty committee comprised of ten faculty members (two per area). The two faculty members in each area are responsible for making up the questions and administering all exams for their area. The exam is scheduled on the same day for all the areas.

Format

The questions achieve the three objectives of the qualifying exam listed above. For uniformity and fairness, the same set of questions is asked of all the students examined in each area. The duration of the exam is up to 40 minutes per student.

Exam Results

Test administrators note pass or fail with comments for each student. The exam results are discussed in caucus by the 10 members of the exam committee. The Graduate Advisor reports the results to all the students taking the exam via email within 24 hours. In case a student failed one of both areas of the exam, he/she must retake the exam the next time the exam is administered (in the area(s) failed). The exam may only be taken twice.

Doctoral Committee and Candidacy Examination

Once the Oral Screening Examination is passed, the student must select a Doctoral Committee, comprised of four members. Three members must have *majority* appointments in the ME Department, and one member must be from outside the department with *at most* a minority appointment in ME. The dissertation advisor (i.e. student's faculty advisor) will serve as Chair of the Doctoral Committee. To officially set up the Doctoral Committee, the student should see the Graduate Program Assistant. **PhD Form I** needs to be completed (Appendix F).

Within 12 months after passing the Oral Screening Examination, the student must take the PhD Candidacy Examination. In consultation with the faculty advisor, the student prepares a written proposal for a research program, which is to be given to the Doctoral Committee at least one week prior to the examination. The student must inform the Staff Graduate Program Advisor 3 weeks prior to the PhD Candidacy Examination of the time/date/place of the exam. **PhD Form II** needs to be completed (Appendix G). The PhD Candidacy Examination consists of an oral presentation of the proposal before the Dissertation Committee. UCSB Graduate Division requires that all committee members be present for the exam. The dissertation proposal session will be open to all faculty

members. Upon approval of the research project by the Doctoral Committee, the student will be allowed to advance to candidacy.

Dissertation and Defense

Following advancement to candidacy, the student completes the proposed research. Upon completion of the research, the student summarizes the work in a written dissertation, submits the dissertation to the Doctoral Committee, and defends the dissertation orally. Acceptable formats for the dissertations are outlined in a booklet published by the Library.

The Dissertation Defense Examination will consist of a seminar (open to all members of the academic community) followed by a closed session with the examining Doctoral Committee. A public announcement by posted notice of the seminar must be made at least one week in advance. The Graduate Program Assistant must be informed of the time/date/place of the exam, and **PhD Form III** needs to be completed (Appendix H). The student must provide a complete draft of the dissertation to the Doctoral Committee at least three weeks in advance of the Dissertation Defense Examination.

Following the defense, the student must have two originals of his/her final dissertation signed by their committee. The two originals, plus one of the title page and abstract, will be filed with Graduate Division, which issues an acceptance sheet. *The student must also submit a copy of the abstract and title page to the Graduate Program Assistant.*

Normative Time

Normative time is the number of twelve-month years considered to be a reasonable time for completion of a particular PhD program by a full-time student who matriculates with no deficiencies. The number of years of normative time for the PhD in the Department of Mechanical Engineering is five years. This time is measured from the time the student begins study at any level, and therefore includes the years spent in the MS program at UCSB.

The institution-wide degree deadline for PhD students is seven years from entering the UCSB graduate program. Students who exceed this time should check with the Graduate Advisor to determine what paperwork, if any, must be filed with the Graduate Division.

Probation

PhD students are required to maintain a minimum grade point average of 3.5 in all upper division and graduate courses. In addition, students are required to make continual progress towards the degree. Probation is intended to provide students whose performance is less than satisfactory, a period of time in which to make up deficiencies. After one quarter of probation, if the student's record is still below minimum, the department may recommend dismissal. This decision is not merely based on GPA but on the opinion of the student's faculty advisor or faculty member with personal knowledge of the student, who ascertains that the student is doing failing work.

Doctoral Candidate Fee Offset Program (DOCFO)

Students in the DOCFO program begin receiving educational fee payments for the quarter after they advance to candidacy until they reach the normative time. Once past the normative time, DOCFO stops and the student will once again pay full fees. Three quarters leave of absence are permitted in which no time shall accrue toward the normative time. More leaves or lapsed status will not stop the normative time clock; the deadline stands. DOCFO students may use the filing fee and thus are not required to remain registered until they finish.

Candidates whose education fee is paid by any sponsoring agency or government are not eligible for the DOCFO program. Careful timing of a student's advancement will aid the student in maximizing eligibility for the Doctoral Fee Offset. Students have until the last weekday before a quarter officially begins as indicated in the Registrar's Schedule of Classes to advance in a previous quarter and be eligible for DOCFO the subsequent quarter. Once a quarter has begun, the student is responsible for the full quarter's fees, so it is better to advance to candidacy late in a quarter or during a between-quarters break, rather than early in a quarter.

Table II

Core Courses

Each student must take 18 units of key courses from a single specified major area as listed below.

COMPUTATIONAL SCIENCE AND ENGINEERING

(See information on page 26 regarding adding the CSE emphasis to your diploma.)

FACULTY IN CHARGE:

Bamieh, Banerjee, Gibou, Homsy, McMeeking, Meiburg, Petzold, Theofanous

CORE COURSES:

NUMERICAL METHODS

ME 210A	Matrix Analysis and Computation
ME 210B	Numerical Simulation
ME 210C	Numerical Solution of PDE's-Finite Difference Methods
ME 210D	Numerical Solution of PDE's-Finite Element Methods

PARALLEL COMPUTING

CS 240A or B	Parallel Computing and Program Parallelization
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APPLIED MATHEMATICS

ME 244A,B	Advanced Theoretical Methods in Engineering
Math 214A	Ordinary Differential Equations
Math 214B	Chaotic Dynamics and Bifurcation Theory
Math 215A	Partial Differential Equations
Math 215B	Fourier Series and Numerical Methods

Credit will not be given for more than one of the above applied math sequences. Advanced courses may be substituted, with approval, as follows:

Instead of Math 214:

Math 243A,B,C	Ordinary Differential Equations
---------------	---------------------------------

Instead of Math 215:

Math 246A,B,C	Partial Differential Equations
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DYNAMIC SYSTEMS, CONTROL AND ROBOTICS

FACULTY IN CHARGE:

Astrom, Bamieh, Bullo, Khammash, MacDonald, Mezić, Moehlis, Paden,
Soh, Turner, Yang

CORE COURSES:

ME 201	Advanced Dynamics
ME 202	Advanced Dynamics
ME 215A & B	Applied Dynamical Systems I & II
ME 225AQ	Introduction to Robust Control
ME 236	Nonlinear Control Systems
ME 237	Nonlinear Control Design
ME 243A	Linear Systems I
ME 243B	Linear Systems II

ENVIRONMENTAL/OCEAN ENGINEERING

FACULTY IN CHARGE:

Banerjee, Holden, Keller, McLean, Theofanous

CORE COURSES:

ME 208	Sediment Transport
ME 209	Contaminant Transport and Fate
ME 212	Risk Assessment and Management
ME 220A,B	Fundamentals of Fluid Mechanics
ME 223	Turbulent Flow
ME 283A	Waves in Fluids
ME 285	Geophysical Fluid Dynamics
ME 286	Nearshore Processes

SOLID MECHANICS, STRUCTURES AND MATERIALS

FACULTY IN CHARGE:

Beltz, Clarke, Evans, Kedward, Levi, Lucas, MacDonald, McMeeking, Milstein,
Odette, Soh, Turner, Yang

CORE COURSES:

ME 219	Mechanics of Materials
ME 230	Elasticity
ME 232	Plasticity
ME 233A,B	Design of Composite Structures
ME 234A	Structural Dynamics
ME 260A	Material Structures and Bonding
ME 262	Thermodynamics of Materials
ME 264	Mechanical Behavior of Materials
ME 265	Composite Materials
ME 271	Finite Element Structural Analysis
ME 273	Dislocation Mechanics
ME 275	Fracture Mechanics

THERMOFLUID SCIENCES

FACULTY IN CHARGE:

Banerjee, Bennett, Homsy, Matthys, McLean, Meiburg, Meinhart,
Moehlis, Theofanous, Yuen

CORE COURSES:

ME 218	Introduction to Multiphase Flows
ME 220A,B	Fundamentals of Fluid Mechanics
ME 221	Advanced Viscous Flow
ME 223	Turbulent Flow
ME 239	Conduction Heat Transfer
ME 240	Convective Heat Transfer
ME 241	Radiative Energy Transfer
ME 250	Advanced Thermodynamics
ME 251	Statistical Thermodynamics
ME 252 A,B,C	Computational Fluid Dynamics

MICRO/NANOSCALE SYSTEMS

FACULTY IN CHARGE:

Beltz, Clarke, MacDonald, Meinhart, Soh, Turner

CORE COURSES:

ME 291	Physics of Transducers
ME 292	Design of Transducers
ECE 220A	Semiconductor Manufacturing

Specialization Areas (see the other areas for course lists)

Dynamics & Control	Solids, Structures & Materials	Fluid Mechanics
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As micro/nanoscale science is an interdisciplinary area, courses may also be found in other departments. These should be chosen with the approval of your faculty advisor once you have identified a research area.

Table III

Approved Courses

The approved courses for the PhD are all ME 200 level courses (except seminars, projects and research group studies) plus those listed below. The entire list in Table I is approved courses. Classes are listed below by area for convenience.

COMPUTATIONAL SCIENCE AND ENGINEERING

FACULTY IN CHARGE:

Bamieh, Banerjee, Gibou, Homsy, McMeeking, Meiburg,
Petzold, Theofanous

APPROVED COURSES:

MATRL 228	Computational Materials
CHE 213	Computational Methods in Materials Science
CHE 220A,B	Advanced Transport Processes-Laminar Flow & Convection
CHE 220C	Advanced Transport Processes-Mass Transfer
CHE 220D	Advanced Transport Processes-Turbulence Theory
Math 243A,B,C	Ordinary Differential Equations
Math 244A,B,C	Computational Fluid Dynamics
Math 246A,B,C	Partial Differential Equations
ECE 271A	Principles of Optimization
ECE 271B	Numerical Optimization Methods
ECE 271C	Dynamic Optimization
ME 252A,B,C	Computational Fluid Dynamics

DYNAMIC SYSTEMS, CONTROL AND ROBOTICS

FACULTY IN CHARGE:

Astrom, Bamieh, Bullo, Khammash, MacDonald, Mezić, Moehlis, Paden,
Soh, Turner

APPROVED COURSES:

ME 125M	Computer Aided Kinematics & Dynamics of Mechanisms
ME 170A,B,C	Introduction to Robotics
Math 118A,B,C	Introduction to Real Analysis
Math 122A,B	Introduction to Theory of Complex Variables
Math 147A,B	Metric Differential Geometry
Math 201A,B,C	Real Analysis
Math 202A,B,C	Complex Analysis

ENVIRONMENTAL/OCEAN ENGINEERING

FACULTY IN CHARGE:

Banerjee, Holden, Keller, McLean, Theofanous

APPROVED COURSES:

ME 112	Energy Conversion
ME 113	Desalination
ME 114	Water Supply and Pollution Control
ME 115	Introduction to Air Pollution Principles
ME 119	Introduction to Coastal Engineering
ME 124	Advanced Topics in Transport Phenomena/Safety
ME 126	Introduction to Environmental Science and Engineering
Chem 101	Problems in Environmental Chemistry
Chem 123	Fundamentals of Environmental Chemistry
EEMB 145A,B	Environmental Processes in Oceans and Lakes
EEMB 125/225	Dynamics of Ecological Systems
EEMB 243	Biological Oceanography
ChemE 121	Colloids and Biosurfaces
ESM 219	Environmental Microbiology

SOLID MECHANICS, STRUCTURES AND MATERIALS

FACULTY IN CHARGE:

Beltz, Clarke, Evans, Kedward, Levi, Lucas, MacDonald, McMeeking,
Milstein, Odette, Turner, Soh, Yang

APPROVED COURSES:

ME 162	Introduction to Elasticity
ME 167	Structural Analysis
ME 168	Applied Finite Element Analysis
ME 185	Materials in Engineering
ME 186	Manufacturing and Materials
Math 122 A,B	Introduction to Theory of Complex Variables
Math 202 A,B,C	Complex Analysis
MATRL 228	Computational Materials
CHE 230 A,B,C	Advanced Theoretical Methods in Engineering
MATRL 220	Mechanical Behavior of Materials
MATRL 221	Introduction to Structural Materials
MATRL 237	Advanced Deformation and Fracture
MATRL 251 A	Processing of Inorganic Mtrls.
MATRL 251B	Densification & Microstructural Control
MATRL 261	Composite Materials
MATRL 262	Structural Ceramics
MATRL 271A	Synthesis and Properties of Macromolecules
MATRL 271B	Structure and Characterization of Complex Fluids
MATRL 271C	Properties of Macromolecules

THERMOFLUID SCIENCES

FACULTY IN CHARGE:

Banerjee, Bennett, Homsy, Matthys, McLean, Meiburg, Meinhart,
Moehlis, Theofanous, Yuen

APPROVED COURSES:

CH E 160	Introduction to Polymer Science
CH E 220A,B,C	Advanced Transport Processes
CH E 222A,B	Colloid and Interfaces I, II
CH E 230D	Numerical Methods in Chemical Engineering
CH E 238A,B	Rheology of Polymeric Fluids
CH E 239	Light Scattering in Complex Fluids
ECE 235	Stochastic Processes in Engineering
MATRL 280	Structure and Characterization of Complex Fluids
Phys 141	Optics
Phys 144	Physics of Complex Fluids

MICRO/NANOSCALE SYSTEMS

FACULTY IN CHARGE:

Beltz, Clarke, MacDonald, Meinhart, Soh, Turner

KEY COURSES:

ME 291	Physics of Transducers
ME 292	Design of Transducers
ECE 220A	Semiconductor Manufacturing

Specialization Areas (see other areas for course lists)

Dynamics & Control	Solids, Structures & Materials	Fluid Mechanics
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As micro/nanoscale science is an interdisciplinary area, courses may also be found in other departments. These should be chosen with the approval of your faculty advisor once you have identified a research area.

Finishing

Degree Checks

Master's Degree The Graduate Division initiates degree checks for Master's Degree students when the student turns in a thesis or when the department notifies them that a student has completed the MS project.

Ph.D. Degree The Graduate Division initiates degree checks for Ph.D. students when the student turns in a dissertation and/or when the department notifies them on a **PhD Form III** that a student has either defended the dissertation or has had the defense waived, using the **PhD Form III-A**.

Incompletes

Except for "thesis preparation" or "dissertation preparation" units, which are obviously completed when the document is accepted, *no Incomplete (I) grade may appear on the transcript of a graduate degree award.* Lifting incompletes in future quarters sometimes causes problems with fees, and will not automatically trigger a second degree check. Students with incompletes must persist until they are sure the degree is awarded since, at present, there is no fail-safe mechanism to initiate another degree check.

Fee Status

A student must be in a fee relationship (i.e. either registered or paying the filing fee) with the university the quarter he/she finishes all degree requirements. Fees paid for one quarter cover activities undertaken until the next quarter begins. Spring fees cover summer up until Fall quarter begins.

The filing fee is for the use of a student who is completing one final requirement for a degree. Students who are registered during the quarter they complete requirements for the degree need not pay the filing fee. Paying the filing fee terminates graduate status. Therefore, it may be used only by PhD students and terminal Master's students. Master's students use it if all their coursework is complete but they still need to file a thesis. PhD students use the filing fee to file and defend dissertations. PhD candidates in the Doctoral Candidate Fee Offset Program (DOCFO) may also use the filing fee.

The filing fee is always half the amount of the registration fee. Do not pay it unless you are certain you will finish in the current quarter (we generally ask you to pay it when you're on the way to the Library, thesis or dissertation in hand) because the filing fee terminates graduate status. Students may not carry forward a filing fee from one quarter to the next. If a student pays the filing fee but does not finish, he/she will lapse student status. Reinstatement may then be required, along with re-advancement, at the committee's discretion. No leaves will be granted following lapses or after "filing fee leaves" in which the thesis or dissertation is not filed.

Degree Dates

Degrees are granted four times a year, the last day of each quarter including summer session. The student must have finished all requirements by the final Friday of the quarter in order to get a degree dated that quarter. A dissertation filed between quarters (in late August or during the Winter break, for example) will not cost the student additional fees if he/she was enrolled the previous quarter. However, the degree will be dated as of the *end of the next quarter*.

Graduation Ceremony

The Graduate Division's graduation ceremony is one of seven coordinated by representatives of the colleges and the Chancellor's Office. Students are eligible to participate in the June ceremony even if they have not yet completed all of the requirements for the degree, provided that both they and their departments really expect them to complete all requirements within the near future. All graduate students who want to participate in the Graduate Division commencement ceremony must complete a Graduate Division Commencement Form at <http://www.graddiv.ucsb.edu/commence/>.

Master's candidates simply show up with cap and gown in hand, and write their name on a card to hand to the announcer. PhD students are traditionally presented by their mentors/advisors. Their participation in commencement is logistically more complicated than Master's candidates because we have to organize faculty for them, as well as produce a printed program with dissertation titles.

Diplomas and Transcripts

After the Graduate Division finishes a degree check, it notifies the Registrar who posts the degree to the transcript and orders diplomas. Degree checks and posting take 6-8 weeks from the end of the quarter. Students wishing to order transcripts which show the degree awarded should mark their order form "holding for posting of degree".

As part of the degree check process, Graduate Division notifies the student of the degree award and sends an order form by which the student can inform the Registrar where to send the diploma when it arrives. Students who are staying in the Santa Barbara area may pick up their diplomas in person from the Registrar's Office.

Petitions

Leaves of Absence Students drop out of school for all kinds of reasons and for varying lengths of time. Those who seek and receive approved leaves of absence are guaranteed that their departments will take them back when they are ready to return. Those who simply drop out and decide to return will have to reapply and be evaluated with the new applicants.

A specific timetable stating when the various stages of work will be completed must be submitted to Graduate Division with a request for leave. A form for this purpose is available in the Graduate Division and on-line at <http://www.graddiv.ucsb.edu/pubs/>. Leaves of Absence may only be granted under extraordinary circumstances and must be approved by the Graduate Advisor prior to petitioning Graduate Division.

In general, foreign students should not take leave until they have either advanced to candidacy for the PhD or completed their coursework and need to work on a Master's thesis. For visa purposes, they are not supposed to take leaves for personal or financial reasons if they are staying in the U.S., although those reasons are acceptable if they exit the U.S. for the duration of the leave. Foreign students who do not register jeopardize their visas if they fail to get an approved leave of absence. **Note:** Students admitted after winter quarter 1990 must be continuously enrolled.

Graduate advisors and students alike should think carefully about the timing of leave requests. A "student" is one who pays fees and registers. Persons on leave are not, technically speaking, students. Student loans, visas, university housing, access to career and counseling services, student health, financial aid, etc. are either unavailable or available only on fee-for-service bases to unregistered persons.

To return from a leave of absence, the student notifies the Graduate Division in writing of his/her intent to return approximately 4 weeks before the beginning of the quarter in which he/she wishes to register. This action triggers the preparation of registration and billing materials. To register, students returning from leave follow instructions for "new and returning" students in the Schedule of Classes.

Reinstatement from Lapsed Status Students who fail to pay fees and/or register by the third week of the quarter lose student status. They may petition for reinstatement if their lapse was for three quarters or less. For lapses of longer than three quarters, students must reapply for admission. Reapplication is not a guarantee of readmission. Graduate advisors evaluate a reinstatement petition with the same care they give new applications. Petitions for reinstatement are available in the Graduate Division and on-line at <http://www.graddiv.ucsb.edu/pubs/>.

Withdrawal Leaving the university after the quarter begins constitutes "withdrawal". Students must file a withdrawal petition with the Registrar; otherwise all the classes in which they are registered will be recorded as "F" grades. In emergencies when students cannot process petitions for themselves, the Office of Student Life will handle withdrawals. Early in the quarter, speed is important to assure maximum refund of fees.

If students intend to return to UCSB in subsequent quarters, they may need to file a leave of absence petition to make returning easier. Contact Academic Affairs, extension 2559, in the Graduate Division to discuss timing and strategies.

Drop/Add and Change of Grading Option - \$3.00 Adjustments to a student's schedule are made on GOLD or by petition, which originate in the Registrar's Office. During approximately the first week of classes, schedule adjustments are made without charge. After that time, the fee applies.

Graduate students may petition to change grading options or to drop classes until the last day of classes. Classes may be added until the 15th day of instruction. From those deadlines until grades are posted, students may still petition but must seek the Dean of Graduate Division's approval in addition to the usual approvals. Once grades are posted, retroactive changes to the permanent record require Graduate Division approval.

Incompletes Students must file a petition in the Registrar's Office prior to the last day of the quarter to receive an incomplete grade. If this petition is not on file and an instructor submits an "I" grade, the Registrar's computer will enter the grade as "F". Automatic F's are permanent scars on the student's record and should be avoided when possible. Submitting no grade at all will result in a blank space on the transcript, but not an "I" or an "F".

Incompletes convert to F's at the end of the quarter following the original class unless the instructor submits a grade to the Registrar. An instructor may extend the "I" for additional quarters by requesting the extension in writing directly to the Registrar's Office.

Advance degrees are not awarded to students carrying incompletes. When a student lifts an incomplete while on leave or during summer, without registering again, the Graduate Division is unaware that they should initiate another degree check. Students who are through with coursework but carrying incompletes, must inform Graduate Division when they wish another degree check to be done.

Second Master's Degree Students wishing to earn a second Master's Degree must petition the Graduate Division. In addition to the standard student petition, a second Master's Degree requires completion of a separate form comparing and contrasting the study plans of the first and second Master's Degrees. The Graduate Division must be convinced there is no significant overlap between the two degrees before it will approve a second Master's petition.

Extension Credit Only Extension courses approved in advance from both the academic department and Graduate Division for transfer of credit, and taken while a student is in graduate standing, will be accepted for graduate credit. The student must petition before enrollment for approval and then petition again for transfer of credit when the class is completed. The second petition must be accompanied by an Extension transcript showing the grade earned. The second petition will be processed without additional fees.

Transfer of Credit Upper division and graduate courses may be transferred to UCSB if the student was in a graduate program when the courses were completed. With approval from the major department and the Graduate Division, up to 8 quarter units of

credits for courses completed with a grade of B or better may be transferred from an accredited college other than another branch of the University of California. Up to 12 quarter units may be transferred from another UC campus. Such transferred units will be treated as Pass/Not Pass, upper division units, and will not be computed into the UCSB grade point average. Units counted for a degree awarded by another institution are not transferable.

No credit will be allowed for any course taken as an undergraduate or as a graduate in non-degree status, nor will credit toward an advanced degree be given for courses completed in a teaching credential or translator-interpreter program before the student was admitted to a degree program.

After students have been in residence at UCSB for at least one quarter, they may petition to transfer credit under the limitations described above. Before approving a transfer of credit, the Graduate Advisor should be satisfied that the courses being transferred, particularly if they are substitutions for required or core courses, are in fact equivalent to the department's own offerings. Petitions are available in departments and in the Graduate Division.

Inter-Campus Exchange Program for Graduate Students (IEPGS)

Occasionally UCSB graduate students wish to study temporarily on another UC campus. If a student desires to take a course not offered at UCSB, wishes to study under the guidance of a specialist in residence at another UC campus, or needs to have continuing access to library holdings or facilities not available at UCSB, he/she may apply to the Inter Campus Exchange Program. Approvals are required from the Department Chairs and the Graduate Deans on both campuses. Applications are available in the Graduate Division.

Separate applications are required for each quarter and must be filed with the Graduate Division at least four weeks before the beginning of the quarter in which the student wishes to make the exchange.

The student pays the fees at UCSB and files registration materials at both campuses. This procedure maintains academic residence at UCSB even though the student is not physically present. Classes taken on the other campus appear on the UCSB transcript and are figured into the UCSB grade point average. Ordinarily, the Graduate Division will not process an Inter Campus Exchange petition until the student has completed at least one year satisfactorily on this campus.