



California State University, Los Angeles

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ELECTRICAL ENGINEERING
GRADUATE
STUDENT HANDBOOK

FOURTH EDITION

DEPARTMENT OF ELECTRICAL
AND COMPUTER
ENGINEERING

CALIFORNIA STATE UNIVERSITY
LOS ANGELES
July, 2006

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GRADUATE
STUDENT HANDBOOK
FOURTH EDITION
Summer 2006

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FOURTH EDITION
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Prepared by the faculty of the Department of Electrical and Computer Engineering at California State University, Los Angeles.

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Although every attempt has been made to keep this handbook up to date and accurate, it is an advising tool and not an official University policy statement. Therefore, in cases where there are contradictions, the Official University rules take precedence over statements in this handbook.

Department of Electrical and Computer Engineering
July, 2006

I. INTRODUCTION

Welcome to the Department of Electrical and Computer Engineering at Cal State LA. The faculty of the department is pleased to provide you with this information manual. You are expected to read this entire manual. Failure to become aware of the information presented may well **delay your graduation!** If you have any questions, make sure to ask an adviser.

If you have not already done so, you should purchase a University catalog (the latest edition is the 2005-2007) and a schedule of classes for the current quarter. Keep the catalog throughout your stay at Cal State LA, but purchase a new schedule each quarter. The schedule contains much more than the listing of classes being offered during the quarter. It also contains important rules and regulations. Both of these documents can be purchased at the University Bookstore.

The schedule goes to press long before the quarter begins, and changes occur while it is being printed. The most up to date version of the Electrical Engineering class schedule is posted on a bulletin board next to the department office (A342). You should check this schedule regularly to note any changes in classes offered or assigned instructors.

Instruction in Electrical Engineering is offered year round on a quarter system. Each of the four quarters that comprise the academic year (Fall, Winter, Spring and Summer) is 11 weeks in duration - 10 weeks for instruction and one week for final exams. You may accelerate your program by attending all four quarters, although to maintain continuing student status, you need only attend two quarters within any 12-month period.

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You will need a minimum of 45-quarter units to obtain the degree. The 45 units are divided into **Area of Specialization**, Electives in Engineering, and Electives in related fields as follows:

- **Minimum of 24 units in Area of Specialization (500-level courses)**
- **400-level courses in Electrical Engineering, including the prerequisites to the specialization**
- **4 units outside of Electrical Engineering, typically a 400-level Math course**

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Feel free to talk with any faculty adviser about any problem you may have. As you become more involved with the Department, you will benefit more.

The advisers are available to answer questions as they arise. You are strongly encouraged to see an adviser prior to each registration. Additionally, you must see an adviser your first quarter of attendance. This is an orientation session where the adviser makes sure that you understand all the rules. At the same time, a graduate program is filed. When the Adviser, Department Chair and Graduate Dean approve this program, it becomes like a contract. You may not take any courses to count toward the degree until a program is filed.

The Department of Electrical and Computer Engineering is here for you! Use it to your advantage.

II. TERMINOLOGY - YOUR STATUS

Post-baccalaureate students fit into one of three categories: Unclassified postbaccalaureate, Conditionally classified, and Classified. The distinctions have always been **important**, but have recently become **critical** as the State of California has tightened up on whom they are willing to financially support in school. The State will only support those seeking an initial Masters degree, and will not support people simply seeking continuing education. It is therefore critical that you “get on the right track” as quickly as possible. Hopefully, the following will clarify the situation.

When you first are admitted to the University, you are an unclassified postbaccalaureate student. You are “post-bac” since you already have a BS degree, and you are unclassified since classification is a formal process described below. The unclassified postbaccalaureate status should be a very temporary status lasting as little as 24 hours. It means that although you have been admitted, you don’t yet have a home in a department. You are a floater, and the state of California will charge you extra tuition since you are not yet formally on a degree track.

When you see an adviser in the department and file a tentative graduate program, you become conditionally classified. This removes you from the higher tuition category. If conditions are specified, they fall into one or more of two categories: (a) “qualifying courses” (b) prerequisite courses.

(a) If your grade point average in the last 90 units in the major in your BS degree is less than 2.75, you must first prove yourself capable of graduate study. The department will assign qualifying courses, (300 or 400-level) as a test, and you must achieve at least a B average in these courses to be eligible for admission. These are known as qualifying courses, and you **MUST** take them before starting on the program. That is, these courses must be the first courses you take at our school. If scheduling problems make it difficult for you to take these in a timely manner, you should see an adviser to discuss changes in the list. If you complete these courses with less than a 3.0 average, you are permanently disqualified from becoming a graduate student in Electrical Engineering at Cal State LA. If you complete the courses with a 3.0 GPA or higher, you have met this condition for classification.

(b) If your BS degree is not equivalent to that offered by Cal State LA, we may require you to complete certain prerequisite courses before being admitted to our program. These will normally be 300-level courses, though the list might contain a limited number of 200 or 400-level courses. Under certain circumstances, you may start on the graduate program prior to finishing the entire list of prerequisite courses. You should discuss this with an adviser. Your grade point average on the prerequisite courses should be over 3.0, but in any case, it must be at least as good as your undergraduate grade point average. For example, if you are admitted with over a 2.75 in the upper division major, you are exempt from taking qualifying courses as described above. However, since the prerequisites are considered part of the BS degree requirement, poor performance on the prerequisite courses could lead to a re-evaluation, and we may have to ask you to take qualifying courses.

Once you have successfully completed all specified conditions (qualifying courses and prerequisite courses), you are ready to become a classified graduate student. The department will normally process this automatically and ask you to come in to sign the necessary papers. However, if you think you are ready for classification and you have not heard from us, please inquire at the department office. Classification is a requirement to register for 500-level courses.

Once you are classified, it is time to think about the final category - Advancement to Candidacy. Upon completion of at least 16 units of your graduate program with the grade point average of at least 3.0, you are eligible to apply for advancement to candidacy for the degree MSEE. Advancement to candidacy is a requirement to apply to thesis or comprehensive exam, and also to apply for graduation. It is a very simple process.

III HOW TO SEE AN ADVISER

In an attempt to better serve our undergraduate and graduate EE majors, and to shorten the time between your discovering a problem and getting advice on the solution, the department has set up an "OPEN ADVISING" system. There are many hours during the week (usually over 16) during which you can see a faculty adviser without any appointment. Signs are posted early each quarter listing the open advising hours. Any of the faculty advisers should be able to help you with your problems or with any necessary forms. They can obtain your records while you wait. Of course, with this open advising system, there may be peak times when a large number of students are seeking advising. If you see a crowd at the faculty member's door, we suggest you return at the next available time. We try to continuously adapt the hours to the needs of the students (e.g. during registration periods, the number of open hours increases), but we hope you understand that, as in any Engineering problem, trade-offs are involved. Since no appointments are required, there is little control to assure against overload situations.

IV. HOW TO REGISTER

If this is your first registration, you must first see an adviser. Following advising, you obtain the department approval to register. Provided you are not trying to take any restricted courses (see description below), you are ready to pay your fees and register. Follow the schedule sent to you with the registration material. **New students are strongly encouraged to attend the University orientation session for new students.** At that session, you will receive valuable information about the university and registration. The information you receive at the University orientation session supplements that given by our faculty advisers. You will also perform your first registration as part of the orientation.

Continuing student registration is very simple. You register from any "push-button" telephone following instructions in the schedule of classes, or use your GET account to register online. You get immediate verification of your schedule since the computer is adding you to classes immediately upon your request. You must pay fees prior to registration. See the schedule of classes for details.

In an effort to simplify the registration procedure, the Electrical Engineering department has "unrestricted" most of our classes. This means you can register for them without any specific course approvals. If we had required approvals telephone registrations would not be possible until such approvals were entered into the computer. The way to know whether a class is restricted or not is to look in the schedule of classes. The restricted classes are the independent research, thesis, and comprehensive exam. As described later in this manual, you must file the necessary forms, obtain an adviser, and secure the necessary signatures before the computer registration system will accept your request to register in these classes.

Adding classes is done by telephone or online GET system. During the first week, if there is room in the class and you meet the requirements you can add without any approvals.

(CAUTION): You must attend the first class meeting or the instructor can drop you from the class). If the class is full, or during the second week of classes you must obtain the instructor's permission to ADD. Once this permission is granted, the department clerical staff enters a code in the computer, which then permits you to add by phone or Internet. These permissions expire in three days, so do not delay adding.

Maximum Study Load: The University has begun enforcing maximum study loads. As this handbook goes to press, the proposed maximum is 18 units, with very limited exceptions allowed for specific reasons (e.g. graduation would be delayed). If you wish to take more than the maximum, ask your adviser about the current restrictions.

V. POLICY ON DROPPING CLASSES

Early in the quarter, students may withdraw from any course with no record of the individual course withdrawal on their permanent academic record. After the “**no-record drop**” deadline, students may withdraw with a W grade from any course but only for serious and compelling reasons. These requests are granted only with the approval of the instructor and the department or division chair on program change forms available at Administration 146. Complete information about withdrawals, as well as a sample program change form and withdrawal deadlines for each academic quarter, appears in the Schedule of Classes.

VI. THE GRADUATE PROGRAM

This section describes the actual graduate program of courses. In addition to courses on the graduate program, you may have to take prerequisite and/or qualifying courses. Under certain circumstances, the graduate program may contain one or more 400-level courses from the qualifying list (i.e. these can count in both categories). The program may not contain any of the courses from the prerequisite list.

Up to 13 quarter units may be used from work prior to admission to our program. These can be transfer courses from a recognized university, or they may be courses taken at Cal State LA after award of the BS degree. No courses taken prior to the award of the BS degree may be used on the MS program (with the one exception of courses fitting the catalog description, “graduate credit for undergraduate students”. This is limited category that requires pre-approval, and must occur during the very last quarter as an undergraduate).

CAUTION: The Admissions Office sends out tentative letters of acceptance to those in the process of completing their BS degrees. For example, if you are completing your BS degree at Cal State LA in June and apply for MS status in Fall, the acceptance comes before final verification of your graduation. If it turns out that you do not receive the BS on schedule (e.g. you do not complete one requirement), your MS admission is canceled and any courses you have taken cannot count toward the MS. This is very important! Even though you receive a nice congratulation letter on your admission, and the computer lists you as a graduate student, if a problem develops with your BS you may be taking courses that will not count on the MS. If you have questions, see an adviser.

Before you begin your first quarter as a graduate student, you make up a program in consultation with an adviser. Up to 13 units can be transfer courses, either taken before CSUL Admission as described above, or taken at another university after admission. The maximum total of 13 units

applies to the sum of all transfer courses. Any courses taken in continuing education status at Cal State LA are considered transfer courses and are included in the 13 unit limitation.

Area of Specialization: You must take at least 24 units of 500-level courses in your area (s) of specialization. If you choose to do a thesis, the research and thesis units count as part of this requirement. The distribution of courses in the area of specialization depends on whether you choose a thesis or comprehensive exam (See Section IX of this handbook). If you choose a comprehensive exam, you will need at least two areas of specialization, while those choosing a thesis may have only one. The currently available areas are:

**COMMUNICATIONS
COMPUTER ENGINEERING
CONTROL SYSTEMS
POWER SYSTEMS
SOLID STATE ELECTRONICS**

The listing of courses in each area is available from your adviser. The list is being expanded as this handbook goes to press.

Electives in Electrical Engineering: The electives consist of 400-level courses in electrical Engineering. They will normally be those courses related to the 500-level courses selected in the specialization.

Electives in Related Fields: One course is required outside of Electrical engineering, and this normally math courses. **MATH 402A** must be this course if it was not taken as an undergraduate. Other typical courses are **MATH 402B** and **MATH 474**. In certain special cases, the list might include Physics or Computer Science courses.

VII. PREREQUISITES

All of the prerequisites can be found by referring to the current University catalog, or to updated supplements issued by the department. As courses evolve, prerequisites can sometimes change. You are responsible for having the prerequisites currently in effect for the courses you are taking. This may not seem fair since it may require altering your projected program from time to time. However, the alternatives are for us to never change course content, or for you to enter a class without the proper preparation. Neither alternative is acceptable. We endeavor to make prerequisite changes only when absolutely necessary.

<u>COURSE</u>	<u>PREREQUISITE</u>
EE412	EE437
EE420	EE320
EE421	EE320
EE422	EE320
EE424	EE320
EE426	EE320
EE427	CS242, EE334, EE422

EE428	EE290, EE332
EE432	EE304
EE433	EE432
EE434	EE304
EE436	EE371
EE437	EE332
EE439	EE336, EE372
EE440	EE320, CS242
EE442	EE290, EE440
EE443	EE448
EE445	EE345
EE447	CS342, EE347
EE448	EE346
EE449	EE347 (MAY BE TAKEN CONCURRENTLY)
EE460	EE360
EE461	EE360
EE462	EE360
EE465	EE360
EE468	EE360 (MAY BE TAKEN CONCURRENTLY)
EE472	EE336
EE483	EE336
EE520	EE420, MATH402A
EE521	EE520
EE522	EE520
EE523	EE520, *EE521(may be taken Concurrently)
EE524	EE520, *EE521(may be taken Concurrently)
EE525	EE520, *EE521 (may be taken Concurrently)
EE530	MATH402A
EE533	EE332, 433
EE534	EE360, EE533
EE537	EE433
EE544	EE440
EE547A	EE449
EE547B	EE547A
EE548	EE447 and EE547A
EE561	EE334, EE360
EE562	EE461, EE462
EE563	EE462
EE566	EE465
EE571	EE436, EE371
EE573	EE483
EE575	EE439, EE371

QUARTER SCHEDULE FOR CLASSES

(Our "Best Guess" for courses by quarter, the actual offering may vary)

<u>FALL</u>	<u>WINTER</u>	<u>SPRING</u>	<u>SUMMER</u>
EE420	EE412	EE420	EE412
EE421	EE424	EE421	EE422
EE422	EE426	EE422	EE439
*EE428	EE427	*EE428	*EE443

EE432	EE432	EE433	*EE448
EE436	EE433	EE436	EE523
EE440	EE434	EE440	EE547B
EE442	EE439	EE442	EE563
*EE448	*EE443	*EE448	
EE449	*EE448	EE449	
EE462	EE461	EE460	
*EE468	EE521	*EE468	
EE483	EE530	EE522	
EE520	EE547A	EE537	
EE533		EE548	
EE544		EE562	
EE561			

*Laboratory courses (1 unit)

VIII. WRITING REQUIREMENT

Unless you are exempt (see next paragraph) you must take the upper division writing proficiency exam (WPE) **in your very first quarter as a graduate student!!!** This is extremely important since the University will block you from registering until you pass this exam **DON'T BE CAUGHT BY SURPRISE!** You will not receive any special notice. It is your responsibility to take the exam at the proper time. You register for the exam as UNIV400, which is listed in the schedule of classes along with the other "UNIV" courses.

There are only two ways that you may be exempt from taking the writing exam. The first is if you have passed a writing proficiency exam at an accredited college or university where the language of instruction is English. This must be clearly indicated on your transcript. The second is if you hold an earned doctorate from an accredited college or university where the primary language of instruction is English.

If you fail the exam the first time, you must meet with a consultant in the University Writing Center. Based on recommendation from the consultant, you may retake the exam or enroll in UNIV401, the upper division writing proficiency course. In any case, the requirement must be satisfied within the first three-quarters or prior to the completion of 16 units, whichever comes later. Failure to pass this requirement in this allotted period will result in blocking of future registrations. Check the schedule of classes for details. Help is also available in the University Writing Center to correct deficiencies in your writing. You must be able to write effectively in order to succeed in the profession.

IX. COMPREHENSIVE EXAMINATION/THESIS

Every graduate student must choose one of two options, comprehensive examination or thesis. These are described below:

Comprehensive Examination: The comprehensive examination is listed as EE596, and counts zero units toward the 45-unit degree requirement. It consists of two 3-hour exams chosen from the fields of specialization: Communications, Computer Engineering, Control Systems, Power and Solid State Electronics. You should take the examination during or very close to your last

quarter of attendance. Since the exams cover both the 400-level and 500-level material, you should be close to finishing the courses on your program. The exam is given late in the quarter, usually during the 9th week of instruction. It is given over the course of one week, so you will have to come in two afternoons, usually from 1pm to 4pm.

Prior to registering for EE596, you must obtain approval on the appropriate form. This requires that you obtain a three-member comprehensive committee, drawn from faculty members in the areas represented by the exam.

Thesis: Thesis is a very valuable choice for graduate students. It is essential for those planning to continue for a Ph.D., degree. However, those with limited ability in English, and those employed full-time are advised to carefully investigate whether the thesis option is appropriate. Discuss this with an adviser.

Thesis normally consists of a total of 9 units, (which counts toward the 45 unit's degree requirement and also toward the 24 unit's minimum of 500-level courses in the specialization). The units are distributed as 4-5 units of EE597 (research) AND 4 UNITS OF EE599 (thesis). Typically, the 4-5 units of research are spread over two quarters, and the thesis takes place in one quarter.

Therefore, a minimum of three-quarters should be allocated to complete a thesis. Details are available in a separate advising document, **Guide to Preparation of Master's Thesis and Project reports**. This is a University publication, which you should purchase in the University Bookstore. There are detailed requirements regarding preparation of the manuscript and submission to the library. If you don't follow all of those instructions, your graduation could be delayed.

A graduate student submitting a Master's Thesis to the library to finish up all MSEE work must be **enrolled in CSULA during that quarter** in order to graduate.

X. PROFESSIONAL ACTIVITIES

You cannot expect to learn to become a successful Electrical Engineer by simply attending classes, doing homework, and taking exams. Preparation for the profession requires far more than that! Professionalism is a way of life that goes far beyond the classroom.

But don't despair - There are convenient opportunities to supplement your classroom instruction in order to be better prepared to enter the profession upon graduation. A primary opportunity exists in the Institute of Electrical Electronics Engineers (IEEE). The department faculty is fully committed to the concept that EVERY Electrical Engineering major should be a member of this organization, and such membership could not possibly be more convenient.

The Institute of Electrical and Electronics Engineers is the world's largest professional engineering society, founded in 1884.

The student branch of IEEE at Cal State LA is indeed very active. In 1984, the branch won the Western U.S. award for fastest growth, and it ranks among the largest student branches in the world. Everyone engaged in the electrical and electronics field is invited to join the 350,000 engineers and students who are members of IEEE.

As a student member, the dues are only a fraction of the regular member dues, and they entitle you to all of the privileges of membership, including receipt of excellent publications. Throughout the year, the student branch of IEEE holds numerous meetings, usually every other week. Engineering leaders from the many companies located in our area present technical talks. Participation in the student branch activities enhances your future career by offering leadership experience, and activities such as field trips, employment seminars, and design projects. It also allows you to meet socially with your professional peers and faculty members.

The student branch of IEEE at Cal State LA sponsors a MicroMouse project which is now world famous. The Cal State LA entry has repeatedly won the nationwide competition, and was the NUMBER 1 student team in the country! In 1985, we had the privilege of representing the United States at the World MicroMouse Competition held in Japan. The student team was sent to the contest with money raised by the branch. Although they did not win the world competition, they made an impressive showing for the United States and for IEEE at Cal State LA!

As a student member, you receive a membership pin and membership card. Included with your membership is POTENTIALS, the IEEE student magazine. It focuses upon the student members' needs and concerns while in school and as they prepare to become working members of the profession. Also included with student membership is the world acclaimed technical magazine, SPECTRUM. Upon graduation, student members participate in a "graduated fee" program. Instead of immediately being assessed the full member dues, the annual assessment takes five years to transition from the subsidized student rate to the full member rate. For this reason, graduates who are not student members often regret this fact when they initially join as professional engineers.

A student member is able to compete in various designs and paper contests sponsored by IEEE. A student can win recognition and cash awards through competition that exercise communication skills. In fact, Cal State LA student entries have won first place in the Southern California TECHNICAL PAPER CONTEST many times! In this competition, we compete against such schools as UCLA, USC, Cal State Long Beach, UC Santa Barbara, and the Cal Polys. Top regional papers are published in the IEEE magazine. Cal State LA won this competition in 1985, 1986, 1988, 1989, 1992 and 1993. Our winner of the 1988 regional contest went on to beat the finalists from five other areas of the country to become the winner for the entire Western United States (including Hawaii and Alaska)!

A membership application is available on: <http://www.ieee.org/web/membership/join/join.html>. If you are not currently an IEEE member, we strongly urge you to immediately fill out an application and have it endorsed by the IEEE adviser (see the front page of this handbook). If you do not join, you will miss a golden opportunity to enhance your education!

XI - APPLYING FOR GRADUATION

Well, you look like you are going to make it. You have followed the instructions in this handbook, and can now see the light at the end of the tunnel. You appear to be close to graduation.

But graduation does not happen automatically. **YOU MUST APPLY** for it. Application forms are available in the department office. You fill out the application form, take it to the cashier and pay the fee, and then return to the department to meet with the Department Chair. The deadlines are given in the instructions accompanying the form and in the Schedule of Classes. Generally,

you must apply about **6 months** before you expect to graduate. In your meeting with the Department Chair, you discuss your program and projected schedules. Do not wait until the last minute! After discussing requirements with the Department Chair, your graduation application is approved. Several months later, the University sends an official “Graduation Check” form, which shows remaining requirements. This form also indicates whether you are meeting the specified grade point averages needed for graduation.

XIII - ACADEMIC STANDARDS

You are joining an academic community. Along with the privileges of membership go certain obligations. Failure to meet established standards will result in your being expelled from the university.

We hope that behavior standards never become an issue, but it is important that you prove worthy of the trust we place in you. Honesty is extremely important both for the operation the university and for your personal development. Any form of cheating on examinations will lead to one or more serious sanctions, including dismissal from the university. The faculty is committed to carefully monitoring examinations and to taking strong action if any dishonest activity is detected. Details are given in the University catalog. Note that plagiarism in writing papers is a form of cheating. Read the section of the catalog, and ask the faculty if you have any questions.

In order to be in good academic standing, you must maintain a minimum of a B average. If your grade point average on your program falls below B (3.0), it means that you are not meeting the academic standards of the department, and you are in danger of not being permitted to continue toward your degree. If your average falls below B, you are immediately placed on **academic (scholastic) probation**, which represents a form of final warning. If after being placed on academic probation you do not raise your average to 3.0 after completion of 16 units or two quarters in residence, whichever comes later, you will be disqualified from pursuing the MS degree in Electrical Engineering.

If your grade point average falls more than 9 grade points below B, you will be disqualified from pursuing the MS degree in Electrical Engineering. Disqualification from the MS program is permanent. There are no second chances. You may be admitted to another degree program on this campus on the recommendation of the new department and of the graduate dean.