



California State University, Los Angeles
Department of Electrical and Computer Engineering

Electrical Engineering Undergraduate Student Handbook

Eleventh Edition

Effective Summer Quarter 2009

*Revised on August 13, 2009
by Dr. Nancy Warter-Perez*

**EE Student Handbook
Eleventh Edition**

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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.

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I. INTRODUCTION

Welcome to the Department of Electrical and Computer Engineering at California State University, Los Angeles. The faculty members of the department are 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 advisor.

If you have not already done so, you should purchase the latest edition of the University Catalog and a Schedule of Classes for the current quarter. Keep the catalog throughout your stay at Cal State L.A., 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 and critical dates and deadlines. Both of these documents can be purchased at the University Bookstore located in the Golden Eagle. For quick reference, the University Catalog can also be found on the Cal State L.A. website at <http://catalog.calstatela.edu>.

Note: 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 and also available through GET at <https://get.calstatela.edu>

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's status, you only need to attend two quarters within any 12 month period (Note: you cannot be absent for more than a total of 8 quarters during your course of study to maintain continuous status).

The BS degree program in Electrical Engineering is accredited by the EAC of the Accreditation Board for Engineering and Technology (ABET). You will need a minimum of 198 quarter units to obtain the degree. The 198 units are divided into General Education (GE) and the major as follows:

- 44 units of General Education
- 4 additional units of Written Communication (ENGL 102) if not taken in Community College
- 62 units of Lower Division Required courses in the major
- 49 units of Upper Division Required courses in the major
- 39 units of Electives in the major

The General Education (GE) courses comprise 44 of the 198 units. GE requirements are modified for engineers. Do not use the GE requirements in the Schedule of Classes. Instead, refer to the modified GE form at the end of this handbook. A faculty advisor will help you decide which courses you should select.

The Lower Division Required courses comprise 62 of the 198 units. These courses are in the areas of Physics, Chemistry, Calculus, and Basic Engineering. They are numbered 1xx and 2xx. If you need to take certain remedial math courses; these won't be counted toward the 62 units. Effective Fall Quarter 2006, the four-course 16-unit General Physics sequence, PHYS 201-204, is being replaced by a three-course 15-unit sequence, PHYS 211-213.

The Upper Division Required courses comprise 49 of the 198 units. These are your basic junior- and senior-level Electrical Engineering courses; they are required of all EE majors. They are numbered 3xx and 4xx, although most of the required core is at the 300 level. Effective Summer Quarter 2006, the second Senior Design course, EE 496B, will be offered for 2 units (previously it was a 1-unit course).

The remaining 39 units are your Electives in Electrical Engineering and an upper division Math class. These courses are mostly at the 400-level. These courses give you the chance to select a specialization area within Electrical and Computer Engineering. You should consult with a faculty advisor in your area of specialization. He or she can discuss your career goals with you and give helpful suggestions.

While it is a good idea to continue to see the same advisor, you can approach any faculty member who is free at the time to discuss any problem you may have. You will find that the faculty have your best interests at heart. The more you become involved with the department, the more you will benefit. Section III describes how and when to see an advisor.

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

II. MISSION AND EDUCATIONAL OBJECTIVES

This section describes the mission, educational objectives, and outcomes of our Electrical Engineering program.

Mission:

To be a pre-eminent Electrical Engineering program that accepts students from diverse backgrounds and through academic excellence prepares them for successful electrical engineering careers.

Educational Objectives and Program Outcomes:

The Educational Objectives describe the characteristics that the California State University, L.A.'s Electrical Engineering Program is seeking to produce in its graduates in the three areas:

- The *knowledge* they will have
- The *skills* they will possess
- The *attitudes* they will hold

Knowledge:

Educational Objectives: Graduates of the Electrical Engineering program will have the knowledge in math, science, engineering fundamentals, and current and emerging societal needs that allows them to competently solve the practical electrical and computer engineering problems considering all the aspects of the impact of the solution. The knowledge base shall be amply broad to enable our graduates to become professional engineers within three to five years of professional practice.

These educational objectives will be demonstrated by the following outcomes:

1. Knowledge of the fundamentals of mathematics. (*ABET a*)
2. Knowledge of the fundamentals of science. (*ABET a*)
3. Knowledge of the engineering principles. (*ABET a*)
4. Awareness of the effect of economics, humanities, and social sciences on engineering. (*ABET h*)
5. Focus on a specialization field in engineering.
6. Knowledge through general education to foster intelligent inquiry, abstract logical thinking, critical analysis, and the integration and synthesis of knowledge.

7. Knowledge of current events and contemporary societal issues (non-engineering related). (*ABET j*)

Skills:

Educational Objectives: Our graduates will possess the necessary practical skills to apply theory to the design, implementation, and analysis of engineering systems. They will be able to identify, formulate and solve engineering problems both as individuals and as members of multidisciplinary teams. The graduates will have the skills needed to effectively use computers in all aspects of their professional life, to utilize the rapidly expanding base of technical information, and to communicate clearly orally and in writing.

These educational objectives will be demonstrated by the following outcomes:

1. Ability to reinforce theory with hands-on laboratory through designing and conducting experiments. (*ABET b*)
2. Ability to design and implement engineering system or component to meet desired needs within realistic constraints such as economical, environmental, social, political, ethical, health and safety, manufacturability, and sustainability. (*ABET c*)
3. Ability to identify, formulate, and solve Electrical and Computer Engineering problems (*ABET e*)
4. Capability to analyze and interpret experimental results. (*ABET b*)
5. Capability to use the computer and other modern engineering tools necessary for engineering practice (*ABET k*)
6. Ability to work individually and in multidisciplinary teams (*ABET d*)
7. Skills to find and use available technical information (*ABET k*)
8. Ability to communicate effectively orally and in written reports (*ABET g*)

Attitudes:

Educational Objectives: Graduates of the Electrical Engineering program will be able to seamlessly adapt to different employment settings and engineering tasks in industry and governmental positions. They will be confident in their abilities and eager to continue their education, either formally or informally, to promote their life long professional and personal development. They will recognize the importance of transferring and adapting knowledge received in electrical and computer engineering study at CSULA as well as complementing it with the team work and management and technical skills developed at their place of employment.

These educational objectives will be demonstrated by the following outcomes:

1. Recognition of the need and ability to engage in life long learning. (*ABET i*)
2. Understanding of their ethical and professional responsibilities. (*ABET f*)
3. An understanding of responsibility and accountability.
4. A desire to be a flexible and adaptable team player.

III. HOW AND WHEN TO SEE AN ADVISOR

All full time faculty in the Department of Electrical and Computer Engineering serve as advisors. Advising hours are posted outside the department and faculty offices. You may select your own advisor based on your area of specialization or schedule constraints. While you are encouraged to select a permanent advisor, you can meet with any faculty advisor.

When to see an advisor:

1. Prior to your first quarter of attendance, there will be an orientation session you can attend where an advisor makes sure that you understand the rules.
2. You must then meet with an advisor during your first quarter of attendance. During this session you should put together a tentative year-by-year plan.
3. If you are a transfer student, you should meet with an advisor to do a complete transfer credit evaluation once the university has evaluated your transcripts
4. You should check with your advisor to periodically revise your year-by-year plan.
5. You must also see an advisor before choosing your upper-division specialization.
6. You must see the Department Chair or designated advisor to do your graduation check as part of your application for graduation. Refer to Section XIII for more details on applying for graduation.

During your first meeting with your advisor at the beginning of your program (a mandatory meeting), the faculty advisor fills out a "Major Department Evaluation" (MDE) form (at the end of this document), which lists all the major requirements, and a "General Education Advisement" (GEA) form (attached to MDE at the end of this document), which lists all GE requirements. Upon completion, the faculty advisor and the Department chair both approve the MDE and GEA forms, and copies are mailed to you and filed in the ECE Department office. During this meeting, you should also develop a tentative year-by-year plan.

If you have transferred to the University from another institution, a "Transfer Credit Evaluation" (TCE) form will be sent to you by the University, specifying which courses (if any) have been accepted toward the major. The information on the TCE form is available on GET. In some occasions during the initial advising the TCE may not yet have been completed by the University. In these cases, the advising is based on a tentative evaluation by the advisor on the basis of an unofficial transcript, which will be formalized later once the University has completed its TCE.

After meeting with your faculty advisor during your first quarter of attendance, you are urged to see your advisor each quarter prior to registration. The purpose of these pre-registration meetings is to review your progress, to double check that you are meeting the prerequisites, and to provide an opportunity for you to discuss any questions you may have.

You are required to see the advisor when you are ready to take upper-division technical electives. During this advisement session, you will discuss with the advisor how to select an area of specialization and how to determine a suitable set of eight lecture courses and three laboratory courses.

In addition to advising students on class schedules and electrical and computer engineering careers, each full-time faculty or group of faculty is responsible for coordinating one of the department's advisement services as shown in Table 3-1. The outreach coordinator oversees the department's outreach efforts to high schools and community colleges working closely with the College Outreach Coordinator. The transfer evaluation coordinator oversees EE transfer credit evaluations and works with the Department Chair to develop and maintain articulation agreements with local community colleges. The internship coordinator coordinates internship opportunities and student placements. The graduation evaluators and Department Chair are responsible for conducting graduation evaluations in GET two quarters prior to a

student's anticipated graduation. The career counseling coordinator coordinates resume and interview skills workshops and works closely with the University Career Center. The graduate coordinator provides general advising related to the graduate program.

Table 3-1. Advisement service coordinators

Advisement Service	Coordinator
Major Transfer Credit Evaluation	Dr. Abledu
Internships	Dr. Tabrizi
Graduation Evaluation	Dr. Dong and Dr. Liu
Career Counseling	Dr. Karimlou and Dr. Ryaciotaki-Boussalis
Graduate Program Advising	Dr. Warter-Perez

IV. HOW TO REGISTER

If this is your first registration, you must first see an advisor. Following advising, you obtain department approval to register. If you are a new student born after December 31, 1956 you must visit the Health Center where you will be asked to present proof of measles and rubella immunizations and verification of negative tuberculin test or chest x-ray within the past year. If you are 18 years of age or younger, you must provide proof of being immunized against the hepatitis B virus. Information can be obtained at the Health Center. 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 must attend the University orientation session for new students. At that session, you will receive valuable information about the University and about registration. The information you receive at the University orientation session supplements that given by our faculty advisors.

Newly admitted students and continuing students can register using GET on the Internet or STAR by phone. Instructions for using GET or STAR are found in the Schedule of Classes. Your Personal Identification Number (PIN) should be sent to you. The PIN is the password to access GET or STAR and should be kept separately from your Campus Identification Number (CIN). You will not be allowed to register for classes if you have not completed the prerequisites. If you took the prerequisite at another university (other than a California Community College), the computer may not know that this is equivalent. In such cases, see an adviser or come to the department office. We can put an authorization into the computer so you will be able to register.

Adding classes is done using GET or STAR. To add during the first week, simply follow the instructions in the schedule of classes. If there is room in the class and it is not restricted, you can add without any approvals during this first week period (CAUTION: you must attend the first class meeting or the instructor can drop you from the class). If the class is full, or if you are adding 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 using GET or STAR. These permissions expire in several days, so do not delay adding.

Study Load: Undergraduate students must carry a study load of 12 units for full-time enrollment certification by the University. The recommended full-time study load for undergraduates is 16 units. The maximum study load is 18 units. This can only be exceeded with written department permission.

V. POLICY ON DROPPING CLASSES

Students withdraw from courses by filing a completed program change form at Administration 146. Early in the quarter (usually the first week), students may withdraw with no indication 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 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, appear in the Schedule of Classes.

VI. GENERAL EDUCATION PROGRAM

To be a University graduate implies a liberal education above and beyond technical skills. This need is universally recognized by such diverse bodies as the State of California, Tau Beta Pi (the Engineering honor society), and IEEE (the EE professional organization). This requirement for liberal education is also mandated by our University system and by the accrediting agency, ABET.

Our General Education (GE) Requirements are categorized into specific areas. These are delineated on the “GENERAL EDUCATION LOWER DIVISION COURSES FOR ENGINEERING MAJORS FORM” (see Section XV). The required courses in your Engineering major cover some of the required General Education areas, and some variances have been permitted. Therefore, it is critical to realize that your General Education requirement is not the same as that of other majors on this campus. If you follow the University requirement without realizing this, **you may not be taking the correct courses**. GE courses for engineers total 44 units: 32 at the lower-division level and 12 in an upper-division "theme". These 44 units must include 2 "diversity" courses, marked (d) in the Schedule of Classes section on GE.

The 32-unit lower-division GE requirement is divided as follows:

A - BASIC SUBJECTS (8 UNITS) - You must take ENGLISH 101 and COMM 150. NOTE: you must also take the second course in Written Communications, ENGL102, which is a University requirement and not considered part of the 44 units for GE.

AMERICAN INSTITUTIONS (8 UNITS) - You must take either HISTORY 202A or HISTORY 202B. In addition, you must take POLITICAL SCIENCE 150. (Exception: if you took a U.S. Government course at an institution outside the Southern California area, you only need State and Local Government. In that case, POLITICAL SCIENCE 200 is an acceptable alternative to 150.)

B - NATURAL SCIENCES (0 UNITS) - No additional courses required.

C - HUMANITIES (12 UNITS) - Five categories are included in this area; they are C1-Literature, C2-Arts, C3-Philosophy, C4-Languages other than English, and C5-Integrated Humanities. You must select 3 courses from among these 5 categories, with no more than one course in any category. If you choose Languages other than English as one of your categories, you *may not* take a 100-level course in your native language.

D - SOCIAL SCIENCES (0 UNITS) - Electrical Engineering majors satisfy this requirement with ENGR 300 (Economics for Engineers), so you need take no additional courses in this category.

E - LIFELONG UNDERSTANDING (4 UNITS) - You must select one course from the list, Category E of the University General Education Requirements.

Beyond the Lower Division General Education courses is an Upper Division Theme consisting of three courses in a defined area. The Upper Division Themes are listed and described in the current Schedule of Classes. You should seek the advice of a faculty advisor when selecting a theme. **IMPORTANT: unless you have taken an acceptable lower-division biology course, you must select an Upper Division Theme which offers a course taught by the Biology Department, and you must take that course as part of your theme.** Also, pay particular attention to the frequency of offerings of the courses in the theme so that you can coordinate the theme with your major program.

Do not consider your GE courses as distasteful chores; they are necessary and vital parts of your education and should provide a rewarding learning experience. Social forces and humanistic considerations have a considerable impact on the work and the lives of engineers (and vice versa). GE courses are designed to help you understand these phenomena and prepare you to deal with the many non-technical realities you will face in the "real world".

VII. LOWER DIVISION REQUIREMENTS

This is a first of three sections describing the requirements in the major.

The Lower Division requirements consist of the following 62 units:

CHEM101	General Chemistry I	5
EE204	Circuit Analysis	4
EE210	Electrical Measurements Laboratory	1
EE211	Electric Circuits Laboratory	1
CS242	“C” Programming	4
EE244	Digital Engineering	4
EE290	EE Computing	3
ENGR150	Introduction to Higher Ed for Engineers	1
CE/ME208	Statics & Strength of Materials	4
MATH206-9	Calculus I – IV	16
MATH215	Differential Equations	4
PHYS211	Mechanics	5
PHYS212	Waves, Optics, and Thermodynamics	5
PHYS213	Electricity and Magnetism	5

The prerequisites for each of these courses are listed in the University catalog. You **MUST** have the prerequisite before taking any class. The only exception is if the course instructor completes and signs a prerequisite waiver form which is also signed by Chairperson of the department. This form must be submitted to the EE department to become a permanent part of your file.

It is extremely important that you complete the 5 required MATH courses (Calculus and Differential Equations) and the 3 required PHYSICS courses as soon as possible. The reason for this becomes obvious when you check prerequisites in the catalog. For example, EE 204-Circuits Analysis is a prerequisite for most Electrical Engineering courses and cannot be taken until you have completed the first three Calculus and Physics courses. Note, effective Fall Quarter 2006, the 16-unit physics sequence PHYS201-204 is being replaced by the 15-unit physics sequence PHYS211-213.

Most of the prerequisite listings are self-explanatory with the following exception:

Prior to taking your first Math course on this campus, you must take one or more **PLACEMENT EXAMS** in addition to taking the Entry Level Math Exam (see Section XI for more details on placement exams).

Even if you think you have a sound background in Algebra and Trigonometry, you may not be ready for immediate entry in the first Calculus course, MATH 206. In order to register for MATH 206, you must pass two placement exams given in the Testing office on the second floor of the Library South. If the placement exams indicate you are not ready to take Calculus, then you must take certain remedial math courses including Algebra and/or Trigonometry. Each of these courses, in turn, has its own prerequisites, so check the University catalog before registering. We again emphasize that it is critical that you get into the Calculus courses as soon as possible. Otherwise, your progress toward a degree will be delayed.

Prior to taking any Placement Exam, you should review the material being covered in the placement exam. This is *most important*; it could save you having to repeat one or more introductory courses.

VIII. UPPER DIVISION REQUIREMENTS

The 49 units of upper division required courses are listed below:

ENGR300	Economics for Engineers	4
ENGR301	Ethics and Professionalism in Engineering	1
EE304	Electric Machines	4
EE317	Electronics Laboratory I	1
EE320	Analog Communication Systems	4
EE330	Writing for Electrical Engineers	1
EE332	Systems Analysis	4
EE334	Probability and Random Processes	4
EE336	Electronics	4
EE345	Microcomputer Programming	4
EE346	Digital Logic Laboratory	1
EE360	Control Systems Theory I	4
EE437	Electric and Magnetic Fields	4
EE496A,B,C	Senior Design I, II, III	2,2,1
PHYS333	Applied Modern Physics	4

Notes on Senior Design:

- During the first senior design course, EE 496A, you will be asked to select a project to work on during EE 496B and C. You will be expected to make considerable progress in EE 496A toward defining your project goals and outlining steps toward that goal. This can be difficult to do in just 10 weeks if you haven't given any thought to your design project before enrolling in EE 496A. Therefore, it is strongly suggested that you explore possible projects and, if possible, select one *during the preceding quarter*.
- The writing course, EE 330, is a prerequisite for EE 496A. This requirement is strictly enforced. Also note that passing the University Writing Proficiency Exam (WPE) is a prerequisite to EE330.
- Also, in your study plan, make sure to take courses that will prepare you for the technical aspects of your specific project before taking EE 496B and C. These courses will likely be in your area of specialization but can also be courses such as EE 445, Microprocessor Interface Design.
- Effective Summer Quarter 2006, EE 496B has been increased from a 1-unit course to a 2-unit course to more accurately reflect the amount of work required to complete your project.

IX. ELECTIVES

As an Electrical Engineering major, you choose 39 units of elective courses. These courses should be selected with the help of an advisor, and based upon interests that you develop while taking the required courses.

Electives fall within 3 categories as follows:

Math Elective	4 units	
Technical Electives	22 units	(5 lectures, 2 laboratories)
Upper Division Specialization	13 units	(3 lectures, 1 laboratory)

We now expand upon each of these 3 categories.

MATH ELECTIVE

Choose one course from the following list. Before making this choice, carefully check the other electives you plan to take. Some of them may require one of these Math courses as a prerequisite.

MATH325	Mathematical Notation and Proof
MATH402A	Advanced Mathematics I for Engineers and Physicists
MATH403	Partial Differential Equations
MATH474	Theory of Probability

TECHNICAL ELECTIVES and UPPER DIVISION SPECIALIZATION

Choose 8 lectures from the following list. Of these, 3 must be in your area of specialization (see below).

CS342	Object Oriented Programming Using C++
EE347	Computer Logic Design
EE371	Analog Electronics
EE372	Digital Electronics
EE412	Antennas
EE420	Digital Communication Systems
EE421	Coding for Communications
EE422	Digital Signal Processing
EE424	Fiber Optics
EE426	Digital Image Processing
EE427	Speech Signal Processing
EE431	Electric Power Distribution
EE432	Power Transmission Lines
EE433	Electric Power System Analysis
EE434	Electromagnetic Energy Conversion
EE436	Analog Integrated Circuits
EE439	Digital Integrated Circuits
EE440	Data Communications and Networking
EE442	Multimedia Networking
EE445	Microprocessor Interface Design
EE447	Backend Compiler Technology
EE449	Computer Organization
EE460	Control Systems Theory II

EE461 Discrete-Time Control Systems
EE462 State Space Control Systems
EE465 Systems Engineering
EE472 Optoelectronics
EE483 Power Electronics

Choose 3 laboratory courses from the following list. Of these, one must be in your area of specialization (see below).

EE314 Electromagnetic Energy Conversion Laboratory
EE321 Communications Laboratory
EE340 Electronics Laboratory II
EE428 Digital Signal Processing Laboratory
EE443 Programmable Logic Laboratory
EE448 HDL Design and Simulation Laboratory
EE468 Control Systems Laboratory
EE498 Cooperative Education
EE499 Undergraduate Directed Study (1)

UPPER DIVISION SPECIALIZATION

You must select one of the following five areas of specialization. You should meet with your advisor to discuss this selection.

Communications	Control Systems
Computers	Electronics
Power	

Courses in each of these areas come from the list of technical electives presented above. Once you choose an area of specialization, you will be required to take three classes and one laboratory from that area. You are free to choose any specialization you wish, and you do not need approval to change specialization. However, you will NOT GRADUATE unless you meet the requirements of at least one area of specialization. Therefore, even though you do not need approval to change, it would be wise to discuss this with an advisor if you have any questions. If you are interested in more than one area, do not be concerned since you still have additional elective units that permit you to select courses in areas beyond your selected specialization.

<p>COMMUNICATIONS: You must take EE420 and choose two courses from the list below. In addition, select one of the two labs listed.</p> <p>EE412 Antennas EE421 Coding for Communications EE422 Digital Signal Processing EE424 Fiber Optics EE426 Digital Image Processing EE427 Speech Signal Processing EE440 Data Communications and Networking select either: EE321 Communications Lab or EE428 Digital Signal Processing Lab</p>	<p>CONTROLS: You must take all the courses listed below:</p> <p>EE460 Control Systems Theory II EE461 Discrete-Time Control Systems EE462 State Space Control Systems EE468 Control Systems Lab</p>
<p>COMPUTERS: You must take EE 347 and choose two courses from the list below. In addition, select one of the two labs listed.</p> <p>CS342 Object Oriented Prog Using C++ EE440 Data Communications and Networking EE442 Multimedia Networking EE445 Microprocessor Interface Design EE447 Backend Compiler Technology EE449 Computer Organization select either: EE443 Programmable Logic Lab or EE448 HDL Design and Simulation Lab</p>	<p>ELECTRONICS: You must take EE371, EE372, and EE340 (lab). In addition, select one course from the list below:</p> <p>EE436 Analog Integrated Circuits EE439 Digital Integrated Circuits EE472 Optoelectronics EE483 Power Electronics</p>
<p>POWER: You must take EE432, EE433, and EE314 (lab). In addition, select one course from the list below:</p> <p>EE431 Electric Power Distribution EE434 Electromagnetic Energy Conversion EE483 Power Electronics</p>	

X. PREREQUISITES

The previous sections have listed the required and elective courses in the major. All of the prerequisites to these courses 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.

Changing the prerequisites 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.

Some courses shown under "Prerequisites" in the following list are followed by the phrase "May be taken concurrently". These courses are also known as "co requisites". For example, EE321 lists prerequisites as: "EE317, EE320 (May be taken concurrently)". This means that to enroll in EE321, you must have already completed EE317, but you need not have already completed EE320. However, if EE320 was not previously taken, it must be taken at the same time as EE321. In such cases, if you register for both EE321 and EE320 but subsequently drop E320, you must also drop EE321.

Current course prerequisites are listed below. Note: EE290, COMM 150, and ENGL 102 are prerequisite to *all* 300- and 400-level EE courses.

COURSE

PREREQUISITE

LOWER DIVISION REQUIREMENTS

ENGR 150	Introduction to Higher Ed for Engineers (1) <i>Prerequisite:</i> NONE
CHEM 101	General Chemistry I (5) <i>Prerequisite:</i> As described in the Catalog
EE 204	Circuit Analysis (4) <i>Prerequisites:</i> Math 208, PHYS 213
CE/ME 208	Statics and Strength of Materials (4) <i>Prerequisites:</i> Math 207, PHYS 211
EE 210	Electrical Measurements Laboratory (1) <i>Prerequisite:</i> PHYS 213
EE 211	Electric Circuits Laboratory (1) <i>Prerequisite:</i> EE 204
CS 242	"C" Programming (4) <i>Prerequisite:</i> Math 103 or Consent of Instructor
EE 244	Digital Engineering (4) <i>Prerequisite:</i> NONE
EE 290	Electrical Engineering Computing (3) <i>Prerequisites:</i> MATH 209, PHYS213
MATH 206	Calculus I: Differentiation (4) <i>Prerequisites:</i> ELM, MATH 102,103 with "C" or Placement Test
MATH 207	Calculus II: Integration (4) <i>Prerequisite:</i> MATH 206 with a minimum of "C" grade
MATH 208	Calculus III: Sequences, Series, and Coordinate Systems (4) <i>Prerequisite:</i> MATH 207 with "C"
MATH 209	Calculus IV: Several Variables (4) <i>Prerequisite:</i> MATH 208 with a minimum of "C" grade
MATH 215	Differential Equations (4) <i>Prerequisite:</i> MATH 209
PHYS 211	Mechanics (5) <i>Prerequisites:</i> High School PHYS; MATH 206 (concurrently)
PHYS 212	Waves, Optics, and Thermodynamics (5) <i>Prerequisites:</i> MATH 207 (concurrently), PHYS 211
PHYS 213	Electricity and Magnetism (5) <i>Prerequisites:</i> MATH 208 (concurrently), PHYS 212

UPPER DIVISION REQUIREMENTS

EE 304	Electric Machines (4) <i>Prerequisite:</i> EE 204 with "C" or higher grade
EE 317	Electronics Laboratory I (1) <i>Prerequisites:</i> EE 210, EE 211, EE 336
EE 320	Analog Communication Systems (4) <i>Prerequisite:</i> EE 332
EE 330	Writing for Electrical Engineers (1) <i>Prerequisites:</i> GWAR; completion of any two 300-level EE lectures
EE 332	Systems Analysis (4) <i>Prerequisites:</i> EE 204 with "C" or higher grade, MATH 215
EE 334	Probability and Random Processes (4) <i>Prerequisites:</i> MATH 209, EE 204 with "C" or higher grade
EE 336	Electronics (4) <i>Prerequisite:</i> EE 204

COURSE PREREQUISITE

UPPER DIVISION REQUIREMENTS (continued)

EE 345	Microcomputer Programming (4) <i>Prerequisite:</i> EE 244
EE 346	Digital Logic Laboratory (1) <i>Prerequisites:</i> EE 244, EE 211
EE 360	Control Systems Theory I (4) <i>Prerequisite:</i> EE 332
EE 437	Electric and Magnetic Fields (4) <i>Prerequisite:</i> EE 332
EE 496A	Senior Design I (2) <i>Prerequisites:</i> Selection of UD specialization; EE 330; completion of at least one UD technical elective lab
EE 496B	Senior Design II (2) <i>Prerequisite:</i> EE 496A with grade of 'C' or higher
EE 496C	Senior Design III (1) <i>Prerequisite:</i> EE 496B with grade of 'C' or higher
ENGR 300	Economics for Engineers (4) <i>Prerequisite:</i> Must be Junior or Senior Standing in Engineering
ENGR 301	Ethics and Professionalism in Eng (1) <i>Prerequisite:</i> Must be Junior or Senior Standing in Engineering
PHYS 333	Applied Modern Physics (4) <i>Prerequisites:</i> PHYS 213, MATH 215

UPPER DIVISION ELECTIVES

EE 314	Electromagnetic Energy Conv Laboratory (1) <i>Prerequisites:</i> EE 304, EE 211
EE 321	Communications Laboratory (1) <i>Prerequisites:</i> EE 317; EE 320 (concurrently)
EE 340	Electronics Laboratory II (1) <i>Prerequisite:</i> EE 317
CS 342	Object Oriented Programming Using C++ (4) <i>Prerequisite:</i> CS 242
EE 347	Computer Logic Design (4) <i>Prerequisite:</i> EE 244
EE 371	Analog Electronics (4) <i>Prerequisite:</i> EE 336
EE 372	Digital Electronics (4) <i>Prerequisites:</i> EE 244, EE 336
EE 412	Antennas (4) <i>Corequisite:</i> EE 437
EE 420	Digital Communication Systems (4) <i>Prerequisite:</i> EE 320
EE 421	Coding for Communications (4) <i>Prerequisite:</i> EE 320
EE 422	Digital Signal Processing (4) <i>Prerequisite:</i> EE 320
EE 424	Fiber Optics (4) <i>Prerequisite:</i> EE 320
EE 426	Digital Image Processing (4) <i>Prerequisite:</i> EE 320
EE 427	Speech Signal Processing (4) <i>Prerequisites:</i> CS 242, EE 334, and EE 422
EE 428	Digital Signal Processing Laboratory (1) <i>Prerequisites:</i> EE 290, EE 332
EE 431	Electric Power Distribution (4) <i>Prerequisite:</i> EE 304
EE 432	Power Transmission Lines (4) <i>Prerequisite:</i> EE 304
EE 433	Electric Power System Analysis (4) <i>Prerequisite:</i> EE 432
EE 434	Electromagnetic Energy Conversion (4) <i>Prerequisite:</i> EE 304
EE 436	Analog Integrated Circuits (4) <i>Prerequisite:</i> EE 371
EE 439	Digital Integrated Circuits (4) <i>Prerequisites:</i> EE 336, EE 372
EE 440	Data Communications and Networking (4) <i>Prerequisites:</i> EE 320, CS 242
EE 442	Multimedia Networking (4) <i>Prerequisites:</i> EE 290, EE 440
EE 443	Programmable Logic Laboratory (1) <i>Prerequisite:</i> EE 448
EE 445	Microprocessor Interface Design (4) <i>Prerequisite:</i> EE 345
EE 447	Backend Compiler Technology (4) <i>Prerequisites:</i> CS 342, EE 347
EE 448	HDL Design and Simulation Laboratory (1) <i>Prerequisite:</i> EE 346
EE 449	Computer Organization (4) <i>Prerequisite:</i> EE 347 (concurrently)
EE 460	Control Systems Theory II (4) <i>Prerequisite:</i> EE 360
EE 461	Discrete-Time Control Systems (4) <i>Prerequisite:</i> EE 360
EE 462	State Space Control Systems (4) <i>Prerequisite:</i> EE 360
EE 465	Systems Engineering (4) <i>Prerequisite:</i> EE 360
EE 468	Control Systems Laboratory (1) <i>Prerequisite:</i> EE 360 (concurrently)
EE 472	Optoelectronics (4) <i>Prerequisite:</i> EE 336
EE 483	Power Electronics (4) <i>Prerequisite:</i> EE 336
EE 498	Cooperative Education (1) <i>Prerequisites:</i> Department's Permission
EE 499	Undergraduate Directed Study (1) <i>Prerequisites:</i> Department's Permission

COURSE PREREQUISITE

UPPER DIVISION MATH ELECTIVE

MATH 325	Math Notation and Proof (4) <i>Prerequisite:</i> MATH 208
MATH 402A	Advanced Math I for Engineers & Physicists (4) <i>Prerequisite:</i> MATH 215 or MATH 401
MATH 403	Partial Differential Equations (4) <i>Prerequisite:</i> MATH 215 or MATH 401
MATH 474	Theory of Probability (4) <i>Prerequisite:</i> MATH 209

XI. PLACEMENT AND WRITING EXAMS

In addition to placement tests that are required to enter the first course in Math, there are **THREE EXAMS** that almost all EE students will have to take. Failure to take these exams as described below is extremely serious, and can result in denial of permission to register. **READ THIS CAREFULLY.**

ENTRY-LEVEL MATHEMATICS (ELM): You must take the Entry-Level Math (ELM) examination very early in your stay at Cal State L.A. You will not be able to register for any Math classes until you satisfy this requirement. The exam tests your knowledge of Algebra and Geometry. Details and exam schedules appear in the Schedule of Classes. Review the material before taking this exam.

You are exempted from this requirement if either of the following applies to you:

1. You enter Cal State L.A. with certified transfer credit for a course that satisfies the General Education-Breadth or Intersegmental General Education Transfer. Such transfer credit must be listed on your credit summary issued by the University upon admission.
2. You have obtained these minimum scores or higher on one of the following:
 - a) 3 or higher on the AP Mathematics (Calculus AB or BC) or Statistics test or...
 - b) 550 or higher on the Mathematics section of the SAT I Reasoning Test or on the College Board SAT II Mathematics Tests Level I, IC (Calculator), II, or IIC (Calculator) or...
 - c) 23 or higher on the Math section of the ACT or...
 - d) 550 or higher on Level I, IC, II, or IIC of the College Board Math Achievement test or SAT II: Mathematics Test or ...
 - e) A score of "Exempt" on the augmented mathematics CST, i.e., the CSU Early Assessment Program (EAP), taken in grade 11.

ENGLISH PLACEMENT TEST (EPT): You must take this examination in order to see if you are ready to register for any English course. Depending upon your performance on the English Placement Test, it may be necessary for you to take one or more English classes prior to registering for ENGL101. See the Schedule of Classes for details and rules regarding this exam and when it must be taken. It should normally be taken immediately after you are admitted to Cal State L.A. You are exempted from this requirement if you satisfy one of the following requirements.

1. You have completed and transferred a course that satisfies the General Education-Breadth or Intersegmental General Education Transfer Curriculum (IGETC) written communication requirement, provided such course was completed with a grade of C or better, or
2. You have obtained these minimum scores or higher on one of the following:
 - a) 3, 4, or 5 on either the Language and Composition or the Literature and Composition exam of the College Board Scholastic Advanced Placement Program or....

- b) A score of “Exempt” on the augmented English CST, i.e. the CSU Early Assessment Program (EAP) taken in grade 11 or ...
- c) 550 or higher on the verbal part of the SAT I: Reasoning Test (taken April 1995 or after) or...
- d) 24 or higher on the enhanced ACT English (October 1989 or after) or...
- e) 680 or higher on the re-centered and adjusted College Board SAT II: Writing Test (taken May 1998 or after)

UPPER DIVISION WRITING REQUIREMENT: Prior to completion of 135 quarter units, you must take the upper division writing proficiency exam (WPE). This is extremely important since the university will block you from registering beyond 135 units until you pass this exam!! If you transferred in with more than 135 transfer units, you are required to take the exam during your very first quarter here. Details are given in the Schedule of Classes. Don’t be caught by surprise! You will not receive any special notice as you near the 135 unit level. It is your responsibility to take the exam at the proper time. You register for the exams as UNIV400, which is listed in the schedule of classes along with the other “UNIV.” courses.

Pass rate statistics for the WPE indicate that students are more likely to pass the exam soon after they complete ENGL101 and ENGL102. Don’t delay out of fear of the exam. If you fail the first time, you must meet with a consultant in the university Writing Center. Based on recommendations from the consultant, you may retake the exam or enroll in UNIV401, the upper-division writing proficiency course. Check the schedule of classes for details. Help is also available to correct deficiencies in your writing. You must be able to write effectively in order to succeed in the profession.

XII. PROFESSIONAL ACTIVITIES

The Department offers opportunities to supplement classroom instruction for the purposes of preparing you to enter into the profession upon graduation. The campus chapter of the Institute of Electrical and Electronics Engineers (IEEE) is one such opportunity. The Institute of Electrical and Electronics Engineers is a professional society for Electrical and Computer Engineers. The IEEE was founded in 1884 and is the world’s largest professional engineering society. Its purposes are summarized as follows:

- A. IEEE is a **SCIENTIFIC AND EDUCATIONAL** organization directed toward the advancement of the theory and practice of electrical engineering, electronics, computer engineering, and the allied branches of engineering and the related arts and sciences. The IEEE publishes journals in the various disciplines and holds meetings and conferences for the reading and discussion of professional papers.
- B. IEEE is a **PROFESSIONAL** organization directed toward the advancement of the standing of the members of the professions it serves. The IEEE conducts and publishes surveys and reports on matters of professional concern to the members, collaborates with public bodies and with other societies for the benefit of the Engineering profession as a whole, and establishes standards of qualification and ethical conduct.
- C. IEEE strives to enhance the quality of life for all people throughout the world through the constructive application of technology. It endeavors to promote understanding of the influence of such technology on the public welfare.

Everyone preparing to enter the electrical and electronics field is invited to join the thousands of engineers and students who are members of IEEE. The campus chapter of IEEE at Cal State LA is a very active chapter. The Department Faculty is fully committed to supporting the chapter and encourages every student to participate in its activities. As a student member of this chapter, your dues are only a fraction of the regular member dues, and they entitle you to all of the privileges of membership. The

chapter schedules numerous meetings, usually every other week. Engineering leaders from the many companies located in our area present technical talks. Participation in the campus chapter 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 campus chapter of IEEE at Cal State LA sponsors a Micro Mouse project. Students design and race robotic "mice" in competition with mice from other schools.

As a student member, you receive a membership pin and membership card, as well as POTENTIALS, the IEEE student magazine. This publication 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.

A student member is able to compete in design paper contests sponsored by IEEE. A student can win recognition and cash awards through competition that emphasizes communication and technical skills. Students in the department are encouraged to submit entries in the Southern California TECHNICAL PAPER CONTEST. Most electrical engineering schools in Southern California participate in this contest. Cal State LA winners have gone on to compete with finalists from other areas and have won recognition at the Western Regional Level (including Hawaii and Alaska).

If you are not currently a member, the Faculty of this Department strongly recommend that you join and take advantage of all the benefits that membership confers.

XIII. 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 fees, and then return to the department to meet with the Department Chair (or a designated advisor). 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 or designated advisor, you discuss your program and projected schedule. Do not wait until the last minute! After discussing requirements with the Department Chair, your graduation application is sent to the University Graduation Office for approval. Several months later, the Graduation Office 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.

Before approving your application, the Graduation Office checks to see if you have completed all requirements and have earned a C average (2.0) or better in the following categories:

- a) All university- and college-level work (including transferred courses).
- b) All work taken at Cal State LA.
- c) All courses taken to satisfy requirements *in the major*.

It is important that you be aware of the last category. Students who have an overall GPA at Cal State LA of even slightly above 2.0 are considered (by the University) to be doing acceptable work in their courses. So, even if their work *in the major* is below 2.0, they will not be placed on probation or disqualified. Therefore, unless you keep track of your performance in the major, you may be in for a

shock when you are told at grad-check time that a grade-point deficiency exists and graduation will be delayed. So, if you think you might be in trouble in the major, see your advisor right away for a preliminary "check-up"--don't set yourself up for an unwanted surprise.

XIV. ACADEMIC STANDARDS

You are now joining an academic community. Along with the privileges of membership go certain obligations. Failure to meet established standards may result in various penalties. In extreme cases this could result in expulsion 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 you in. Honesty is extremely important both for the operation of the University and for your personal development.

COURSE	TRANSFERRED FROM		QTR UNITS	GRADE	G*
	INSTITUTION	DEPT & COURSE			
UPPER DIVISION REQUIRED COURSES (49 units)					
EE 304	Electric Machines (4)				
EE 317	Electronics Laboratory I (1)				
EE 320	Analog Communication Systems (4)				
EE 330	Writing for Electrical Engineers (1)				
EE 332	Systems Analysis (4)				
EE 334	Probability and Random Processes (4)				
EE 336	Electronics (4)				
EE 345	Microcomputer Programming (4)				
EE 346	Digital Logic Laboratory (1)				
EE 360	Control Systems Theory I (4)				
EE 437	Electric and Magnetic Fields (4)				
EE 496A	Senior Design I (2)				
EE 496B	Senior Design II (2)				
EE 496C	Senior Design III (1)				
ENGR 300	Economics for Engineers (4)				
ENGR 301	Ethics and Professionalism in Engineering (1)				
PHYS 333	Applied Modern Physics (4)				
UPPER DIVISION MATH ELECTIVE (4 units)					
<i>Select one from the following:</i>					
MATH 325	Math Notation and Proof (4)				
MATH 402A	Advanced Math I for Engineers and Physicists (4)				
MATH 403	Partial Differential Equations (4)				
MATH 474	Theory of Probability (4)				
UPPER DIVISION TECHNICAL ELECTIVES AND SPECIALIZATION (35 units)					
<i>Select 3 lecture courses and 1 laboratory course in one specialty with advisor's approval. Select 5 additional lectures and 2 laboratories as upper division technical electives.</i>					
ELECTIVE LECTURES:					
CS 342	Object Oriented Programming Using C++ (4)				
EE 347	Computer Logic Design (4)				
EE 371	Analog Electronics (4)				
EE 372	Digital Electronics (4)				
EE 412	Antennas (4)				
EE 420	Digital Communication Systems (4)				
EE 421	Coding for Communications (4)				
EE 422	Digital Signal Processing (4)				
EE 424	Fiber Optics (4)				
EE 426	Digital Image Processing (4)				
EE 427	Speech Signal Processing (4)				
EE 432	Power Transmission Lines (4)				
EE 433	Electric Power System Analysis (4)				
EE 434	Electromagnetic Energy Conversion (4)				
EE 436	Analog Integrated Circuits (4)				
EE 439	Digital Integrated Circuits (4)				
EE 440	Data Communications & Networking (4)				
EE 442	Multimedia Networking (4)				
EE 445	Microprocessor Interface Design (4)				
EE 447	Backend Compiler Technology (4)				
EE 449	Computer Organization (4)				
EE 460	Control Systems Theory II (4)				
EE 461	Discrete-Time Control Systems (4)				
EE 462	State Space Control Systems (4)				
EE 465	Systems Engineering (4)				
EE 472	Optoelectronics (4)				
EE 483	Power Electronics (4)				

COURSE	TRANSFERRED FROM		QTR UNITS	GRADE	G ⁺
	INSTITUTION	DEPT & COURSE			
<i>ELECTIVE LABORATORIES:</i>					
EE 314 Electromagnetic Energy Conversion Laboratory (1)					
EE 321 Communications Laboratory (1)					
EE 340 Electronics Laboratory II (1)					
EE 428 Digital Signal Processing Laboratory (1)					
EE 443 Programmable Logic Laboratory (1)					
EE 448 HDL Design and Simulation Laboratory (1)					
EE 468 Control Systems Laboratory (1)					
EE 498 Cooperative Education (1)					
EE 499 Undergraduate Directed Study (1)					

EVALUATION APPROVAL	
Advisor: _____	Date: _____
Department Chair: _____	Date: _____

GENERAL EDUCATION ADVISEMENT FORM

CATEGORY/COURSE	TRANSFERRED FROM		QTR UNITS	GRADE	REMARKS
	INSTITUTION	COURSE			
I. LOWER DIVISION GENERAL EDUCATION AND UNIVERSITY REQUIREMENT (32 or 36 units) (please skip to Part II if the Lower Division GE is entirely completed and certified at a community college.)					
BLOCK A: BASIC SUBJECTS (8 units)					
A1: ENGL 101 (4)					
A2: COMM 150 (4)					
AMERICAN INSTITUTIONS (8 units)					
HIST 202A or 202B					
POLS 150 or 200					
BLOCK B: NATURAL SCIENCES (4 units)*					
BIOL 155 or 156 or MICR 151					
BLOCK C: HUMANITIES (12 units) Select three courses from three different areas					
C1: LITERATURE AND DRAMA ANTH/ENGL 245 ENGL 207, 250, 258, (d) 260, (d) 270, 280 SPAN 242 TA 152					
C2: ARTS ART 101ABC, 150, 152, 155, 156, 157, 159, 209 CHS 112 (d) CHS/PAS 260 DANC 157 DANC/TA/TVF 210 ENGL/TVF 225 (d) LBS 234 MUS 150, 151, 152, 156, 157, 160					
C3: PHILOSOPHY AND RELIGIOUS STUDIES PHIL 151, 152 (d) PHIL/RELS 200 (d) PHIL 220					
C4: LANGUAGES OTHER THAN ENGLISH COMD 150 CHIN 100ABC, 101ABC, 200ABC FREN 100ABC, 130, 200AB GERM 100ABC ITAL 100ABC, 200AB JAPN 100ABC, 130, 200ABC KOR 100ABC LATN 100ABC PAS 120 PORT 100ABC RUSS 101AB SPAN 100ABC, 105, 130, 200ABC, 205AB					
C5: INTEGRATED HUMANITIES ENGL/TA/TVF 240 ENGL/PHIL 210					
BLOCK E: LIFELONG UNDERSTANDING AND SELF-DEVELOPMENT (4 units)					
ANTH 265 (d) ART 240 BUS 200 (d) CHD/SOC 120 COMM 230 HS 150 KIN 150 (d) PHIL 230 POLS 120 PSY 160 (d) SOC 202 TECH 250					
* Natural Sciences course is not required for all students who are admitted Fall 1998 and later. (d) preceding the course number indicates that it is an Approved Diversity Course.					
II. LOWER DIVISION GENERAL EDUCATION CERTIFICATION					
<input type="checkbox"/> GE Certification					

CATEGORY/COURSE	TRANSFERRED FROM		QTR UNITS	GRADE	REMARKS
	INSTITUTION	COURSE			
III. UNIVERSITY REQUIREMENT (4 units)					
ENGL 102					
WPE	* must be taken at CSU				
IV. GENERAL EDUCATION UPPER DIVISION THEME (12 units)					
			Theme Designation _____		
	* must be taken at CSU				
	* must be taken at CSU				
	* must be taken at CSU				

GENERAL EDUCATION NOTES

- ☛ A minimum C grade average in GE is required of all students following the 1987-1999 or any later catalog.
- ☛ Students, who fall under the Fall 1998 or any later GE catalog, must complete two diversity courses which may be selected from BLOCK C, BLOCK E or from the GE Upper Division Themes.
- ☛ ENGL 102 is required for all students who entered Cal State L.A. Summer 1993 or later, and who are subject to the requirements of the 1993-95 or later GE catalog. A minimum C grade is required. A 'C-' grade is not acceptable.
- ☛ Engineering majors, who fall under the Fall 1998 or any later GE catalog, must complete a BIOLOGY course as part of their Upper Division Theme.

Advisor: _____

Date: _____

Department Chair: _____

Date: _____

GE FOR ENGINEERING MAJORS

Effective: Fall Quarter, 1998

A Basic Subjects	American Institutions	B Natural Sciences	C Humanities	D Social Sciences	E Lifelong Understanding & Self Development
8 units	8 units	0 units	12 units	0 units	4 units
<p><u>A1: WRITTEN COMM</u> ENGL 101 ENGL 102*</p> <p><u>A2: ORAL COMM</u> COMM 150</p> <p><u>A3: CRITICAL THINKING</u> <i>exempt</i></p> <p><u>A4: MATH</u> <i>fulfilled in major</i></p> <p>"C" grade or better in these courses is required.</p>	<p><u>US HISTORY</u> HIST 202A or 202B</p> <p><u>US CONSTITUTION</u> POLS 150†</p> <p><u>STATE-LOCAL GOV'T</u> POLS 150† or 200</p>	<p><u>B1: BIOLOGICAL**</u> <i>(with lab)</i> <i>exempt</i></p> <p><u>B2: PHYSICAL</u> <i>(with lab)</i> <i>fulfilled in major</i></p> <p><u>B3: APPLIED NATURAL</u> <i>exempt</i></p>	<p><u>C1: LITERATURE & DRAMA</u> ANTH/ENGL 245 (d) CHS 201 ENGL 207, 250, 258, (d) 260, (d) 270, 280 SPAN 242 TA 152</p> <p><u>C2: ARTS</u> ART 101ABC, 150, 152, 155, 156, 157, 159, (d) 209 CHS 112 (d) CHS/PAS 260 DANC 157 DANC/TA/TVF 210 ENGL/TVF 225 (d) LBS 234 MUS 150, 151, 152, 156, 157, 160</p> <p><u>C3: PHILOSOPHY & RELIGIOUS STUDIES</u> PHIL 151, 152 (d) PHIL/RELS 200 (d) PHIL 220</p>	<p><u>ENGR 300</u> <i>fulfilled in major</i></p> <p><u>C4: LANGUAGES OTHER THAN ENGLISH</u> COMD 150 CHIN 100ABC, 101ABC, 200ABC FREN 100ABC, 130, 200AB GERM 100ABC ITAL 100ABC, 200AB JAPN 100ABC, 130, 200ABC KOR 100ABC LATN 100ABC PAS 120 PORT 100ABC RUSS 101AB SPAN 100ABC, 105, 130, 200ABC, 205AB</p> <p><u>C5: INTEGRATED HUMANITIES</u> ENGL/TA/TVF 240 ENGL/PHIL 210</p>	<p>ANTH 265 (d) ART 240 BUS 200 (d) CHDV/SOC 120 COMM 230 HS 150 KIN 150 (d) PHIL 230 POLS 120 PSY 160 (d) SOC 202 TECH 250</p> <p><i>(d) Approved diversity courses.</i></p> <p>CAL STATE L.A.</p>
<p>NOTES:</p> <p>* ENGL 102 is required for all students who entered Cal State LA Summer 1993 or later and who are subject to the 1993-95 or later GE catalog requirements.</p> <p>† POLS 150 meets the requirements for both areas.</p> <p>** Natural Sciences: Biological course is not required for all students who are admitted Fall 1998 and later.</p> <ul style="list-style-type: none"> • A minimum "C" grade average in general education is required for all students following the 1987-89 or any later catalog. • Students must complete two diversity courses which may be selected from blocks C, E, or from GE upper division themes. • To satisfy the upper division requirement, all engineering majors must successfully complete a biology course as part of their upper division theme. • Engineering majors may not include successful completion of a course in Engineering or Technology to meet any part of their upper division theme requirement. 					

XVI. ROADMAPS

**Sample 4 year plan for Freshman Students for the Bachelor of Science Degree in Electrical Engineering
(Total: 198 Units)**

	Fall ____	Winter ____	Spring ____	Summer __	Total
Year 1	CHEM 101 (5) ENGL 101 (4) ENGR 150 (1) MATH 206 (4) TOTAL: (14)	ENGL 102 (4) MATH 207 (4) PHYS 211 (5) TOTAL: (13)	CE/ME 208 (4) MATH 208 (4) PHYS 212 (5) TOTAL: (13)	COMM 150 (4) MATH 209 (4) PHYS 213 (5) TOTAL: (13)	53
Year 2	EE 204 (4) EE 210 (1) EE 244 (4) MATH 215 (4) TOTAL: (13)	EE 211 (1) EE 290 (3) HIST 202A/B (4) PHYS 333 (4) UNIV 400 (0) TOTAL: (12)	EE 332 (4) EE 336 (4) EE 346 (1) POLS 150 (4) TOTAL: (13)	CS 242 (4) EE 317 (1) ENGR 300 (4) TOTAL: (9)	47
Year 3	EE 330 (1) EE 334 (4) EE 345 (4) GE: HUMANITIES (4) TOTAL: (13)	EE 304 (4) EE 320 (4) ENGR 301 (1) GE: HUMANITIES (4) TOTAL: (13)	EE 360 (4) EE ELECTIVE (4) EE LAB ELECTIVE (1) GE: HUMANITIES (4) TOTAL: (13)	EE ELECTIVE (4) EE ELECTIVE (4) EE LAB ELECTIVE (1) TOTAL: (9)	48
Year 4	EE 437 (4) EE 496A (2) EE ELECTIVE (4) GE BLOCK E (4) TOTAL: (14)	EE 496B (2) EE ELECTIVE (4) GE THEME (4) UPPER DIVISION MATH (4) TOTAL: (14)	EE 496C (1) EE ELECTIVE (4) EE ELECTIVE (4) GE THEME (4) TOTAL: (13)	EE ELECTIVE (4) EE LAB ELECTIVE (1) GE THEME (4) TOTAL: (9)	50

**Sample 2 year plan for Transfer Students for the Bachelor of Science Degree in Electrical Engineering
(Total: 198 Units including Transfer Units)**

	Fall ____	Winter ____	Spring ____	Summer __	Total
Year 3	EE 290 (3) EE 332 (4) ENGL 102 (4) ENGR 150 (1) PHYS 333 (4) TOTAL: (16)	EE 304 (4) EE 334 (4) EE 336 (4) ENGR 301 (1) UNIV 400 (0) TOTAL: (13)	EE 317 (1) EE 330 (1) EE 345 (4) EE 360 (4) ENGR 300 (4) TOTAL: (14)	EE 320 (4) EE ELECTIVE (4) EE LAB ELECTIVE (1) TOTAL: (9)	52
Year 4	EE 437 (4) EE 496A (2) EE ELECTIVE (4) EE LAB ELECTIVE (1) GE THEME (4) TOTAL: (15)	EE 496B (2) EE ELECTIVE (4) EE ELECTIVE (4) EE LAB ELECTIVE (1) UPPER DIVISION MATH (4) TOTAL: (15)	EE 496C (1) EE ELECTIVE (4) EE ELECTIVE (4) EE ELECTIVE (4) GE THEME (4) TOTAL: (13)	EE ELECTIVE (4) EE ELECTIVE (4) GE THEME (4) TOTAL: (12)	55

Assumes transfer credit received for the following courses (Equivalent of 91 Units):

ENGL 101 (4)	CHEM 101 (5)	CE/ME 208 (4)
COMM 150 (4)	MATH 206 (4)	EE 204 (4)
HIST 202A/B (4)	MATH 207 (4)	EE 210 (1)
POLS 150 (4)	MATH 208 (4)	EE 211 (1)
GE HUMANITIES (4)	MATH 209 (4)	EE 244 (4)
GE HUMANITIES (4)	MATH 215 (4)	EE 346 (1)
GE HUMANITIES (4)	PHYS 211 (5)	CS 242 (4)
GE BLOCK E (4)	PHYS 212 (5)	
	PHYS 213 (5)	

Total: 32 Units

Total: 40 Units

Total: 19 Units