California State University, Los Angeles
Department of Mechanical Engineering

Undergraduate Student Handbook
B.S. in Mechanical Engineering

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.

Prepared by the Faculty of the Department of Mechanical Engineering

2006

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I. INTRODUCTION

THE MECHANICAL ENGINEERING PROFESSION

Mechanical engineering is one of the most fundamental and broadest engineering disciplines, covering many technical specialties that interact with each other, and is closely related to several other engineering professions, such as, civil, electrical, aerospace, marine, automotive, chemical, and petroleum engineering. As a mechanical engineer, you may become involved in the planning, design, fabrication, testing, operation, and maintenance of parts, devices, machines, systems, or processes, that vary widely in nature, size, and scope. You may deal with individual parts, components, mechanisms, sub-systems, or complete systems of complex machines, such as, land, sea, aerial, and space vehicles. You may work for production-oriented industries, such as, machine shops, power plants, oil refineries, and even food processing plants. Inter-disciplinary specializations related to bio-medical products, renewable energy systems, and environmental protection are also some of the emerging opportunities for mechanical engineers.

As you develop your experience and skills, you will have the opportunity to advance into the rank of management, supervising engineering teams, engineering projects, or even entire facilities. In addition to these technical and management opportunities, you will also have the option to become a teacher, or a professor, and to conduct research at a university, a national research lab, or in the industry of your specialty.

As we enter the new millennium, the growth of the world population to six billion people will create unprecedented demands for energy producing, food supplying, land stabilizing, water preserving, transportation providing, materials handling, waste disposing, earth moving, health caring, environmental cleansing, living, working, and manufacturing facilities. As always, highly-trained mechanical engineers will be indispensable to meet the world's demands, designing and building new machines, systems, and processes to advance civilization, and raise the standard of living, while conserving energy resources and preserving the environment.

You will be in the forefront of technology, and will be using the latest concepts and high-tech tools in designing and fabricating new devices and systems. You will be working with project managers, fellow engineers, technicians, workers, contractors, consultants, customers, academia, research labs, and the government in the many aspects and phases of engineering projects. Some of the greatest rewards of mechanical engineering are the professional achievements of creating efficient machines and systems to better serve our society, and the personal satisfaction derived from the interaction with other professionals from all walks of live.

AREAS OF SPECIALIZATION

Applied Mechanics
All mechanical engineers must be proficient in the subjects of applied mechanics (statics, dynamics, materials and control), which best distinguish mechanical engineering from other engineering disciplines. These subjects provide knowledge on the behavior of objects under forces, pressure, and stresses, whether the objects are stationary, such as buildings and bridges, or moving, such as vehicles or vibrating structures. With the knowledge in applied mechanics, a mechanical

engineer will be able to design durable structures and efficient mechanical systems, and select the right materials for the structures or systems to accomplish some prescribed functions. Those mechanical engineers who are most specialized in applied mechanics often deal with the properties of engineering materials and the design of structures, mechanisms, machines and the control systems for these devices. (Prof. Lin-Min Hsia, Prof. Maj Mirmirani, Prof. Adel Sharif, Prof. Stephen Felszeghy)

Thermal Systems Engineering
The knowledge in thermal sciences (thermodynamics, fluid mechanics, and heat transfer) is equally important for mechanical engineers. Mechanical engineers specializing in thermal systems mainly deal with the production and conversion of energy required for human needs and for other systems. They design efficient engines and power plants to provide mechanical power for other machines and electrical power for society. They design heating, ventilation and air-conditioning systems to provide comfortable living and working environment. They operate oil refineries and build pipelines for the transport of petroleum. They design solar and wind power stations to extract clean energy from nature. They predict and control the flow of water and air to minimize the adverse effects of pollutants. (Prof. Darrell Guillaume, Prof. Ram Manvi)

Manufacturing Engineering
It is the manufacturing engineer who turns design ideas and engineering drawings into reality. Mechanical engineers specialized in manufacturing are familiar with machine tools, manufacturing processes, and properties of engineering materials. They work closely with design engineers and technicians to fabricate parts, components, sub-assemblies, or complete systems. Modern computer-aided design and manufacturing (CAD/CAM) software, high-tech precision machines, and computer-controlled manufacturing technologies have been developed to enable the manufacturing engineers to produce highly complex and efficient systems. (Prof. Neda Fabris)

Aeronautical Engineering
The required curriculum for aeronautical engineering is very similar to mechanical engineering, with emphases on applications of applied mechanics and thermal sciences to the configuration design, structural design, propulsion systems, and control systems of aircraft. Using the same knowledge, aeronautical engineers may also be involved in the design of land and marine vehicles. The recent development of autonomous unmanned aerial vehicles (UAV) integrating the use of the Global Position System (GPS), and the potentials of alternative propulsion systems, such as, solar power or fuel cells, are creating new windows of opportunity for aeronautical engineers. These UAV's may become the long-endurance surveillance platforms and low-cost satellites of the future, on top of many other applications. (Prof. Chivey Wu)

Rehabilitation Engineering
This is a new, rare, and very specialized field that crosses paths with the medical and human service professions. Rehabilitation engineers work closely with doctors and therapists to design machines to train natural handicaps, or to assist patients to recover from injuries. They also design devices to support handicapped persons in their everyday life and learning. (Prof. Sam Landsberger)

CHOOSING YOUR TECHNICAL SPECIALTY

Introductory courses in all areas of mechanical engineering are included among the upper division required courses. These courses will give you an overview of the field and help you select an area in which you would like to specialize. If you decide to concentrate on a specialty at this stage, you will

be able to pursue it in more detail by choosing the appropriate upper division electives. You may, however, continue taking courses in several areas if you wish and wait until after graduation before deciding on a specialty.

Some mechanical engineering graduates today go straight into a master's degree program, and others pursue a master's degree later while in practice. This postgraduate study is widely supported by many employers. Significant and increasing numbers of those with master's degrees continue on to earn a doctorate degree, primarily to prepare for careers in research and teaching. In the master's degree program at Cal State L.A., you can specialize in applied mechanics, thermal systems engineering, manufacturing engineering, and aeronautical engineering.

STUDENT ORGANIZATIONS

Honor Societies
Pi Tau Sigma and Tau Beta Pi are undergraduate honor societies. Election to honor societies represents outstanding scholarship as well as participation in other activities. Tau Beta Pi is for all engineering disciplines, while Pi Tau Sigma is for mechanical engineering students only.

Professional Societies
The student chapters of professional societies conduct regular meetings, invite speakers, arrange field trips, and participate in local competitions. Our American Society of Mechanical Engineers (ASME) and Society of Automotive Engineers (SAE) Student Chapters have participated in the past in society sponsored design and racing contests, such as, human-powered vehicle, remote-control aircraft, and Mini-Baja car.

Student Organization	Faculty Advisor
American Society of Mechanical Engineers (ASME)	Prof. Adel Sharif
Society of Automotive Engineers (SAE)	Prof. Lih-Min Hsia
Society of Manufacturing Engineering (SME)	Prof. Neda Fabris
American Institute of Aeronautics and Astronautics (AIAA)	Prof. Maj Mirmirani

PROFESSIONAL REGISTRATION

Some mechanical engineers in charge of projects must be licensed or registered in the state or states in which the projects will be conducted. To use the term "Professional Engineer," you must complete the requirements for professional registration or licensure established by the state. Registration requires education, professional experience, and successful completion of the Engineer-in-Training (EIT/FE) examination (Prof. Sharif), and of the Professional Engineering (PE) examination (Prof. Sharif). The department offers a review course to help students prepare for the FE/EIT examination, and reimburses the application fees to undergraduate students who successfully pass the exam.

II. UNDERGRADUATE DEGREE REQUIREMENTS

The Mechanical Engineering program provides instruction in the basic sciences, and in engineering analysis and design. Areas of interest within Mechanical Engineering include: machine design, energy systems, robotics, aeronautics, materials, manufacturing, air-conditioning, and inter-disciplinary fields, such as, environmental engineering, and rehabilitation engineering. The minimum requirements (194 quarter units) for the Bachelor of Science degree in Mechanical Engineering are described in the following. This program of study is accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology (EAC/ABET).

REQUIREMENTS FOR THE MAJOR (146 UNITS MINIMUM)

Lower Division Required Courses (68 units)

ENGR 100	Introduction to Engineering (1)
MATH 206-209	Calculus I-IV (4 each)
MATH 215	Differential Equations (4)
PHYS 201-204	General Physics I-IV (4 each)
CHEM 101	General Chemistry I (5)
ME 103	Introduction to Mechanical Design (3)
CE/ME 201	Statics (4)
ME 204	Mechanical Engineering Measurements and Instrumentation (4)
CE/ME 205	Strength of Materials I (4)
ENGR 207	Materials Science and Engineering (4):
CE/ME 210	Matrix Algebra for Engineers (2)
CE/ME 211	Statistics and Probability for Engineers (2)
EE 210	Electrical Measurements Laboratory (1)
CS 290*	Introduction to FORTRAN Programming (2)

May substitute a course in any high-level programming language with department approval.

Upper Division Major Requirements (41 units)

ENGR 300	Economics for Engineers (4)
ENGR 301	Ethics and Professionalism (1)
CE/ME 303	Fluid Mechanics I (4)
ME 306	Heat Transfer I (4)
ME 310	Mechanical Engineering Writing Laboratory (1)
CE/ME 312	Strength of Materials Laboratory I (1)
CE/ME 313	Fluid Mechanics Laboratory I (1)
ME 315	Thermal Systems Laboratory I (1)
CE/ME 320	Dynamics I (4)
ME 321*	Kinematics of Mechanisms (4)
ME 323	Machine Design I (4)
ME 326A	Thermodynamics I (4)
ME 326B	Thermodynamics II (4)
ME 327	Manufacturing Processes (4)
ME 421*	Dynamics of Mechanisms (4)

Students must select either ME 321 or ME 421 as a required course.
The other may be taken as an upper division technical elective.

Senior Design Requirements (12 units)

The senior design requirement is a three‑course series that must be completed sequentially. The first course (497A) is offered in the Fall quarter.

ME 497A	Mechanical Engineering Senior Project (4)	
ME 497B	Mechanical Engineering Senior Project (4)	
ME 497C	Mechanical Engineering Senior Project (4)	

Upper Division Technical Electives (25 units)
Select six lecture courses and one laboratory course from the following.

Lecture Electives (24 units):

ME 402	Advanced Mechanics of Materials (4)
ME 403	Aerodynamics (4)
ME 406	Heat Transfer II (4)
ME 407	Design of Thermal Systems (4)
ME 408	Fluid Mechanics II (4)
ME 409	Mechanical Engineering Analysis (4)
ME 410	Control of Mechanical Systems (4)
ME 411	Vibrational Analysis I (4)
ME 414	Machine Design II (4)
ME 415	Air Conditioning (4)
ME 416	Energy Systems (4)
ME 419	Computer-Aided Mechanical Engineering (4)
ME 422	Optimization of Mechanical Engineering Systems (4)
ME 423	Introduction to the Finite Element Method (4)
ME 428	Automation and Computer-Aided Manufacturing (4)
ME 430	Properties and Selection of Engineering Materials (4)
ME 454	Special Topics in Mechanical Engineering (1-4)
EE/ME 481	Introduction to Robotics (4)

Laboratory Electives (1 unit)

ME 412	Strength of Materials Laboratory II (1)
ME 413	Fluid Mechanics Laboratory II (1)
ME 417	Machine Analysis Laboratory (1)
ME 431	Material Laboratory (1)
ME 499	Undergraduate Directed Study (1)

NOTE: No subject credit is allowed for transferred upper division courses with "D" grades.

LOWER DIVISION GENERAL EDUCATION REQUIREMENTS (32 UNITS)

Block A – Basic Subjects (16 units)

ENGL 101	Composition I: Reflective and Expository Writing (4)
COMM 150	Oral Communication (4)
HIST 202A *or* 202B	United States Civilization (4)
POLS 150	Government and American Society (4)

Block C - Humanities (12 units. Select one course each from three different areas)

C1 – Literature and Drama	ENGL 207, 250, 258, *(d)*260, *(d)*270, 280 ANTH/ENGL 245 SPAN 242 TA 152
C2 - Arts	ART 101ABC, 150, 152, 155, 156, 157, 159, 209 MUS 150, 151, 152, 156, 157, 160 TVF/DANC/TA 210 TVF/ENGL 225 *(d)* CHS 112 *(d)* CHS/PAS 260 *(d)* LBS 234 DANC 157
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, 201ABC FREN 100ABC, 130, 200AB GERM 100ABC, 200ABC ITAL 100ABC, 200ABC JAPN 100ABC, 130, 200ABC, 230 KOR 100ABC LATN 100ABC, 222 PAS 120 PORT 100ABC RUSS 101AB SPAN 100ABC, 105, 130, 200ABC, 205ABC, 230
C5 – Integrated Humanities	ENGL/PHIL 210 TVF/ENGL/TA 240

Block E - Lifelong Understanding and Self-Development (4 units. Select one course)

ANTH 265	*(d)* ART 240	BUS 200	*(d)* CHDV/SOC 120
HS 150	KIN 150	*(d)* PHIL 230	POLS 120
PSY 160	COMM 230	SOC 202	TECH 250

Diversity Requirement

Those courses with the course number preceded by the designation *(d)* are 'diversity courses'. Students must include at least two diversity courses (8 units), which may be selected from Block C, Block E, or from the General Education Upper Division Themes as described in the following section.

Minimum Average Grade

A minimum *C grade average in general education* is required of all students following the 1987-1989, or any later catalog.

GENERAL EDUCATION UPPER DIVISION THEME (12 UNITS)

Students are required to select one Upper Division Theme as part of the General Education program. Completion of the lower division basic subjects (Block A) requirement is prerequisite to all Upper Division Theme courses. Courses in each theme are distributed among three areas:

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Natural Sciences and Mathematics, Social Sciences, and Humanities. Students must select one course from each area for the theme selected.

All engineering students <u>must</u>, except for those noted later, select a theme that contains a biology (BIOL) course, and they must enroll in the BIOL course. However, if any engineering student has completed BIOL 155 or 156, or MICR 151, or any course equivalent to these, then such a student is exempt from the above restriction in selecting a theme.

If you have not taken any *diversity* courses as part of your Lower Division General Education requirements, you must fulfill this requirement when you complete the Upper Division Theme.

The following is a complete listing of all the themes and courses they contain.

<u>A. Challenge of Change in the Developing World</u>
Natural Sciences and Mathematics
	GEOG 333	Environment and Development in the Third World (4)
	GEOL 351	Environmental Geology of Developing Nations (4)
Social Sciences
	ECON 360	Developing Countries and the New Global Economy (4)
	HIST 360	Revolution and Society in Developing Countries (4)
	LAS/PAS/POLS 360	Dynamics of Change in the Developing World (4)
	EDFN/LAS/PAS/380	Education and Development in the Third World (4)
Humanities
	TVF 324	Third Cinema/Video (4)
(d)	LAS/PAS 342	Cultural Impact of Development (4)
	PHIL 334	Post-Colonial Values and Modernization in the Developing World (4)

<u>B. Perspectives on Violence</u>
Natural Sciences and Mathematics
	ANTH 315	Evolutionary Perspectives on Violence (4)
	HS/NURS 308	Psychophysiology of Substance Abuse and Violence (4)
	NURS/PSY 307	Physiology and Psychology of Violence and Aggression (4)
Social Sciences
	HIST/POLS 351	Beyond Conflict, Violence and War (4)
	NURS/SW 355	Strategies for Family Violence & Abuse (4)
	COMD/PSY 309	Human Violence and Individual Change (4)
	SOC 383	Violence in American Society (4)
Humanities
	TVF 366	Violence and the Media (4)
	ENGL 382	Violence and Literature (4)
	PHIL 325	Violence and Ethics (4)
	TA 314	Staging Violence in World Theatre (4)

<u>C. Gender in the Diversity of Human Experience</u>
Natural Sciences and Mathematics
	BIOL 388N/PSY 388	Sex and Gender (4)
	ANTH 310	Evolutionary Perspectives on Gender (4)

	NURS 330	Human Reproductive Health (4)

Social Sciences
	(d) SOC 341	Sociology of Gender Roles (4)
	(d) ANTH 338	Gender Roles in Cross-Cultural Perspectives (4)
	(d) HIST 357	Gender in History (4)
	(d) POLS 310	Gender, Politics, and Government (4)

Humanities
	(d) PHIL 327	Philosophy, Gender and Culture (4)
	(d) ENGL/COMM 385	Sex and Gender in Language and Literature (4)
	(d) ENGL/TVF 379	Gender and Sexuality in Popular Culture (4)
	(d) RELS 335	Gender in the Diversity of World Religions (4)

D. Urban Life and Environment

Natural Sciences and Mathematics
	CE 352	Technological Aspects of the Urban Environment (4)
	GEOG 310	Urban Climatology (4)
	GEOL 357	Urban Geology (4)

Social Sciences
	(d) CHDV 321	Urban Families: Contemporary Issues (4)
	(d) GEOG 376	Urban Spatial Processes and Patterns (4)
	HIST 383	Rise of Urban America (4)
	SOC 330	Social Issues in the Urban Setting (4)

Humanities
	ART 317	Visual Arts in Urban Contexts (4)
	ML 300	Language Diversity in Urban America (4)
	(d) COMM 389	Intercultural Communication in the Urban Environment (4)
	TAD 316	Theatre and Dance in the 20th Century Urban Contexts (4)

E. The Diversity of Human Emotions

Natural Sciences and Mathematics
	ANTH 300	Evolutionary Perspectives on Emotions (4)
	PSY 323	Psychology of Emotion (4)

Social Sciences
	(d) HIST 356	History of Emotions (4)
	(d) SOC 300	Cultural Emotion (4)
	(d) RELS 380	Emotion in Religion (4)

Humanities
	(d) CHS/ENGL/PAS 327	Ethnicity and Emotions in U.S. Film (4)
	PHIL 372	Philosophy and the Emotions (4)
	TA/TVF 380	Emotion in Theatre and Film (4)
	ENGL/ML 389	Human Emotions in Literary Expression (4)

F. Human Maturity and Aging Processes and Problems

Natural Sciences and Mathematics
	BIOL 384N	Biology of Human Aging (4)
	NTRS 351	Adult Nutrition (4)
	KIN 345	Physiological Effects of Exercise During Aging (4)

Social Sciences
     (d) ANTH 335   Maturity and Aging in Cross-Cultural Perspectives (4)
     POLS 330   Politics of Aging (4)
     PSY 362   Psychosocial Developmental Stages in Maturity and Aging (4)
     SOC 323   Socialization: Maturity and Aging (4)
Humanities
     ENGL 383   Narratives of Maturity and Aging (4)
     ML 382   Maturity and Aging in East Asia and Romance Literatures (4)
     (d) PHIL 373   Themes of Adult Life in Philosophy (4)
     (d) RELS 325   Themes of Adult Life in the World's Religions (4)

G. The Global Environment: Past, Present, and Future

Note: Effective Fall Quarter 2004, Theme G is discontinued. Only students who started Theme G prior to Fall 2004 may enroll in Theme G courses.
Natural Sciences and Mathematics
     BIOL 341N/GEOL 341   Evolution of Earth and Life through Time (4)
     CE/GEOG 358   Environment, Earth Systems and Technology (4)
Social Sciences
     GEOG/POLS 322   Global Change and the Human Condition (4)
     GEOG 341   World Resources and Environmental Issues (4)
Humanities
     ART 315   The Arts and the Environment (4)

H. Race, Diversity, and Justice

Natural Sciences and Mathematics
     ANTH 361   Race, Racism, and Human Variation (4)
     ANTH/PHIL 385   Measurement of Human Difference (4)
     HS 370   Environmental Racism (4)
Social Sciences
     (d) HIST 352   Mechanical Rights in the United States (4)
     (d) POLS/COMM 342   Rights and Justice in Communication and Politics (4)
     (d) SOC 348   Class, Race/Ethnicity and Gender (4)
     (d) SW 362   From Institutional Racism to Cultural Competency (4)
Humanities
     (d) TVF 334   "Race," Justice and Mass Media (4)
     (d) ENGL/PAS 377   Literary Explorations of Justice and Racism (4)
     (d) LAS 335   Race and Culture in the Americas (4)
     (d) PHIL 323   Human Diversity and Justice (4)

I.   Ancients and Moderns

Natural Sciences and Mathematics
     CHEM 380N/HIST/   Ancient and Modern Science (4)
          PHIL 380
     ENGR/TECH 383   Ancient and Modern Technology (4)
     ASTR 360   Ancient and Modern View of the Universe (4)
Social Sciences
     ANTH 355   Cultural Evolution and Ancient Mechanization (4)
     HIST 311   Classical Mechanization and the Modern World (4)

Humanities

AAAS 350	Ancient East Asian Literature and the Modern World (4)
CHS/ML 312	Mediterranean and Pre-Columbian Myths in Latin American Literature (4)
ENGL 381	Legacy of Greek and Roman Literature (4)
PHIL 321	Ancient Thought and its Modern Legacy (4)

Biology Requirement

This requirement is normally met by engineering students by completing a biology course in an Upper Division Theme (Themes C, F, or G). However, this requirement can also be met by taking a course from the Lower Division General Education Block B1:

B1-Biological   BIOL 155, BIOL 156 or MICR 151 (4 units)

See also "GENERAL EDUCATION UPPER DIVISION THEME" for further details.

UNIVERSITY REQUIREMENTS (4 UNITS)

ENGL 102   Composition II: Analytical and Persuasive Writing (4)
UNIV 400   Writing Proficiency Exam (Must be completed prior to completing 135 units)

All CSU students must demonstrate competence in writing skills as a requirement for graduation. A minimum C grade is required for ENGL 102 (A 'C-' grade is *not* acceptable). Students must also satisfy lower and upper division writing skills requirements.

Lower Division Writing Requirement

The English Placement Test (EPT), described in the *Admissions* chapter of the general catalog, must be taken before enrolling in any courses at Cal State L.A. The EPT is prerequisite to all lower division English writing courses. All baccalaureate students who enter Cal State L.A. Summer 1993 or later, and who are subject to requirements of the 1993-95 or later general education catalog, are required to take two quarters of English composition (ENGL 101 and 102), which must be taken in sequence. Students entering Cal State L.A. as freshmen must complete these courses before they reach upper division standing (90 quarter units). Transfer students entering above the freshmen level who are required to take one or both of these composition courses must do so before they complete 45 quarter units at Cal State L.A. Only the first of the two courses (ENGL 101) is applied to General Education. The second course (ENGL 102) is prerequisite to UNIV 400 (WPE).

Upper Division Writing Requirements (WPE/GWAR)

All Cal State L.A. students who entered in Summer 1984 or later and are pursuing a degree or credential must satisfy the Graduation Writing Assessment Requirement (GWAR) by passing the Writing Proficiency Examination (WPE). Students must first pass ENGL 101 and 102 (or their equivalents) with a minimum grade of C prior to taking the WPE. The WPE must be taken and passed prior to completion of the 135 quarter units. Transfer students who have completed 135 units upon entrance must pass the WPE during their first quarter of residence at Cal State L.A. Students who have satisfied the upper division writing proficiency requirement at another CSU campus shall be considered to have met the Cal State L.A. requirement.

Students who fail to take and pass the WPE within the required time limit of 135 units will have a hold placed on their records, which will preclude them from enrolling in any courses until the WPE requirement is satisfied. Students who receive a No Credit (NC) grade on the WPE must meet with a WPE consultant in the University Writing Center to discuss deficiencies identified by the exam and receive recommendations of activities to correct these deficiencies. Based on the recommendations from the WPE consultant, students may re-take the WPE or enroll in UNIV 401, the upper division writing proficiency course.

To take the WPE, students must register for UNIV 400 by the add deadline of each quarter. Additional information about the WPE is available in the *Schedule of Classes* and at the University Writing Center

Sample 4-year Study Plan
Bachelor of Science Degree in Mechanical Engineering
(Total: 194 Units)

	Fall ____	Winter____	Spring ____	Total
Year 1	ENGL 101 (4) ENGR 100 (1) MATH 206 (4) PHYS 201 (4) COMM 150 (4) TOTAL: (17)	CS 290 (2) ENGL 102 (4) MATH 207 (4) ME 103 (3) PHYS 202 (4) TOTAL: (17)	CE/ME 201 (4) CHEM 101 (5) HIST 202A/B (4) MATH 208 (4) TOTAL: (17)	51
Year 2	CE/ME 210 (2) CE/ME 211 (2) ENGR 207 (4) MATH 209 (4) PHYS 203 (4) TOTAL: (16)	ENGR 300 (4) MATH 215 (4) ME 326A (4) PHYS 204 (4) UNIV 400 (0) TOTAL: (16)	CE/ME 205 (4) CE/ME 320 (4) EE 210 (1) ME 204 (4) ME 326B (4) TOTAL: (17)	49
Year 3	CE/ME 303 (4) ME 310 (1) POLS 150 (4) ME 319 (4) ME 323 (4) TOTAL: (17)	ME 306 (4) CE/ME 312 (1) GE Humanities (4) ME Elective (4) GE Humanities (4) TOTAL: (17)	ENGR 301 (1) GE Humanities (4) GE Block E (4) ME 327 (4) ME Elective (4) TOTAL: (17)	51
Year 4	ME 497A (4) GE Theme (4) ME Elective (4) ME Elective (4) ME Lab Elective (1) TOTAL: (17)	ME 497B (4) GE Theme (4) ME Elective (4) ME Lab Elective (1) TOTAL: (13)	ME 497C (4) GE Theme (4) ME Elective (4) ME Lab Elective (1) TOTAL: (13)	43

This sample study plan assumes the student will attend only three quarters per academic year. However, the university operates on a year round academic calendar and the Department offers a wide variety of courses during the summer quarter. Students may also take courses in summer quarters to accelerate their program of study.

Sample 2-Year Study Plan
Bachelor of Science Degree in Mechanical Engineering

	Fall	Winter	Spring
Year 1	CE/ME 303 (4) ME 310 (1) ME 319 (4) ME 323 (4) ME 326A (4) TOTAL: (17)	ME 306 (4) CE/ME 312 (1) ME Elective (4) GE (4) ME 326B (4) TOTAL: (17)	ENGR 301 (1) GE (4) GE (4) ME 327 (4) ME Elective (4) TOTAL: (17)
Year 2	ME 497A (4) ME Elective (4) ME Elective (4) ME Lab Elective (1) GE (4) TOTAL: (17)	ME 497B (4) GE Theme (4) ME Elective (4) ME Lab Elective (1) GE (4) TOTAL: (17)	ME 497C (4) GE Theme (4) ME Elective (4) ME Lab Elective (1) GE Theme (4) TOTAL: (17)

This sample 2-year study plan is suggested for students who transfer from another higher education institution or a community college with an equivalent of two years of transfer credits in General Education and the Major requirements. It also assumes the student will attend only three quarters per academic year. However, the university operates on a year round academic calendar and the Department offers a wide variety of courses during the summer quarter. Students may also take courses in the summer quarter to accelerate their program of study.

III. LIST OF COURSES

COURSES IN MECHANICAL ENGINEERING

ME 103 Introduction to Mechanical Design (3)
Prerequisite: TECH110 or one year of high school mechanical drafting. Graphics for mechanical engineering design, freehand sketching, use of computer-aided design (CAD) software for solid modeling, descriptive geometry, and selected design projects. Optional rehabilitation engineering service leaning activities.

ME 114 Machine Shop (1)
Introduction to machine shop procedures, safety practices, hand tools, band saw, drill press, milling, turning, welding (Graded CR/NC).

ME 154 Special Topics in Mechanical Engineering (1-4)
Prerequisite: Instructor consent and as needed for specific topic. Current topics of special interest to students in mechanical engineering, as announced in Schedule of Classes. May be repeated for credit.

ME 201 Statics (4) (also listed as CE 201)
Prerequisites: MATH 207, PHYS 201. Fundamental principles of statics, resolution and composition of forces, algebraic and graphic solutions, friction, center of gravity, moment of inertia.

ME 204 Mechanical Measurements and Instrumentation (4)
Prerequisite: PHYS 203. Introduction to electrical circuits, engineering measurements and instrumentation, introduction to automatic control systems and components.

ME 205 Strength of Materials I (4) (also listed as CE 205)
Prerequisite: CE/ME 201. Stressed and strains under axial, shearing, and torsional forces; flexural stresses and deflections of simple beams; columns; and combined stresses.

ME 208 Statics and Strength of Materials (4) (also listed as CE 208)
Prerequisites: MATH 207, PHYS 201. Principles of statics, force systems and equilibrium, structures, machines distributed force, centroid, moment of inertia, stresses, strains and deformation under axial, torsional, and bending loads. For Electrical Engineering students only**.**

ME 210 Matrix Algebra for Engineers (2) (also listed as CE 210)
Prerequisites: MATH 208. Introduction to calculations using vectors; matrix operation; solution of linear simultaneous equations; coordinate transformation; application to engineering problems.

ME 211 Statistics and Probability for Engineers (2) (also listed as CE 211)
Prerequisites: MATH 208. Introduction to calculations using probability distributions and densities; concepts in statistics; application to engineering problems.

ME 303 Fluid Mechanics I (4) (also listed as CE 303)
Prerequisite: <u>PHYS 202</u>. Fundamental principles and methods of fluid mechanics; thermodynamics of fluid flow; Newtonian fluids; equations of fluid flow; laminar and turbulent flow; applications.

ME 306 Heat Transfer I (4)
Prerequisites: <u>MATH 208</u>, <u>PHYS 202</u>. Fundamental principles of heat transfer; conduction, convection, and radiation; applications.

ME 310 Mechanical Engineering Writing Laboratory (1)
Prerequisite: Satisfactory completion of WPE or <u>UNIV 401</u>, and <u>ENGR 100</u>. Technical and laboratory report writing, oral and written communication, introduction to information technology. Laboratory 3 hours.

ME 312 Strength of Materials Laboratory I (1) (also listed as CE 312)
Prerequisites: <u>CE/ME 205</u> (may be taken concurrently). Tests of engineering materials in tension, compression, bending, and torsion; verification by experiment of basic theories learned in strength of materials. Laboratory 3 hours.

ME 313 Fluid Mechanics Laboratory I (1) (also listed as CE 313)
Prerequisites: <u>CE</u>/<u>ME 303.</u> Experiments on fluid properties, fluid statics, conservation of mass, energy, and momentum, and fluid resistance. Laboratory 3 hours.

ME 315 Thermal Systems Laboratory I (1)
Prerequisites: <u>ME 306</u>, <u>326A</u>. Experiments in heat transfer and thermodynamics; thermophysical properties of fluids; analysis, operation, and performance testing of thermal energy conversion systems. Laboratory 3 hours.

ME 319 Computer-aided Problem Solving in Mechanical Engineering (4)
Prerequisites: <u>CS 290</u> , <u>CE/ME 210</u>, <u>211</u>, <u>MATH 215</u>. Application of computer-aided numerical and graphical methods to the solution of problems drawn from various areas of mechanical engineering. The computer-aided methods will be implemented using a combination of one or more computer programming languages and/or existing software packages.

ME 320 Dynamics I (4) (also listed as CE 320)
Prerequisite: <u>CE/ME 201</u>. Kinematics and kinetics of rigid bodies; work, kinetic energy, impulse, momentum in two and three dimensions; applications to space mechanics.

ME 321 Kinematics of Mechanisms (4)
Prerequisites: <u>ME 319</u>. Transmission of motion; theory of mechanisms; linkages; gears; cams; belts and chains.

ME 323 Machine Design I (4)
Prerequisites: <u>ME 103</u>, <u>CE/ME 205,</u> <u>ENGR 207</u>, <u>MATH 208</u>. Application of principles of mechanics, properties of materials, and fabrication processes to design of simple machines and structural elements.

ME 326A Thermodynamics I (4)
Prerequisites: <u>MATH 208</u>, <u>PHYS 202</u>. Concepts of equilibrium and temperature; first and second laws of thermodynamics. Properties of pure substances; ideal gases; application of thermodynamic principles to closed and open systems.

ME 326B Thermodynamics II (4)
Prerequisite: <u>ME 326A</u>. Application of thermodynamic principles; steam generators, engines and turbines; combustion, vapor cycles; refrigeration; internal combustion engines.

ME 327 Manufacturing Processes (4)
Prerequisite: <u>CE/ME 207</u>. Manufacturing properties of metals, alloys, and nonmetallic materials; solidification processes; material forming; material removal; joining processes; unconventional processing; numerical control; and automated processes.

ME 398 Cooperative Education (1- 4)
Prerequisites: Approval of student adviser and department chair. Integration of mechanical engineering work experience with academic program, individually planned through coordinator. Minimum of 10 hours per week required for each unit. Graded CR/NC

ME 402 Advanced Mechanics of Materials (4)
Prerequisites: <u>ME 323</u>, <u>MATH 215</u>. Basic concepts; unsymmetrical beam bending, shear flow, energy methods; the finite element method; theories of failure; introduction to theory of elasticity, plane elastostatic problems; torsion of prismatic cylinders.

ME 403 Aerodynamics (4)
Prerequisites: <u>CE</u>/<u>ME 303</u>, <u>MATH 208</u>. Air-foil characteristics; transonic, supersonic, and viscous effects on lift and drag; power considerations, airplane performances, introduction to airplane and missile stability and control.

ME 406 Heat Transfer II (4)
Prerequisites: <u>ME 303</u>, <u>ME 306</u>. Numerical methods in conduction; theory and applications of convection; thermal radiation, condensing and boiling heat transfer; mass transfer special topics.

ME 407 Design of Thermal Systems (4)
Prerequisites: <u>ME 306</u>, <u>326A</u>. Design in engineering practice; system simulation and optimization; economic, environmental, other constraints; practical aspects of equipment selection; thermal design literature.

ME 408 Fluid Mechanics II (4)
Prerequisites: <u>CE</u>/<u>ME 303</u>; <u>MATH 209</u>. Compressible and incompressible fluid dynamics; continuity, momentum, and energy equations for viscous fluids; circulation and vorticity, Navier-Stokes equation, boundary layer theory, turbulence, two-dimensional flow, three-dimensional flow.

ME 409 Mechanical Engineering Analysis (4)
Prerequisites: <u>MATH 215</u>, and senior standing. Setup of vibration, heat transfer, fluid flow, and other mechanical engineering systems as ordinary and partial differential equations; analogies

between various physical systems. Classical, transform, numerical, and computer-aided methods of solution.

ME 410 Control of Mechanical Systems (4)
Prerequisites: <u>PHYS 204</u>, <u>MATH 215</u>, <u>ME 306</u>. Mathematical models of dynamic systems, fundamentals of feedback control, basic control actions and devices, applications to mechanical systems.

ME 411 Vibrational Analysis I (4)
Prerequisites: <u>CE</u>/<u>ME 320</u>, <u>MATH 215</u>. Analysis of free and forced vibrations with and without damping, systems with several degrees of freedom, vibration isolation, mechanical transients, torsional vibrations, natural frequency computation techniques, finite element analysis software.

ME 412 Strength of Materials Laboratory II (1)
Prerequisite: <u>CE</u>/<u>ME 312</u>; prerequisite or corequisite: <u>CE 360</u> or <u>ME 323</u>. Fatigue tests of materials and connections, stress concentration, photoelasticity, creep tests, shock and vibration tests, combined stresses, and individual projects. Laboratory 3 hours.

ME 413 Fluid Mechanics Laboratory II (1) (also listed as CE 413)
Prerequisite: <u>CE</u>/<u>ME 313</u>; prerequisite or corequisite: <u>CE 387</u> or <u>ME 408</u>. Experiments on subsonic and supersonic flow, free surface flow, pumps, turbines, fans, and unsteady flow.

ME 414 Machine Design II (4)
Prerequisite: <u>ME 323</u>. Design of unit assemblies and machines; materials, safety, lubrication, and construction.

ME 415 Air Conditioning (4)
Prerequisites: <u>ME 306</u>, <u>326B</u>. Psychometric properties of air, heat loads, air conditioning and heating equipment, and air distribution.

ME 416 Energy Systems (4)
Prerequisite: <u>ME 326A</u>. Unconventional energy conversion systems, energy storage, thermoelectric power and refrigeration, absorption refrigeration and cryogenics.

ME 417 Machine Analysis Laboratory (1)
Prerequisites: <u>ME 310</u>, <u>321</u>, <u>323</u>. Experimental analysis of steady state and transient characteristics of machine components and of complete machines. Laboratory 3 hours.

ME 419 Computer Aided Mechanical Engineering (4)
Prerequisites: <u>ME 103</u>, <u>323</u>, <u>303</u>, <u>306</u>, <u>CS 290</u> (or equivalent). Applications of modern engineering tools in computer-aided design, finite element analysis, computational fluid dynamics and control simulations. Problems in mechanics, heat transfer, fluid dynamics, and control, etc. are covered.

ME 421 Dynamics of Mechanisms (4)
Prerequisite: <u>CE</u>/<u>ME 320</u>. Application of principles of statics, kinematics, and dynamics to analysis and design of mechanisms with rotating or reciprocating masses.

ME 422 Optimization of Mechanical Engineering Systems (4)
Prerequisites: PHYS 204, MATH 215, ME 306. Design considerations of mechanical engineering systems; optimization techniques; application of existing computer programs and analytical methods to optimization of mechanical engineering systems.

ME 423 Introduction to the Finite Element Method (4)
Prerequisites: CE/ME 210, CS 290, MATH 215. Corequisites: ME 306, ME 323. Derivation of element stiffness matrices for spring, bar, beam, and constant-strain triangle elements, from energy principles. Application to trusses and frames. Steady-state heat transfer. Use of finite element method software.

ME 428 Automation and Computer-Aided Manufacturing (4)
Prerequisite: ME 327. Automation of manufacturing processes, numerical control, computer-aided manufacturing, group technology, flexible manufacturing, applications of robots in industry.

ME 430 Properties and Selection of Engineering Materials (4)
Prerequisites: ENGR 207, ME 327. Production, strengthening, alloying and thermal treatment of metals. Types, properties of polymers, ceramics and composites. Semiconductor materials and devices. Material selection and protection against deterioration.

ME 431 Material Laboratory (1)
Preparation of metallic samples and study of their internal structure by microscopic techniques. Mechanical testing of non-metallic materials: plastics, ceramics and composites.

ME 454 Special Topics in Mechanical Engineering (1-4)
Prerequisites: Senior standing in mechanical engineering; enrollment subject to approval of instructor in charge. Group study of selected topics not currently offered as technical electives; study groups may be organized in advanced mechanical engineering subjects upon approval of instructor. May be repeated for credit.

ME 481 Introduction to Robotics (4) (also listed as EE 481)
Prerequisite: EE 360 or ME 410. General considerations of robotic manipulator; spatial description, homogeneous transformations; manipulator kinematics; inverse manipulator kinematics; motion trajectories; static forces.

ME 497ABC Mechanical Engineering Senior Project (4, 4, 4)
Prerequisite: Satisfactory completion of the graduation writing assessment requirement (GWAR), senior standing and/or consent of the instructor. Study of engineering design processes. ME 497A includes case studies to discuss the impact of design constraints. 497B and 497C includes the selection and completion of a faculty-supervised project focusing on typical problems encountered in engineering practice and resulting in a formal report and oral presentation. Must be taken in sequence starting with ME 497A.

ME 499 Undergraduate Directed Study (1-4)

Prerequisite: Consent of an instructor to act as sponsor. Project selected in conference with the sponsor before registration; progress meetings held regularly, and a final report submitted. May be repeated for credit.

COURSES IN MATHEMATICS

MATH 206 Calculus I: Differentiation (4)
Prerequisites: Satisfactory score on (or exemption from) ELM; <u>MATH 102</u> and <u>103</u>, each with a minimum *C* grade *or* satisfactory score on placement examination; students with a grade less than B- in either MATH 102 or MATH 103 must enroll concurrently in MATH 206P. Functions, graphs, conics, limits, and continuity, derivatives, antidifferentiation, and applications.

MATH 206P Calculus I Workshop (1)
Activity for Math 206 students with emphasis on problem solving. Concurrent registration in Math 206 required. Open to all Math 206 students but mandatory for students whose grade in Math 102 and Math 103 is less than B-. Graded CR/NC

MATH 207 Calculus II: Integration (4)
Prerequisite: <u>MATH 206</u> with minimum *C* grade; students with a grade less than B- in MATH 206 must enroll concurrently in MATH 207P. The definite integral, Fundamental Theorem of Calculus, transcendental functions, methods of integration, applications to physics and biology.

MATH 207P Calculus II Workshop (1)
Activity for Math 207 students with emphasis on problem solving. Concurrent registration in Math 207 required. Open to all Math 207 students but mandatory for students whose grade in Math 206 is less than B-. Graded CR/NC

MATH 208 Calculus III: Sequences, Series, and Coordinate Systems (4)
Prerequisite: <u>MATH 207</u> with minimum *C* grade; students with a grade less than B- in MATH 207 must enroll concurrently in MATH 208P. Limits of sequences and series, indeterminate forms, Taylor Series, plane coordinate systems, and change of coordinates.

MATH 208P Calculus III Workshop (1)
Activity for Math 208 students with emphasis on problem solving. Concurrent registration in Math 208 required. Open to all Math 208 students but mandatory for students whose grade in Math 207 is less than B-. Graded CR/NC

MATH 209 Calculus IV: Several Variables (4)
Prerequisite: <u>MATH 208</u> with minimum *C* grade. Three-dimensional analytic geometry, partial differentiation, multiple integration, spherical and cylindrical coordinate systems, line integrals.

MATH 215 Differential Equations (4)
Prerequisite: MATH 209. Ordinary differential equations with concentration on methods of finding solutions; applications in science and engineering.

COURSE IN CHEMISTRY

CHEM 101 General Chemistry I (5)

Prerequisite: High school chemistry and physics; two years of high school algebra; satisfactory performance on chemistry diagnostic examination given during registration period. Physical concepts, stoichiometry, structure of atom, periodic table, chemical bonding. Lecture 3 hours, recitation 1 hour, laboratory 3 hours.

COURSES IN PHYSICS

PHYS 201 General Physics (4)
Prerequisites: High school physics or permission of department; MATH 206 (may be taken concurrently). Vectors, mechanics of particles and rigid bodies, basic conservation laws of mechanics.

PHYS 201P: Physics Recitation (1)
Prerequisite: Concurrent registration in PHYS 201. Recitation for PHYS 201 with emphasis on techniques of problem solving. Graded *CR/NC*.

PHYS 202 General Physics (4)
Prerequisite: PHYS 201; prerequisite or corequisite: MATH 207. Mechanical vibrations and sound, elementary thermodynamics.

PHYS 202P: Physics Recitation (1)
Corequisite: PHYS 202. Recitation for PHYS 202 with emphasis on techniques of problem solving. Graded *CR/NC*.

PHYS 203 General Physics (4)
Prerequisite: PHYS 202. Prerequisite or corequisite: MATH 208. Elementary field theory, basic electricity and magnetism, DC and AC circuits.

PHYS 203P: Physics Recitation (1)
Corequisite: Concurrent registration in PHYS 203. Recitation for PHYS 203 with emphasis on techniques of problem solving. Graded *CR/NC*.

PHYS 204 General Physics (4)
Prerequisite: PHYS 203. Prerequisite or corequisite: MATH 209. Continuation of electricity and magnetism including oscillations and waves; geometrical and physical optics.

PHYS 204P Physics Recitation (1)
Corequisite: Concurrent registration in PHYS 204. Recitation for PHYS 204 with emphasis on techniques of problem solving. Graded *CR/NC*.

COURSE IN COMPUTER SCIENCE

CS 290 Introduction to FORTRAN Programming (2)
Prerequisite: MATH 206. Elementary computer programming using FORTRAN language. Lecture 1 hour, laboratory 3 hours.

COURSE IN ELECTRICAL ENGINEERING

EE 210 Electrical Measurements Laboratory (1)

Prerequisite: <u>PHYS 203</u>. Characteristics and limitations of analog and digital electrical and electronic instrumentation, signal sources, and d-c power supplies. Analysis, tabulations, and graphical presentation of measurement data and technical report writing. Laboratory 3 hours.

COURSES IN ENGINEERING

ENGR 100 Introduction to Engineering (1)
Introduction to profession of engineering; ethical and legal aspects of engineering profession; engineering design process; communication and computer skills in engineering. Laboratory 3 hours. Graded CR/NC.

ENGR 154 Special Topics in Engineering (1-4)
Prerequisites: Instructor consent and as needed for specific topic. Current topics of special interest to students in engineering, as announced in Schedule of Classes. May be repeated to maximum of 8 units.

ENGR 207 Materials Science and Engineering (4)
Prerequisites: CHEM 101, MATH 206. Understanding structure and fundamental atomic and molecular mechanisms of engineering materials, atom and electron movement, physical and mechanical properties; overview of engineering materials, semiconductors, metals, ceramics, polymers, and composites.

COURSES IN GENERAL EDUCATION

For description of courses in the General Education and Upper Division Theme requirements, refer to the University catalog, or the website at http://catalog.calstatela.edu.

IV. GENERAL INFORMATION: PROCEDURES AND REGULATION

PLACEMENT TEST REQUIREMENTS

The California State University requires each entering undergraduate, except those who qualify for an exemption, to take the CSU Entry Level Mathematics (ELM) examination and the CSU English Placement Test (EPT) prior to enrollment. These placement tests are not a condition for admission to the CSU, but they are a condition of enrollment. They are designed to identify entering students who may need additional support in acquiring basic English and mathematics skills necessary to succeed in CSU baccalaureate-level courses. Undergraduate students who do not demonstrate college-level skills both in English and in mathematics will be placed in appropriate remedial programs and activities during the first term of their enrollment. Students placed in remedial programs in either English or mathematics must complete all remediation in their first year of enrollment. Failure to complete remediation by the end of the first year may result in denial of enrollment for future terms.

Students register for the EPT and/or ELM at their local CSU campus. Questions about test dates and registration materials may be addressed to the Cal State L.A. Testing Center, Library, Palmer Wing 2098, (323) 343-3160.

All nonexempt undergraduates must complete the EPT and ELM after admission and before first enrollment in courses at Cal State L.A.

English Placement Test (EPT)

The CSU English Placement Test (EPT is designed to assess the level of reading and writing skills of entering undergraduate students so that they can be placed in appropriate baccalaureate-level courses. The CSU EPT must be completed by all entering undergraduates, with the exception of those who present proof of one of the following:

· A score of "Exempt" on the augmented English CST, i.e. the CSU Early Assessment Program (EAP), taken in grade 11.

· A score of 550 or above on the verbal section of the College Board SAT I Reasoning Test taken April 1995 or later.

· A score of 24 or above on the enhanced ACT English Test taken October 1989 or later.

· A score of 680 or above on the re-centered and adjusted College Board SAT II: Writing Test taken May 1998 or later.

· A score of 3, 4, or 5 on either the Language and Composition or the Composition and Literature examination of the College Board Scholastic Advanced Placement program.

· Completion and transfer of 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.

Verification of successful completion of the appropriate course may be required either before registration or by the document deadline date specified at the time of admission. Students who do not submit the required documentation by the time specified are subject to having their admission rescinded and, if enrolled, being dropped from all courses.

The results of the EPT will not affect admission eligibility, but will be used to identify students who need special help in reading and writing to complete college-level work. Information bulletins for the EPT will be mailed to all students subject to this requirement or may be obtained at the Cal State L.A. Testing Center, Library, Palmer Wing 2098, (323) 343-3160.

Entry Level Mathematics (ELM) Placement Examination

The ELM examination is designed to assess the skill levels of entering CSU students in the areas of mathematics typically covered in three years of rigorous college preparatory mathematics courses in high school (Algebra I, Algebra II, and Geometry). The CSU ELM must be completed by all entering undergraduates, with the exception of those who present proof of one of the following:

· A score of "Exempt" on the augmented mathematics CST, i.e., the CSU Early Assessment Program (EAP), taken in grade 11.

· A score of 550 or above on the mathematics section of the College Board SAT I Reasoning Test or on the College Board SAT II Mathematics Tests Level I, IC (Calculator), II, or IIC (Calculator).

· A score of 23 or above on the American College Testing Mathematics Test.

· A score of 3 or above on the College Board Advanced Placement mathematics examination (AB or BC) or Statistics examination.

· Completion and transfer of a course that satisfies the General Education-Breadth or Intersegmental General Education Transfer Curriculum (IGETC) quantitative reasoning requirement, provided such course was completed with a grade of C or better.

Verification of successful completion of the appropriate course may be required either before registration or by the document deadline date specified at the time of admission. Students who do not submit the required documentation by the time specified are subject to having their admission rescinded and, if enrolled, being dropped from all courses.

Students who are required to take this examination should do so as soon as possible after admission and before they enroll in courses. The results of this examination do not affect admission, but will be used to identify students who need special help in mathematics to do college-level work.

Students who cannot demonstrate basic competence on the examination are required to take steps to overcome deficiencies the first quarter of their enrollment. Any course work undertaken primarily to acquire the required competence shall not be applicable to the baccalaureate

Information bulletins for the EPT and ELM examinations are mailed to all students subject to the requirements. The materials may also be obtained from the Cal State L.A. Testing Center, Library, Palmer Wing 2098, (323) 343-3160.

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. Students on scholastic probation must limit their study load to 12 units.

CAMPUS IDENTIFICATION NUMBER (CIN)

California State University, Los Angeles will randomly assign a nine-digit Campus Identification Number (CIN) to all students in the University. This number is used as a means of identifying records and offering services pertaining to students. The students' Social Security Number will continue to be retained for purposes of financial aid eligibility and other debts payable to the institution.

REGISTRATION

Continuing students at California State University, Los Angeles receive a registration notification form in the mail before the scheduled registration dates for each quarter. Complete information about registration procedures is provided in the *Schedule of Classes,* issued each quarter before the registration period and available for purchase at the University Square Bookstore. Student Telephone-Assisted Registration (STAR) is available to all eligible continuing students.

Absence for more than two of any four consecutive quarters without an approved leave of absence will cancel continuing registration eligibility. Attendance in University extension courses does not constitute continuous attendance.

ACADEMIC ADVISEMENT

Academic advisement is required for all new students before or during their first quarter in attendance. Before registering for their first quarter at Cal State L.A., students must consult an adviser in their major department/division or college-based advisement center to plan a program of study. After the first advisement session, students must consult an academic adviser at least annually or more often as necessary to enhance academic success.

Annual, or more often as needed, consultation with an academic adviser *in* the major department required. Newly admitted students should bring a copy of all high school and/or college transcripts when seeking advisement. They should consult the *Department of Mechanical engineering* for making an appointment with their academic adviser.

REPEATING COURSES

Unless otherwise indicated, students may not repeat for credit any course they have already completed with a grade of *C* (2.0 grade points) or higher nor may they, in any case, receive units earned more than once for each passing attempt.

REMOVAL OF WORK FROM DEGREE CONSIDERATION

Under certain circumstances, up to two semesters or three quarters of previous undergraduate course work taken at any college may be disregarded from all considerations associated with requirements for the baccalaureate. Detailed eligibility and procedural information is provided in the *Schedule of Classes*. The basic criteria are listed below:

- Five years must have elapsed since the completion of the most recent work to be disregarded;

- Any previous removal of work from degree consideration must be included in applying the limits on work that may be disregarded;

- Since completion of the work to be disregarded, students must have maintained the following grade point averages at Cal State L.A. at the time of petition: 3.0 for students with 22–44 quarter units completed; 2.5 with 45–66 units completed; and 2.0 with 67 or more units completed; *and·* there must be evidence that the student would find it necessary to complete additional units and enroll for one or more additional quarters to qualify for the baccalaureate if the request was not approved.

- There must be evidence that the student would find it necessary to complete additional units and enroll for one or more additional quarters to qualify for the baccalaureate if the request was not approved.

REPEATING COURSES FOR ACADEMIC RENEWAL

Effective Summer 1983, students who are pursuing a baccalaureate may repeat a course one time for purposes of academic renewal if the grade of record is below a *C* (2.0 grade points). This procedure is limited to a maximum of 20 quarter units. *All repetitions must be done at Cal State L.A.*

Students who are pursuing a second or subsequent bachelor's degree may repeat only courses leading to the present degree objective (not courses used for prior bachelor's degrees) for purposes of academic renewal. In computing grade point averages for graduation with a baccalaureate from Cal State L.A., units attempted, units earned (if any), and grade points (if any) for previous attempts of the same or equivalent courses shall be excluded when specified conditions are met.

Students are advised that repeating a course under this policy does not result in removal of the original record and grade from the transcript. However, the earlier grade is disregarded in calculating the grade point average. The repeated course form, available at Administration 146, must be on file when a student enrolls in the course to be repeated and no later than the add deadline.

WITHDRAWAL FROM COURSES

Within the first seven days of 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/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*.

Withdrawals during the final three weeks of instruction are permitted only when the cause of withdrawal (such as accident or serious illness) is clearly beyond the student's control and assignment of an *I* (Incomplete) is not practicable. Ordinarily, such withdrawals also involve total withdrawal from the University, except that *CR* (credit) or *I* (Incomplete) may be assigned for

courses in which the student has completed sufficient work to permit an evaluation. Requests to withdraw under these circumstances are handled as described above, except that such requests must also be endorsed by the dean of the college.

COURSE PREREQUISITES AND COREQUISITES

Students are responsible for fulfilling prerequisites and corequisites. *A prerequisite waiver must be approved for students taking Mechanical engineering courses without the necessary prerequisite(s) and/or corequisite(s).*

GRADES REQUIRED FOR CREDIT

The grade point average (GPA) is computed by dividing the total number of grade points earned by the total number of units attempted. Students are advised that they receive no credit for any course in which they do not earn a grade of *D-* or higher.

GRADE POINT AVERAGE REQUIREMENTS

Undergraduate students are expected to maintain a *C* (2.0) average in all courses attempted at Cal State L.A. and any other college or university attended and to make satisfactory progress toward their academic objectives. Students who receive financial aid should inform themselves of additional criteria defining satisfactory progress by consulting the Center for Student Financial Aid.

PROBATION FOR UNDERGRADUATE STUDENTS

Probation is determined separately for academic and administrative-academic deficiencies. Students' probation status is indicated on their grade report.

ACADEMIC PROBATION

Students are placed on academic probation at the end of a quarter if either their grade point average at Cal State L.A. or their cumulative grade point average in all college work attempted falls below C (2.0). They are continued on academic probation until their Cal State L.A. and cumulative grade point average is 2.0 or higher or until they are disqualified in accordance with the regulations for academic disqualification.

DISQUALIFICATION OF UNDERGRADUATE STUDENTS

Disqualification is determined separately for academic and administrative-academic deficiencies. Students' disqualification status is indicated on their grade report.

Academic Disqualification: Students currently on probation or special probation whose Cal State L.A. or cumulative grade point average reaches the following levels are disqualified:

Class Level	Grade Point Average
Freshman (0-44 units completed)	<1.50
Sophomores (45-89 units completed)	<1.70
Juniors (90-134 units completed)	<1.85
Seniors (135+ units completed)	<1.95

Immediate Reinstatement: Disqualified students may submit a petition for immediate reinstatement to their college dean or designee (department chair in the Colleges of Engineering, Computer Science, and Technology and Natural and Social Sciences) after the exit interview has taken place. The University Academic Advisement Center will rule on petitions for immediate reinstatement for undeclared majors after their exit interview has taken place. Students' approved petitions must be received in Enrollment Services, Administration 146, by the end of the third week of the quarter after disqualification.

Immediate reinstatement may be granted for not more than two successive quarters to students who are pursuing the program in which disqualification was incurred, including an undeclared major. Students who are admitted with a grade point average less than 2.0 on transfer work and whose grades at Cal State L.A. alone are not the basis for disqualification may qualify for immediate reinstatement in additional quarters.

Students who are enrolled but not officially reinstated for the quarter after disqualification should file a request for complete withdrawal and full refund of fees by the end of the third week of the quarter. Official withdrawal and refund application forms are available at Administration 146. Complete withdrawal may also be accomplished by writing to the Registrar's Office. Registration will be cancelled for disqualified students who are enrolled and do not file a withdrawal request; fees are not returned in these cases.

Special Probation: All disqualified students who are reinstated or readmitted are placed on special probation because their grade point average is less than is allowed for their class level as outlined above. These students are required to earn better than a C (2.0) grade point average each quarter until their grade point average is increased to a level that is higher than that which would normally cause them to be disqualified according to their class level. Students who withdraw completely from any quarter while on special probation will again be disqualified.
Readmission of Disqualified Students

Readmission after disqualification is not automatic. Disqualified students will not be considered for readmission until at least two quarters have elapsed.

RESIDENCE REQUIREMENT

Undergraduate students must complete a minimum of 45 quarter units, including at least 36 upper division units, 18 units in the major, and 12 units in general education courses, in residence at Cal State L.A. for the baccalaureate. Credit earned in special sessions may be applied toward this residence requirement. However, only 36 residence units may be earned through Open University. Credit earned in extension courses or by examination may not apply toward the residence

requirement. *A minimum of 12 units in CE upper division electives must be taken in residence at Cal State L.A.*

SCHOLARSHIP REQUIREMENTS

In addition to meeting total unit requirements for graduation, students must also satisfy specific scholarship requirements. These include achievement of a minimum 2.0 grade point average (C on a scale in which A=4.0) in all units attempted, including those accepted by transfer from another institution, all courses required for the major, all courses used to meet General Education requirements, and all units attempted at Cal State L.A.

UNDERGRADUATE CREDIT FOR GRADUATE COURSES

Under extraordinary academic circumstances as specified below, the University Curriculum Subcommittee may approve the granting of baccalaureate credit for 500-level course work to a maximum of two courses not to exceed a total of 8 quarter units. The following conditions must be met:

- Senior standing at the time of petition (completion of 135 quarter units);

- grade point average of 3.5 in the major;

- submission of a petition to the Curriculum Subcommittee at least one full quarter in advance of the quarter in which the courses are to be taken; and

- submission of a letter of recommendation from the instructor of the 500-level course(s), endorsed by the chair of the student's major department, division or college and by the chair of the host department, division or college if the proposed course is not in the student's major department, division or college.

GRADUATE CREDIT FOR UNDERGRADUATE STUDENTS

Except for provisions for outstanding seniors described above and for vocational teachers enrolled for the community college credential and the BVE degree, graduate course credit may not be applied toward a baccalaureate. In their final quarter of undergraduate study, students may apply toward graduate credit a maximum of eight units in courses beyond the minimum requirements for the baccalaureate, provided they have maintained a minimum 2.5 grade point average in all upper division work. Students with a 3.0 average or higher may include in this allowance one 500-level course. Any course for which graduate credit is requested must be approved in advance by the graduate adviser in the department, division or college in which the master's degree is to be taken.

The approved application must be delivered to the Graduation Office, Administration 409, during the quarter before that in which courses are to be taken. Graduate credit is allowed for courses numbered in the 400 and 500-series only.

APPLICATION FOR GRADUATION (DEGREE CHECK)

Once a minimum of 135-quarter units is earned, students may apply for graduation. Application for graduation (degree check) is made on a form available at the Cal State L.A. Graduation Office Website, academic department / division / college, the college advisement centers and at Enrollment Services in Administration 146. These forms are available five days prior to the

application filing period. Candidates take their completed application form for payment to the Cashiers Office. Once payment is made, candidates take their application to their department, division or college for approval and processing. Filing periods are published in the Graduation Information section of the Schedule of Classes.

Students arrange to meet with their faculty adviser who will complete the Bachelors Degree Worksheet and approve the candidate's major program. The department, division or college will forward all documentation to the Graduation office for processing. The Graduation Office notifies students of the receipt of their graduation application and supporting documents.

Graduation check results are sent to the students in the mail prior to their final anticipated quarter. Students who are enrolled in the quarter they expect to graduate but do not complete all degree requirements will have their graduation application "automatically" transferred to the following quarter for processing. All questions regarding the graduation check or final results are to be directed to the student's major department, division or college.

Degrees dates are posted at the end of the quarter in which all requirements are met.

V. FACULTY AND AREAS OF SPECIALIZATION

Neda S. Fabris, Professor of Mechanical Engineering
Ph.D., Illinois Institute of Technology
Manufacturing; Material Science; Mechanics; Design

Darrell W. Guillaume, Associate Professor of Mechanical Engineering
Ph.D. University of California, Irvine
Registered Professional Mechanical Engineer
Fluid Mechanics; Thermodynamics; Heat Transfer; Combustion

Lih-Min Hsia, Professor of Mechanical Engineering
Ph.D., University of California, Davis
Registered Professional Mechanical Engineer
Kinematics of Mechanisms; Computer-Aided Design; Robotics

Samuel Landsberger, Professor of Mechanical Engineering and Kinesiology
Sc. D., Massachusetts Institute of Technology, Cambridge, MA
Design; Kinematics; Rehabilitation Engineering

Maj Dean Mirmirani, Chair, Professor of Mechanical Engineering
Ph.D., University of California, Berkeley
Dynamic Systems and Control; Applied Mechanics; Flight Mechanics

Adel Sharif, Assistant Professor of Mechanical Engineering
Ph.D., University of California, Irvine
Machine Design, Structural Materials

Chivey Wu, Professor of Mechanical Engineering
Ph.D., University of Illinois
Aerodynamics; Computer-Aided Engineering

Emeriti Professors:

Stephen F. Felszeghy, Professor of Mechanical Engineering
Ph.D., University of California, Berkeley
Solid Mechanics; Finite Element Methods; Mechanical Vibrations; Dynamics

Philip Gold, Emeritus Professor of Mechanical Engineering
Ph.D., University of California, Los Angeles
Energy Systems; Thermodynamics

Raymond B. Landis, Dean Emeritus
Ph.D., University of California, Los Angeles
Thermal Sciences and Fluid Mechanics

Ram Manvi, Emeritus Professor of Mechanical Engineering
Ph.D., Washington State University

Registered Professional Mechanical Engineer
Energy Conversion; Thermal and Environmental Engineering

Michael, M. Maurer, Emeritus Professor of Mechanical Engineering
Ph.D. Tulane University
Thermodynamics; Turbomachinery

Richard D. Roberto, Emeritus Professor of Mechanical Engineering
M.S., University of California, Los Angeles
Registered Professional Mechanical Engineer
Machine Design; Dynamics; Vibrations

VI. FORMS

California State University, Los Angeles
College of Engineering, Computer Science, and Technology
Mechanical Engineering Department

WAIVER OF PREREQUISITES

Quarter: ❑ Fall   ❑ Winter   ❑ Spring   ❑ Summer   Year: _____

Last Name: _____   First Name: _____   SID: _____

This is to request the waiver of the pre-requisites for

                               Taken

_____   _____   _____
Course   Quarter   Year

based on the indicated reason(s) below:

❑   Equivalent course taken at other institution

     _____   _____
                 Course   Institution

❑   Others

     _____

     _____

Justification:

_____

_____

Requested by:
Instructor: _____   Date: _____

Approved by:
Department Chair: _____   Date: _____

California State University, Los Angeles
College of Engineering, Computer Science, and Technology

Course Overlap/Override Petition

Quarter _____

Name of Student _____ , SID _____
is requesting permission to register for the following two courses that overlap,

1. _____   2. _____
       Department and Course #   Department and Course #

      _____   _____
           Day and Time   Day and Time

      _____   _____
         Professor Signature   Professor Signature

Student will make up time/work by completing the following:

_____

_____

_____

_____

APPROVALS:

Advisor   _____ Date:_____

Department Chair _____ Date:_____

Associate Dean _____ Date:_____

After obtaining all signatures, please submit this form to Administration Building, Room 146.

GE for Engineering Majors

Effective: Fall Quarter, 1998

A Basic Subjects	B American Institutions	C Natural Sciences	D Humanities		E Social Sciences	F Lifelong Understanding and Self-Development

Note: the column headers A–E above correspond to the printed letters A, B (American Institutions), B (Natural Sciences), C (Humanities), D (Social Sciences), E (Lifelong Understanding and Self-Development).

A Basic Subjects	American Institutions	B Natural Sciences	C Humanities	D Social Sciences	E Lifelong Understanding and Self-Development
UNITS: 16	8	0	12	0	4
A1 WRITTEN COMM ENGL 101 **A2 ORAL COMM** COMM 150 **A3 CRITICAL THINKING** *exempt* **A4 MATH CONCEPTS** fulfilled in major minimum C grade in these classes is required.	**U.S. HISTORY** HIST 202A or 202b **U.S. CONSTITUTION** +POLS 150 **STAE/LOCAL GOV'T** +POLS 150 or 200 +*POLS 150 meets both areas.*	**B1 BIOLOGICAL** (with lab) BIOL 155, 156 MICR 151 (for exemption from this requirement, engineering majors must successfully complete a biology course as part of their upper division theme)	**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 210/TVF ENGL 225/ /TVF　　(d) LBS 234 MUS 150, 151, 152, 156, 157, 160	ENGR 300 fulfilled in major	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
A minimum C grade average in general education for all students following 1987-89 or any later catalog ENGL 102 is required of all students who entered Ca tate LA Summer 1993 or later & who are subject to th requirements of the 1993-95 or later GE catalog. A minimum C grade is required in ENGL 102.		**B2 PHYSICAL (with lab)** fulfilled in major **B3 APPLIED NATURAL** *exempt* **INEGRATED NATURAL** *exempt*	**C3 PHILOSOPHY AND RELIGIOUS STUDIES** PHIL 151, 152, (d) PHIL 220　(d) PHIL/RELS 200 **C4 LANGUAGES OTHER THAN ENGLISH** COMD 150　KOR 100ABC　LATN 100ABC, 222 CHIN 100ABC, 101ABC, 200ABC, 201ABC FREN 100ABC, 130, 200AB　GERM 100ABC, 200ABC		TECH 250 (d) Courses with the course number **preceded by the designation (d)** indicate those approved to meet the 2-course **Diversity** requirement.
Students must complete two diversity courses which may be selected from blocks C, E, or from GE upper division themes.			ITAL 100ABC, 200ABC　PAS 120　PORT 100ABC JAPN 100ABC, 130, 200ABC, 230　　RUSS 101AB SPAN 100ABC, 105, 130, 200ABC, 205AB, 230 **C5: INTEGRATED HUMANITIES** BCST / ENGL / TA 240　　ENGL / PHIL 210		
Engineering students must complete the Introduction to Higher Education requirement, ENGR 100, within their first two quarters at CSULA. MESA/MEP students must take the ENGR 154 sequence					

California State University, Los Angeles

Department of Mechanical engineering

DEPARTMENT OF MECHANICAL ENGINEERING
FUNDAMENTALS OF ENGINEERING (FE) EXAM RESULTS REPORTING FORM

A. Your Personal Information

1. Last Name: _____   First Name: _____

2. Address: _____

   _____

3. Telephone Number   Day: _____   Evening: _____

   E-mail address: _____

4. Expected Graduation Date: _____

B. F.E. Exam Information

   F.E. Exam Status: Passed   Yes ☐   No ☐

   Date Taken: _____

Please attach a copy of your results. If you pass FE while an undergraduate, you will get a refund of $60.00 (exam fee) from the College of Engineering, Computer Science and Technology. To get your refund, you need to submit this form together with:
   I)   A copy of your results indicating a pass.
   II)   Confirmation of payment to state board (i.e. a copy of cancelled check, or a receipt form the state board). If you do not have this, please call the state board at *(916) 263-2222* and ask for a duplicate receipt.

If you need more information, please contact Maj Mirmirani at (323) 343-4490.

CALIFORNIA STATE UNIVERSITY, LOS ANGELES

COLLEGE OF ENGINEERING, COMPUTER SCIENCE, AND TECHNOLOGY
DEPARTMENT OF MECHANICAL ENGINEERING

Application for Independent Study (ME 499)

DATE: _____ Call #: _____ Section: _____

(Leave Blank)   **(Leave Blank)**

Quarter: ❑ **Fall**   ❑ **Winter**   ❑ **Spring**   ❑ **Summer**   **Year**: _____

Last Name: _____ First Name: _____ CIN: _____

Address: _____

City/State: _____ Zip Code: _____

Telephone: (Home) _____ Business: _____ Email: _____

WPE Date: _____ ❑ Taken **(WPE must have been completed)** GPA: _____

Title of Proposed Independent Study

Units: _____   Specify: ❑ Lab Elective   ❑ Technical Elective

Brief Description of Project: _____

_____

_____

_____

Sponsor's Approval: _____ Date: _____

Advisor's Approval: _____ Date: _____

Department Chair Approval: _____ Date: _____

The work taken under CE 499 shall be of such caliber that it is acceptable as the equivalent of the type of formal course with which it will be classified. One to four (1-4) units may be used as a technical elective or one (1) unit may be used for a laboratory elective. Laboratory Electives can only be obtained when work is experimental in nature.

To take on one (1) unit, the student **must have a 2.00 grade point average (GPA)** in a minimum of twenty (20) units of engineering subjects taken at California State University, Los Angeles. To take more than one (1) unit, the grade point average (GPA) **must be 2.76 in a minimum of twenty (20) units** of engineering taken at California State University, Los Angeles.

In order to receive a grade, four (4) copies of a formal report on the study must be submitted to the sponsor no later than the last day of classes in the quarter in which the study is conducted.

CALIFORNIA STATE UNIVERSITY, LOS ANGELES

COLLEGE OF ENGINEERING, COMPUTER SCIENCE, AND TECHNOLOGY
DEPARTMENT OF MECHANICAL ENGINEERING

DATE:

TO: Joan Woosley, Registrar
Registrar's Office

FROM: Benjamin L. Lee, Acting Associate Dean
College of Engineering, Computer Science, and Technology

SUBJECT: EXCEPTION TO 18 UNIT STUDY LOAD

<u>EXCEPTION TO 18 UNIT STUDY LOAD</u>
The student listed has been approved to exceed the 18 unit study load limit.

CIN #:   Department: **Mechanical Engineering**

Last Name:			First Name:		
Course Number	Course Titled:		Section Number:		Units:
			Total Units with overload course:		

Reason for Overload

❑   Student is graduating this quarter.
❑   Course is not available to student for another year.
❑   Student is taking a 5-unit course.
❑   Other (explain):

Department Approval:	
	Maj Mirmirani, Department Chair Signature
College Approval:	Benjamin L. Lee, Associate Dean Signature

CALIFORNIA STATE UNIVERSITY, LOS ANGELES

COLLEGE OF ENGINEERING, COMPUTER SCIENCE, AND TECHNOLOGY
DEPARTMENT OF MECHANICAL ENGINEERING

APPLICATION FOR ACADEMIC CREDIT: ME 398 COOPERATIVE EDUCATION

Date: _____

Last Name: _____   First Name: _____   SID: _____

Address: _____

City and State: _____   Zip Code: _____

Telephone: (Home) _____   (Business): _____   Email: _____

Quarter Beginning Study: ❑ Fall   ❑ Winter   ❑ Spring   ❑ Summer   Year: _____

Units: ❑ 1   ❑ 2   ❑ 3   ❑ 4   # of Quarters Requested: ❑ 1   ❑ 2   ❑ 3   ❑ 4

Specify: Lab Elective _____   Technical Elective _____   GPA: __

Name & Address of Employer: _____

_____

Name of Supervisor: _____

Description of Job (explain how it fits your academic career objectives):

_____

_____

_____

Sponsor's Approval: _____   Date: _____

Advisor's Approval: _____   Date: _____

Department Chair's Approval: _____   Date: _____

The work taken under ME 398 shall be of such caliber that it is acceptable as the equivalent of the type of formal course with which it will be classified. One to four (1-4) units may be used as a technical elective or one (1) unit may be used for a laboratory elective. These may be earned one (1) unit at a time. Laboratory electives can only be obtained when the work is experimental in nature.

To take one (1) unit, the student must have a 2.00 grade point average in a minimum of twenty (20) units of Mechanical Engineering subjects taken at CSULA. To take more than one (1) unit the grade point average must be a 2.75 in a minimum of twenty (20) units of Mechanical Engineering taken at CSULA.

In order to receive a grade, a Cooperation Education Student Progress Report must be submitted to the sponsor no later than the last day of classes in the quarter in which the study is conducted.

This application is valid for the number of quarters of credit requested up to a maximum of four (4) quarters. A change of job or failure to register for ME 398 for more than one (1) quarter requires a new application and approval.