



Department of
Computer Science

www.calstatela.edu/cs
cs.calstatela.edu

Undergraduate Student Handbook
(Updated 01/01/2011)

Note: 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. Check our website for any updates. This handbook is also posted on the website. Carry this handbook with you for every major advisement visit.

Undergraduate Student Handbook

TABLE OF CONTENTS

	Page
I. INTRODUCTION.....	3
II. VISION, MISSION, OBJECTIVES, AND LEARNING OUTCOMES.....	4
III. USEFUL WEB LINKS	6
IV. PLACEMENT, WRITING AND EXIT EXAMS	7
V. ADVISEMENT.....	9
VI. UNDERGRADUATE REQUIREMENTS	10
a. LOWER DIVISION GE REQUIREMENTS.....	10
b. UPPER DIVISION GE REQUIREMENTS	11
c. UNIVERSITY REQUIREMENTS	11
d. MAJOR REQUIREMENTS	12
e. MAJOR REQUIREMENTS (FLOW CHART).....	13
VII. QUATERLY PLANNERS	14
a. PLAN #1: TRANSFER STUDENTS	14
b. PLAN #2: FRESHMEN STUDENTS	15
c. PLAN #3: INDIVIDUAL.....	17
VIII. SCHEDULING PATTERN	18
IX. APPLYING FOR GRADUATION.....	19
X. ACADEMIC STANDARDS	20
XI. LIST OF COURSES	21

I. INTRODUCTION

Would you like to create the next level of software for a popular computer game or design a program that will run an aircraft flight simulator? Does everything about the world of E-commerce and the Internet excite you? Then, computer science is the career for you.

Cal State L.A.'s **Department of Computer Science** will prepare you for careers involving the design of computer systems and their applications to science and industry. Students who complete the degree program will be well qualified for high-paying jobs in a field where unprecedented demand exists for men and women who are trained in computer software skills. With recent, rapid advances in computer hardware and software technology, computer science offers some of the most dynamic job opportunities available today. You can choose a challenging, fulfilling career from a wide selection of specialties such as computer networks, computer graphics, artificial intelligence, database systems, systems analysis and distributed systems.

The Department of Computer Science bachelor's degree program provides you with an excellent foundation in all areas of computer science by stressing both theory and practice. In addition, the program offers a solid base for students who intend to pursue graduate study, and a general background for students interested in scientific or systems programming, or other areas of computer science. Our curriculum is taught by faculty with extensive industry expertise, in small classes that facilitate individual attention to enhance your learning experience. From theory to experimentation to practice, you'll learn to apply theoretical knowledge to real-world situations. This hands-on approach to learning will prepare you for the next step in your career development, whether it's immediate employment upon graduation or entrance into an advanced degree program.

Our quality-learning environment will further enhance your educational experience. At Cal State L.A.'s College of Engineering, Computer Science, and Technology, you'll have access to 50,000 square feet of newly remodeled, state-of-the-art lab space and equipment, as a result of a \$31 million renovation to the Engineering and Technology building.

The Department of Computer Science can show you the shape of the future—today! At Cal State L.A.'s College of Engineering, Computer Science, and Technology, we have the faculty, programs and facilities to help you achieve your goals.

Don't hesitate to contact the Department of Computer Science at (323) 343-6690 for any information. One of the faculty is designated as a principal advisor who will be available to answer all your questions. Note that all the information you need is available at **www.calstatela.edu/cs** (or) **cs.calstatela.edu**

II. VISION, MISSION, OBJECTIVES, AND LEARNING OUTCOMES

Vision Statement :

To be a pre-eminent computer science program that prepares students from diverse backgrounds for productive careers by providing them with a student-centered, practically-focused quality learning experience.

Mission Statement:

To graduate well educated computer scientists who are prepared to meet the challenges of a rapidly changing, increasingly complex world. This will be accomplished through:

- *A well-qualified faculty who care about students and their success.*
- *A dynamic, up-to-date curriculum that has an optimal balance between theory and practice.*
- *Laboratories, computer facilities, and instructional classrooms on par with any computer science program in the nation.*
- *Unique co-curricular opportunities for students such as participation in student design competitions, professional student organizations, and pre-professional employment.*
- *Opportunities for undergraduate and graduate students to participate in research and industry-funded design clinic projects.*
- *Mutually beneficial partnerships with area industry that take advantage of our location in one of the most concentrated high-tech centers in the nation.*
- *Strong cooperative relationships with local high schools, community colleges, and with other four-year institutions.*

Objectives : (Broad goals/statements of what the department would like to achieve).

1. *Graduating students have the knowledge and skills to pursue a career in industry and/or continue their education in graduate programs.*
2. *Graduates have the knowledge and skills that enable them to participate in life-long learning and to adapt to an ever-changing technological environment.*
3. *Faculty have enough time in their work schedule to pursue their research interests.*
4. *Faculty remain current in their fields.*
5. *The curriculum is up-to-date and reflects the best current thinking about computer science.*
6. *Enrolled students have opportunities to participate in professional student organizations and pre-professional employment.*
7. *Our teaching and research facilities consist of state of the art classrooms and equipment.*
8. *We are well known and respected in the regional community.*
9. *Our programs are considered attractive and desirable options by all qualified students in our service community.*

10. *We retain contact, offer support, and establish a networking community for our alumni.*

Learning Outcomes: (Specific skills that the students will possess at the end of the degree program).

1. *Students will be able to apply concepts and techniques from computing and mathematics to both theoretical and practical problems.*
2. *Students will be able to demonstrate fluency in at least one programming language and acquaintance with at least three more.*
3. *Students will have a strong foundation in the design, analysis, and application of many types of algorithms.*
4. *Students will have a fundamental understanding of computer systems.*
5. *Students will have the training to analyze problems and identify and define the computing requirements appropriate to their solutions.*
6. *Students will have the training to design, implement, and evaluate large software systems working both individually and collaboratively.*
7. *Students will be able to communicate effectively orally and in writing.*
8. *Students will have the knowledge, skills, and attitudes for lifelong self-development.*
9. *Students will have the ability to analyze the local and global impact of computing on individuals and society.*
10. *Students will have a fundamental understanding of social, professional, ethical, legal, and security issues in computing.*

III. USEFUL WEB LINKS

Web address	Description
http://www.calstatela.edu/cs http://cs.calstatela.edu	Department of Computer Science (Curriculum Faculty, and student information)
http://csns.calstatela.edu	CSNS (Computer Science Networking Services): facility for students, faculty and alumni.
https://get.calstatela.edu	The Golden Eagle Territory (GET) is a student self-service offering and makes it possible to handle registration, student account information such as address changes, credit card payments, and view grades, and other on-line services.
http://www.calstatela.edu/its/techsupport/helpdesk/nis_account.htm	A Network Information Services (NIS) account that allows access to the campus network and resources.
http://www.calstatela.edu/catalog	University online catalog
http://www.calstatela.edu/library	University Library
http://acm.calstatela.edu	Student Chapter of the Association for Computing Machinery

IV. PLACEMENT, WRITING, AND EXIT EXAMS

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 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 and registration materials 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 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 and registration materials 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.

*Beginning in May 1998, SAT II: Writing Test scores increased about 10 to 20 points. The adjustment was made to make Writing Test scores more comparable to scores on other SAT II subject tests. Although scores will be higher, their relative rank compared to scores for tests taken before May 1998 remains the same.

MATHEMATICS EXIT EXAMS

Students may choose to attempt a set of questions designed to promote the student to the next course in mathematics other than what the ELM has placed them at. You can request for exit exams from MATH80 onwards up to MATH 103. More information may be obtained from the Cal State L.A. Testing Center.

V. ADVISEMENT

Academic Advisement is an essential component for a positive student experience and your success at Cal State L.A. Obtaining Academic Advisement in a timely and regular basis increases your opportunity to succeed academically, to successfully progress toward your degree objective, and to graduate in a timely manner.

For a transfer student, it is important to know what was transferred over as recognized CSULA courses. At the time of student's admission into CSULA, the evaluators' office generates a Transfer Evaluation report showing all the courses from transfer institutions that have been successfully transferred to CSULA. Credit is given for all the courses that meet the campus articulation agreements. All non-articulated transfer courses are evaluated by the undergraduate advisor to determine the course equivalencies.

The students should check their real-time "Unofficial Transcript" or "Degree Progress Report" to monitor their degree progress. This report gives all the information regarding their progress to their degree and lists all the missing requirements. Students will have a clear picture of the remaining requirements. Students must maintain a quarterly planner (See Section VIII) and discuss making any changes to the planner on every advisement visit.

Remember that students must officially request a graduation requirement check from the advisor two quarters prior to the end of the term of their expected graduation.

Students can check the "Advisement" forum on CSNS for any relevant questions on advisement and consult with the advisor for any clarifications.

VI. UNDERGRADUATE REQUIREMENTS (180 - 183 units)

Computer Science majors have a modified (reduced) set of requirements to meet the accreditation requirements. The modifications apply to both the General Education and the Major requirements as described below:

VI (a): Lower Division General Education Requirements (36 units)

A Basic Subjects	American Institutions	B Natural Sciences	C Humanities	D Social Sciences	E Lifelong Understanding and Self- Development
UNITS: 8 (Two courses)	UNITS: 8 (Two courses)		UNITS: 12 (Select one course from 3 different areas :C1,C2,C3, C4,C5)	UNITS: 4 (Select one course)	UNITS: 4 (Select one course)
<u>A1 WRITTEN COMM</u> ENGL 101 <u>A2 ORAL COMM</u> COMM 150	<u>U.S. HISTORY</u> HIST 202 or 202B <u>U.S. CONSTITUTION</u> + POLS 150		<u>C1 LITERATURE AND DRAMA</u> ANTH/ENGL 245 ENGL 207, 250, 258, (d) 260 , (d) 270, 280 SPAN 242 TA 152 <u>C2 ARTS</u> ART 101ABC, 150, 152, 155 156, 157, 159, 209 TVF/DANC/TA 210 TVF/ENGL 225 (d) CHS 112 (d) CHS/PAS 260 DANC 157 (d) LBS 234 MUS 150, 151, 152, 156, 157, 160 <u>C3 PHILOSOPHY AND RELIGIOUS STUDIES</u> PHIL 151, 152 (d) PHIL/RELS 200 (d) PHIL 220 <u>C4 LANGUAGES OTHER THAN ENGLISH</u> 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 <u>C-5 INTEGRATED HUMANITIES</u> TVF/ENGL/TA 240 ENGL/PHIL 210	(d) AAAS 200 (d) ANTH 250 (d) TVF 250 (d) BUS 250 CHDV 140 (d) CHS 111 or (d) CHS/LAS 255 (d) CRIM 210 ECON 150 ANTH/ENGL 230 (d) GEOG 155 HIST 110ABC (d) HIST 150 or (d) SOC 263 (d) LAS/PAS 102 PAS 250AB POLS 250 PSY 150 SOC 201 (d) SOCS 180 URBA 180 (d) WOMN 203 <u>INTEGRATED SOCIAL SCIENCES</u> LAS 150 SOCS 230	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

VI (b): Upper Division General Education Requirements : (BLOCK F -12units)

Select any one of the themes listed (A thru I). Courses in each theme are distributed among three **areas** including: Natural Sciences and Mathematics, Social Sciences and Humanities. You must complete one course from each of the three **areas** in the chosen theme. Do not take more than one course from the same area. You can find all the different themes (Theme A to Theme I) in the Schedule of Classes and also the University Catalog.

EXAMPLE: If you choose Theme C as described below, you can take BIOL388N, ANTH338 and COMM385; In the process, you will also satisfy the 2-course diversity requirement;

Theme C: GENDER IN THE DIVERSITY OF HUMAN EXPERIENCE

Natural Sciences and Mathematics

- ANTH 310, Evolutionary Perspectives on Gender (4)
- BIOL 388N/PSY 388, Sex and Gender (4)
- LBS 386, Gender in Science (4)
- NURS 330, Human Reproductive Health (4)

Social Sciences

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

Humanities

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

VI (c): University Requirements (6units)

ENGL 102
CS 101

Composition II: Analytical and Persuasive Writing (4)
Introduction to Higher Education for Computer Science Majors (2)

Note:

1. A minimum 2.0 grade is required in all Basic Subjects (Block A) and ENGL102.
2. A minimum 2.0 grade average is required Overall at CSULA and in all General Education Requirements
3. Complete two *diversity* courses which may be selected from Blocks C, D, E or F.
4. Must take and pass the *Writing Proficiency Examination* (WPE) prior to completing 135-quarter units.
5. Computer Science students must complete the Introduction to Higher Education for CS Majors requirement, CS 101, within their first two quarters at CSULA.
6. Block F cannot be transferred from a Community College. (A Full GE certificate from a community college satisfies Blocks A thru E).

VI (d): MAJOR REQUIREMENTS (126-129units)

Lower Division Major Requirements (60-63 units)

A grade of "C" or better is required in all prerequisite coursework.

CS 120*	Introduction to Web Site Development (3) Prerequisite: Computer Literacy
CS 122*	Using Relational Databases and SQL (3) Prerequisite: Computer Literacy
CS 201*	Introduction to Programming (5) Prerequisite: Math 103 or consent of the Instructor
CS 202*	Introduction to Object Oriented Programming (5) Prerequisite: CS 201 Reco: Math 206
CS 203*	Programming with Data Structures (5) Prerequisite: CS 202 Recommended: Math 207, 248
CS 245	Introduction to Computer Org., OS, and Networks (3) Prerequisite: CS 202
MATH 206*	Calculus I (4) Prerequisites: ELM: Math 102, 103 both with min. C grade
MATH 207*	Calculus II (4) Prerequisites: Math 206 with minimum C grade
MATH 208*	Calculus III (4) Prerequisite: Math 207 w/min C grade
MATH 248	Discrete Mathematics (4) Prerequisite: Math 207
MATH 255	Introduction to Matrix Theory (4) Prerequisite: Math 208
MATH 270	Probability with Applications (4) Prerequisite: Math 208
PHYS 101-103	General Physics I-III (4,4,4)
OR	OR
PHYS 211-213	Mechanics, Waves, Electricity (5,5,5)

***: Concurrent registration in a 1-unit workshop may be required**

Upper Division Major Requirements (42 units)

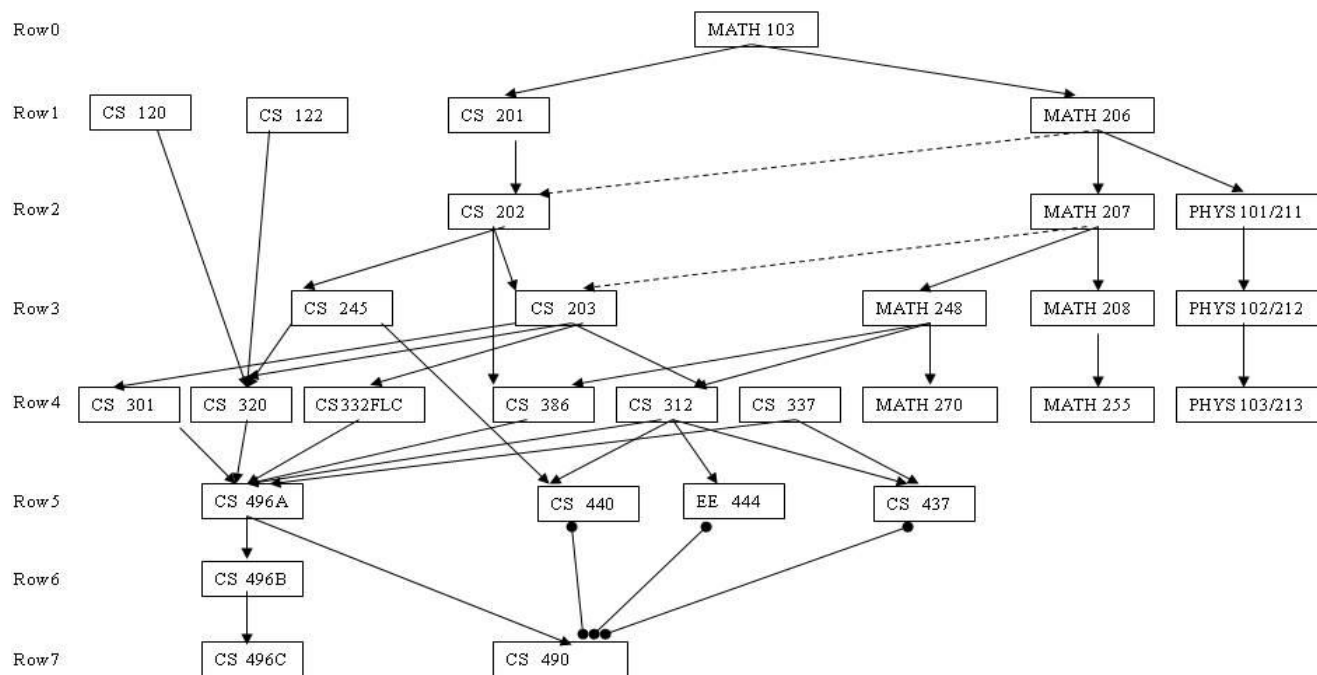
A grade of "C" or better is required in all prerequisite coursework.

CS 301	Computer Ethics in the Information Age (1) Prerequisites: CS 203
CS 312	Data Structures and Algorithms (4) Prerequisites: CS 203, Math 208, Math 248
CS 320	WEB and Internet Programming (3) Prerequisites: CS 120, CS 122, CS 203
CS 332FLC	Functional, Logic, C++ Programming (2,2,2) Prerequisite: CS 203
CS 337	Software Design (3) Prerequisite: CS 203
CS 386	Introduction to Automata Theory (4) Prerequisites: CS 202, Math 248,
CS 437	Software Engineering (5) Prerequisites: CS 312 and completion of the GVAR
CS 440	Introduction to Operating Systems (4) Prerequisites: CS 245 & 312
EE 444	Computer Architecture (4) Prerequisite: CS 245
CS 490	Computer Science Recapitulation (2) Pre/Co Requisites: CS 386, 437, 440, EE 444, Math 255, 270
CS 496ABC	Software Design Laboratory (2,2,2)

Upper Division Technical Electives (24 units)

Select 6 additional upper division Computer Science courses (CS 3xx/CS4xx except CS 342).

VI (e): CS MAJOR (REQUIRED) COURSES FLOW CHART



Remarks 1. (—> Prerequisite) (•• Co/Prerequisite) (---> Recommended Prerequisite)
 2. Thumb rule: Complete all courses appearing in a row before proceeding too far ahead to the next row below.
 3. Complete 6 electives (CS 3xx/4xx) to be taken starting Row 4 onwards. Check individual courses for prerequisites.

VII. QUATERLY PLANNERS

Quarterly Planners

1. Remedial Entry Sequence
2. Freshmen Student
3. Transfer Student
4. Blank Student Planner

Plan #1: Remedial Quarterly Plan - Beginning Students

(Prior to Math 206 and ENGL 101: Consult with Department Advisor)

	Summer	Fall	Winter	Spring
Year 1		MATH 91	MATH 102	MATH 103
		CS 101	CS 190	CS 120
		ENGL 95	ENGL 96	ENGL 101
		ENGR 154*	ENGR 154*	ENGR 154*
		GE	GE	GE

* Workshops designed for corresponding MATH courses

Plan #2: Ideal 4 Year Quarterly Plan - Freshmen Students

(Assuming Calculus & English ready)

	Summer	Fall	Winter	Spring
Year 1		CS 101*	CS 120	CS 122
		MATH 206	MATH 207	MATH 208
		ENGL 101	ENGL 102	COMM 150
		GE E(TECH250)	HIST 202A/B	POLS 150

	Summer	Fall	Winter	Spring
Year 2		CS 201	CS 202	CS 203
		MATH 248	MATH 255	MATH 270
		GE C1	GE C2	CS 245
		PHYS 101/211	PHYS 102/212	PHYS 103/213

	Summer	Fall	Winter	Spring
Year 3		CS 312	CS Elective 1	CS Elective 2
		CS 332F	CS 332C	CS 332L
		CS 320	GE C3	CS 386
		CS 337	CS 437	CS Elective 3
				GE D

	Summer	Fall	Winter	Spring
Year 4		CS 496A	CS 496B	CS 496C
		CS Elective 4	CS Elective 5	CS Elective 6
		EE 444	CS 440	CS 490
		GE UD Theme 1	GE UD Theme 2	GE UD Theme 3

* Must be taken within the first two quarters of attendance at CSULA.

Plan #3: Ideal Two Year Quarterly Plan: Transfer Students

(Assuming completion of Lower Division Transfer Pattern courses -
Lower division GE courses, MATH206-208, CS120, CS201-202, PHYS211-213)

	Summer	Fall	Winter	Spring
Year 1		CS 101	cs 332C	CS 312
		CS 122	CS Elective 1	CS 320
		CS 203	MATH 255	CS 386
		CS 245	MATH 270	CS 332L
		MATH 248	CS 301	CS 337

	Summer	Fall	Winter	Spring
Year 2		CS 332F	CS 437	CS 490
		EE 444	CS 440	CS Elective 5
		CS 496A	CS 496B	CS 496C
		CS Elective 2	CS Elective 4	CS Elective 6
		CS Elective 3		

* Must be taken within the first two quarters of attendance at CSULA.

Plan #4: Individualized Quarterly Plan

Year #1	Summer	Fall	Winter	Spring

Year #2	Summer	Fall	Winter	Spring

Year #3	Summer	Fall	Winter	Spring

Year #4	Summer	Fall	Winter	Spring

Year #5	Summer	Fall	Winter	Spring

Year #6	Summer	Fall	Winter	Spring

VIII. SCHEDULING PATTERN

Check get.calstatela.edu or cs.calstatela.edu for actual scheduled time/locations.

Required Courses – Scheduling Pattern

COURSE	TITLE	Scheduling Pattern: Fall (F), Winter (W), Spring(S), Summer(X)			
		F	W	S	X
CS101	Introduction to Higher Education.	√	√	√	-
CS120	Introduction to Website Dev.	√	√	√	-
CS122	Using Relational Databases and SQL	√	√	√	-
CS201	Intro. to Progr. (Java)	√	√	√	-
CS202	Intro. to OOP (Java)	√	√	√	-
CS203	Progr. with Data Struct. (Java)	√	√	√	-
CS245	Using OS & Networks for Progr.	√	-	√	-
CS301	Computer Ethics in the Information Age	√	-	√	-
CS312	Data Structures & Algorithms	√	√	√	-
CS320	Web and Internet Programming	√	-	√	-
CS332F	Functional Programming	√	-	-	-
CS 332L	Logic Programming	-	-	√	-
CS 332C	C++ OOP Programming	-	√	-	-
CS337	Software Design	-	√	-	-
CS386	Intro. to Automata Theory	√	-	√	-
CS437	Software Engineering	√	-	√	-
CS440	Intro. to Operating Systems	-	√	-	-
CS490	CS Recapitulation	-	-	√	-
CS496A	Software Design Laboratory	√	-	-	-
CS491B	Software Design Laboratory	-	√	-	-
CS491C	Software Design Laboratory	-	-	√	-

Elective Courses – Scheduling Pattern

COURSE	TITLE	Scheduling Pattern: Fall (F), Winter (W), Spring(S), Summer(X)			
		F	W	S	X
CS340	Assembly Lang. & Systems Progr.	-	√	-	-
CS345	UNIX & Shell Progr.	√	-	√	-
CS350	Foundations of Computer Graphics	-	√	-	-
CS370	Parallel and Distributed Prog.	√	-	√	-
CS420	Web Applications Architecture	-	√	-	-
CS422	Principles of Data Base Systems	-	√	-	-
CS447	Computer Networks	√	-	-	-
CS450	Computer Graphics – II	-	-	√	-
CS451	Multimedia Software Systems	-	-	√	-
CS454	Topics in Advanced CS (varies)	-	-	-	-
CS460	Artificial Intelligence	√	-	-	-
CS461	Machine Learning	-	√	-	-
CS 470	Computer Networking Protocols	-	√	-	-
CS480	Cryptography and Information Security	-	-	√	-
CS486	Grammars, Lang. & Automata	-	√	-	-
CS488	Compilers	-	-	√	-
CS499	UG Directed Study (varies)	-	-	-	-

IX. 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 at the Cashiers Office. You fill out the application form, take it to the cashier and pay the fees (\$30: \$20 for the application and \$10 for the Diploma), and then return to the department to meet with the advisor. The deadlines are given in the instructions accompanying the form and in the Schedule of Classes. Generally, you must apply about 2 quarters before you expect to graduate.

You do not have to wait for the audit process to begin at the time of applying for graduation. You should be checking the Degree Progress Report (DPR) every quarter and contact the adviser for any clarifications regarding the DPR. You should not wait till the time of graduation application to fix any error concerning transfer courses.

Once you apply for graduation, the graduation application is sent to the University Graduation Office for final audit. 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*.
- d) All *upper-division* work done to satisfy requirements in the major.

X. 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.

XI. List of Courses

Lower Division Courses

CS 101 Introduction to Higher Education for Computer Science Majors (2)

Exploration of skills and resources that will help students to obtain a baccalaureate degree in the Department of Computer Science. This course must be taken once during the first two quarters at Cal. State LA. Graded CR/NC. NIS Account Required.

CS120 Introduction to Web Site Development (3)

Prerequisite: Computer Literacy.

Development of client-side web pages using hypertext markup language ([d][x]html), Cascading Style Sheets (CSS), Javascript, and computer animation software. Lecture 2 hours, laboratory 3 hours. Graded ABC/NC.

CS 122 Using Relational Databases and SQL (3)

Prerequisite: Computer literacy.

An introduction to relational databases and the SQL query language. Database modeling as collection of objects and their relationships; Entity-relationship model. SQL as a query language. Grouping and other advanced queries. Lecture 2 hours, laboratory 3 hours. Graded ABC/ NC.

CS 160 Introduction to Computers (3)

Prerequisite: GE mathematics requirement.

History of computers; hardware, software including data base systems, word processors, spreadsheets, programming languages; social and ethical implications. Lecture 2 hours, laboratory 3 hours. Offered CR/NC only.

CS 190 BASIC Programming (2)

Prerequisite: One year of high school algebra.

Introduction to computer programming using BASIC language. Applications will assume a minimal mathematics background. Does not fulfill mathematics major requirement. Lecture 1 hour, laboratory 3 hours.

CS 201 Introduction to Programming (5)

Prerequisite: MATH 103 or consent of the instructor.

Algorithm development for structured programming; designing, coding, debugging, and documenting programs. Laboratory activities on problem analysis and software development. Lecture 4 hours, laboratory 3 hours. Graded ABC/ NC

CS 202 Introduction to Object Oriented Programming (5)

Prerequisite: CS 201, recommended: MATH 206.

Algorithm development for Object Oriented Programming; designing, coding, and documenting programs. Laboratory activities on problem analysis and software development. Lecture 4 hours, laboratory 3 hours. Graded ABC/NC

CS 203 Programming with Data Structures (5)

Prerequisite: CS 202, recommended: MATH 207, MATH 248.

Advanced programming techniques; elementary data structures such as dynamic arrays, linked lists, stacks, queues, and trees, sorting and searching algorithms. Laboratory activities on problem analysis and software development. (Lecture 4 hours, laboratory 3 hours) Graded ABC/ NC

CS 242 C Programming (4)

Prerequisites: MATH 103 or consent of the instructor.

Introduction to program design and problem solving using the C programming language. Programming topics include control structures, functions, arrays, pointers, and file I/O.

CS 245 Using Operating Systems and Networks for Programmers (3)

Prerequisite: CS202.

Essential information about operating systems and computer networks for programmers. Topics include: the Windows operating system; Unix/Linux and their shell language(s), and wide area and local area networks. Lecture 2 hours, laboratory 3 hours. Graded ABC/NC

CS 290 Introduction to FORTRAN Programming (2)

Prerequisite: MATH 206.

Elementary computer programming using FORTRAN language. Lecture 1 hour, laboratory 3 hours. No credit toward Computer Science major.

Upper Division Courses

CS 301 Computer Ethics in the Information Age (1)

Prerequisite: CS 203.

Responsibilities of computer scientists as influenced by growth in computer use and networks. Professional and Ethical Responsibilities; Intellectual Property; Piracy, Hacking, Viruses, Liability, Privacy, Crime, and Civil Liberties.

CS 312 Data Structures and Algorithms (4)

Prerequisites: CS 203, MATH 208 and 248.

Abstract data types and their use in constructing algorithms for manipulating lists, trees, and graphs; analysis of algorithms for searching, sorting, and data structure manipulation.

CS 320 Web and Internet Programming (4)

Prerequisites: CS120, CS 122, CS 203.

Server-side internet programming. Development of full-fledged Internet enterprise services and applications.

CS 332F Functional Programming (2)

Prerequisite: CS 203.

Programming in Functional non-procedural programming language such as Haskell. Programming in a language (a) in which functions are values, (b) expression evaluation without side-effects (c) with typed lambda-calculus, (d) with lazy evaluation, and with other features common to the functional programming paradigm.

CS 332L Logic Programming (2)

Prerequisite: CS 203.

Programming in non-procedural logic programming language such as Prolog. Programming in a language that supports unification and backtracking and in which execution of a program is the search for values that satisfy a declarative specification.

CS 332C C++ Object Oriented Programming (2)

Prerequisite: CS 203.

Breadth and depth of C++ programming concepts; control statements, functions, pointers, classes, application development using the object-oriented paradigm. Advanced topics such as I/O, templates, exception handling, Standard Template Library (STL).

CS 337 Software Design (3)

Prerequisite: CS 203.

Methodologies and tools for requirements analysis and design of large complex software system; Process models, project planning, tracking, documentation, communication, and quality assurance; group laboratory project; oral and written presentations. Lecture 2 hours, laboratory 3 hours.

CS 340 Assembly Language and Systems Programming (4)

Prerequisite: CS 245.

Assembly language; addressing techniques; subroutines; macros; system input/output; interrupts and traps; assemblers; linkers; loaders; macroprocessors.

CS 342 Object Oriented Programming Using C++ (4)

Prerequisite: CS 242.

Concepts and techniques of object-oriented programming; structured design and modular construction; use of C to demonstrate structured programming; use of C++ to demonstrate fundamentals of object-oriented programming.

CS 345 UNIX and Shell Programming (4)

Prerequisites: CS 203.

A theoretical and practical study of the UNIX operating system and shell programming. Topics: Shell commands and utilities, UNIX file system, UNIX shells, UNIX \ graphical user interfaces, and shell programming.

CS 350 Foundations of Computer Graphics (4)

Prerequisites: CS 203, MATH 208, and MATH 255.

Programming in an object oriented graphics environment implementing primitive operations in two and three dimensions. Emphasis on image modeling using affine transformations, polygonal meshes and other topics.

CS 370 Parallel and Distributed Programming (4)

Prerequisites: CS 203, CS 245.

Parallel programming techniques; abstract models of hardware and operating systems to support parallel programs.

CS 386 Introduction to Automata Theory (4)

Prerequisites: CS 202, and MATH 248.

Formal approach to automata theory; finite state machines, regular expressions, regular languages. Develops mathematical foundation for computer science.

CS 420 Web Applications Architecture (4)

Prerequisite: CS 320.

Covers architectural considerations, design patterns, and implementation techniques in the development of enterprise web applications, as well as technologies that address productivity, stability, flexibility, scalability, and security.

CS 422 Principles of Data Base Systems (4)

Prerequisites: CS 122, and 312.

Normal forms, database system architecture, query optimization, file structures, transaction management, data warehouses, object-oriented databases, databases for e-commerce.

CS 437 Software Engineering (5)

Prerequisites: CS 312 and completion of the GWAR.

Methodologies and tools for the specification, design, development, testing, evaluation, and maintenance of software systems. Ethical issues in software development. Laboratory activities on team interactions, problem analysis and software development. This course satisfies the upper division writing requirement. Lecture 4 hours, laboratory 3 hours.

CS 440 Introduction to Operating Systems (4)

Prerequisites: CS 245, 312.

Resource, memory and process management; concurrent processing; networking and distributed systems.

CS 447 Computer Networks (4)

Prerequisites: MATH 270, CS 440.

Overview of principles and concepts in computer networks and distributed systems; network structures, topology, architecture, and related software.

CS 450 Computer Graphics (4)

Prerequisites: CS 312, CS 350.

An advanced course in computer graphics with emphasis on rendering. Polygonal meshes, bezier curves and surfaces, line and back face removal, shading, lighting, and texture algorithms.

CS 451 Multimedia Software Systems (4)

Prerequisite: CS312 or CS 342.

Introduction to multimedia information and processing. Topics: basic signal processing, color, space, formations of image, video, and audio data. Current standards and the state-of-the-art techniques for multimedia systems. Lecture 4 hours.

CS 454 Topics in Advanced Computer Science (1 to 4)

Prerequisites: As needed for specific topic.

Current topics of special interest to students in computer science, as announced in Schedule of Classes. May be repeated to a maximum of 20 units of credit as topic changes.

CS 460 Artificial Intelligence (4)

Prerequisite: CS 312.

Knowledge representation; problem solving strategies and search algorithms; applications from such areas as theorem proving, expert systems, natural language processing, robotics, and pattern recognition.

CS 461 Machine Learning (4)

Prerequisite: CS 312.

Means that enable computers to perform tasks for which they were not explicitly programmed; learning paradigms include inductive generalization for examples, genetic algorithms, and connectionist systems such as neural nets.

CS 470 Computer Networking Protocols (4)

Prerequisite: CS 245, CS 312.

Study of computer network layered architecture and protocols. Topics to be covered include: network architecture, data link layer, addressing, LAN, network layer, transport layer and network applications.

CS 480 Cryptography and Information Security (4)

Prerequisite: CS 245, CS 312.

This course covers both principles and practice of cryptography and information security. Topics covered include basic concepts of cryptology, classical ciphers, modern symmetric ciphers (DES, IDEA, RC5), Advanced Encryption Standard (AES), public key cryptography, data integrity and digital signature schemes.

CS 486 Computability and Intractability (4)

Prerequisite: CS 386.

Theory of Computing; nondeterminisms, decidability and unsolvable problems; NP completeness and intractable computations.

CS 488 Compilers (4)

Prerequisites: CS 312, 332, 386.

Compiler construction; lexical analysis, including regular languages and finite-state acceptors; syntactic analysis, including parsing techniques and grammars; code generation and optimization.

CS 490 Computer Science Recapitulation (2)

Prerequisite/corequisites: MATH 270, CS 386, CS 332FL, CS 437, CS 440, EE 444.

A recapitulation of the primary concepts of Computer Science in preparation for the Major Field Achievement Test.

CS 496A Software Design Laboratory (2)

Prerequisites: CS 312, 320, 337, 386, and senior standing.

Approaches to software design, including Design Patterns and other strategies for designing software systems. Students working individually or as a group will propose a substantial software project, resulting in a preliminary report and project presentation. Laboratory 6 hours. Graded ABC/NC

CS 496B Software Design Laboratory (2)

Prerequisite: 496A.

Software design, including Design Patterns and other strategies for designing software systems. Students will make further progress on the project initiated in CS 496A resulting in an intermediate report and project presentation. Laboratory 6 hours. Graded ABC/NC

CS 496C Software Design Laboratory (2)

Prerequisite: 496B.

Software design, including Design Patterns and other strategies for designing software systems. Students will complete the project initiated in CS 496AB resulting in a final formal report and project presentation. Laboratory 6 hours. Graded ABC/NC

CS 499 Undergraduate Directed Study (1 to 4)

Prerequisite: Consent of an instructor to act as sponsor.

Project selected in conference with sponsor before registration; progress meetings held regularly, and a final report submitted. May be repeated for credit.