2016

Computer Science
Graduate Student Handbook

Commit to EXCELLENCE,
Engage in COMMUNITY.

Cal State L.A.
College of Engineering, Computer Science and Technology

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Welcome

Dear Students,

Welcome to the Department of Computer Science! In choosing this course of study, you have selected an exciting and dynamic career that uses technology to make life better for everyone — and sometimes make it more fun!

This handbook has the information and tools that you will need to navigate the requirements that will lead to graduation. I encourage you to read it and keep it handy for your reference. In addition, please know that the faculty and staff are here to help you and we encourage you to ask us for help when you need it.

The curriculum is designed to give you a well-rounded education, with flexibility in your major so that you can focus on areas that most interest you. Becoming a computer scientist will require a lot of study time and hard work. Beyond learning the theories and technical skills, you will learn to collaborate with your fellow students, communicate with diverse audiences, become aware of your environmental and social responsibilities as they relate to your field, and nurture your innovative and creative spirit.

We sincerely hope you will enjoy your time at Cal State L.A. and that you will also take advantage of all the wonderful resources available to you as a student.

Sincerely,

Dr. Raj Pamula

I.   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 way and on a regular basis increases your opportunity to succeed academically, to successfully progress toward your degree objective, and to graduate in a timely manner. Students must check with the advisor whenever they have any questions.

Students should discuss their academic program plan on every advisement visit. Most of the information concerning student progress can be accessed on GET and CSNS.

GRADUATE STANDING

1. Students are generally admitted as "**Conditionally Classified Graduate**" standing. Students should have their undergraduate degree coursework evaluated to determine the prerequisites.
    *   Students must commit to a plan for completing the prerequisites before being allowed to take any required courses for the graduate program.
    *   Students should commit to satisfying the Writing Proficiency Exam (WPE) requirement within the first two semesters of enrollment.

2. Student's status will be changed to "**Classified Graduate**" standing upon completion of all the prerequisites.
    *   Students have completed the Writing Proficiency Exam(WPE) requirement or enrolled in a course leading to completion of this requirement.
    *   Student should then plan on taking the "Core" and "Electives".
    *   The "Electives" must also be indicated prior to taking those courses. It is highly recommended that 5000 level electives are to be taken following the 4000level course as both can be counted as electives. Check with the advisor as you cannot take the course out of sequence and if you need to waive the 4000 level prerequisite to the 5000 level course.
    *   Note: Please inform the Dept. that all prerequisites have been completed. The Dept. will then verify and change your standing to Classified.

3. Student's status will be changed to "**Candidacy**" standing upon
    *   Completion of "Core" (12 Units) and
    *   Completion of at least half of the remaining elective requirements
    *   Satisfying the Writing Proficiency Exam (WPE) requirement.
    *   Declaring a thesis/project or a comprehensive exam option.
    *   Note: Please inform the Dept. that Candidacy standing has been completed. The Dept. will then verify and change your standing to Candidacy.

4. Student with "**Candidacy**" standing
    *   Thesis/Project Option: Complete the necessary electives and a thesis/Project (CS5991/CS5992 sequence). The thesis/project must be sponsored by a faculty. It is highly recommended to start the process of getting the faculty approval by the end of the first year.

- Comprehensive Exam (Non-Thesis) Option: Complete the necessary electives and satisfactorily complete the CS596 comprehensive exam. Typically, CS5960 must be taken during the last semester of graduation.

5. Students should officially apply for a "**graduation check**" one semester before the graduating term. This entails paying a fee and checking with the graduate advisor to ensure that all courses listed on the Course Requirements for M.S degree in Computer Science have been completed with a GPA of more than 3.0. Students need to make an appointment with the Graduate Advisor.

II.   Objectives and Learning Outcomes

Objectives

Program Educational Objectives are broader statements that will describe what graduates are expected to attain within a few years of graduation.

1. Students who enter the workforce will have established themselves as effective professionals by having solved real problems through the use of their computer science knowledge and their communication, critical thinking, and problem-solving skills.

2. Students who continue in academia will have been successful in pursuing advanced degrees and in demonstrating their ability to master advanced areas of computer science.

3. Students will have demonstrated their ability to adapt to a rapidly changing environment by having learned and applied new skills and new technologies.

Learning Outcomes

Student Learning Outcomes are specific skills that the students will possess on completion of the degree program. Students will:
1. Students will be able to use advanced mathematical methods to analyze the complexity of algorithms.
2. Student will have the ability to use state-of-the-art patterns and frameworks to design, analyze, and assess software architectures.
3. Students will understand modern software engineering concepts, techniques, practices, and tools, and will be able to apply them to the development of complex software systems.
4. Students will have acquired advanced knowledge and skills in one or more specialized areas of computer science.
5. Students will be able to communicate effectively both orally and in writing.
6. Students will embrace lifelong learning and exhibit the knowledge, skills and attitude for adapting to new environments and technologies.
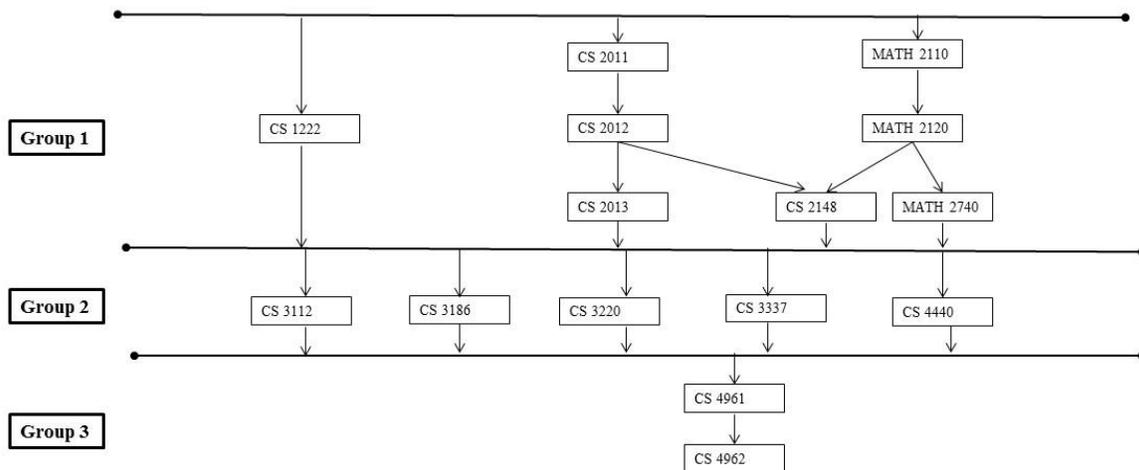
III. Useful Web Links

DESCRIPTION	WEB ADDRESS
University home page	http://www.calstatela.edu/
Department of Computer Science home page	http://cs.calstatela.edu/ http://www.calstatela.edu/cs
Golden Eagle Territory (GET) provides basic online student services.	http://get.calstatela.edu
Computer Science Network Services (CSNS)	http://csns.calstatela.edu
Graduate Project/Thesis archive	http://csns.calstatela.edu/wiki/content/department/cs/assessment/grad/Culminating_Experience/
University online catalog	http://ecatalog.calstatela.edu/
University Library	http://www.calstatela.edu/library
Student Chapter of the Association for Computing Machinery	http://acm.calstatela.edu

IV. Prerequisite Flowchart

The prerequisite flowchart for the graduate program are a subset of the requirements for the bachelor's degree program in the Computer Science. These requirements are depicted in the figure below. The courses are structured with the basic programming/math courses in Group 1. The essential core required CS courses are shown in Group 2. A culminating project course requirements are indicated in Group 3.

As a general rule, students are required to have completed these courses and show competency of these courses before starting the required graduate courses.

Required Pre-requisites Flow Chart

Group 1	CS 1222	CS 2011	MATH 2110
		CS 2012	MATH 2120
		CS 2013	CS 2148 / MATH 2740

| Group 2 | CS 3112 | CS 3186 | CS 3220 | CS 3337 | CS 4440 |

| Group 3 | | CS 4961 |
| | | CS 4962 |

V.   Major Curricular Requirements

The MSCS degree requires completion of 30-33 units as described in (i) through (ii) below. No more than 6 units of acceptable post-baccalaureate transfer course work completed prior to entrance into classified standing may be included in the master's degree program.

(i) Breadth Requirement (9 units)

Select three courses from the following five areas of study.

Algorithms:
- CS 5112 - Design and Analysis of Algorithms (3)

Network Systems:
- CS 5780 - Advanced Information Security (3)

Web Systems:
- CS 5220 - Advanced Topics in Web Programming (3)

Advanced Programming:
- CS 5035 - Topics in Functional Programming (3)

Software Engineering:
- CS 5337 - Advanced Software Engineering (3)

(ii) Choose one of the following two options:

Option 1: Thesis/Project Option
With the approval of the CS advisor, choose 18 units of 4000/5000 level courses with a minimum of 9 units from 5000 level courses.
- CS 5991 - Thesis or Project I (2)
- CS 5992 - Thesis or Project II (1)

Option 2: Comprehensive Exam Option
With the approval of the CS advisor, choose 24 units of 4000/5000 level courses with a minimum of 12 units from 5000 level courses.
- CS 5960 - Comprehensive Examination (0)

VI. THESIS/PROJECT OPTION

Students who chose a Thesis/Project option should choose an advisor/sponsor at some point soon after attaining classified standing. In addition, students must have a current GPA of at least 3.0 on their program, completed the core requirements, completed the WPE requirement and advanced to Candidacy standing. Students register for the CS5991/CS5992sequence in order to complete this requirement. A few formalities are described below:

a. Students must get an approval from an advisor to supervise the project/thesis. It is advisable to choose and discuss with the advisor to get started on doing preliminary research as soon as possible. Interaction with the thesis/project advisor is a key to complete this requirement in a timely manner.
b. Students must write a project report/thesis using the guidelines specified at http://www.calstatela.edu/graduatethesis
c. Students do a formal presentation at the end of CS5991 and CS5992 to the advisor which is open to all other students and faculty.
d. Computer Science Department encourages all students to submit the results of their project/research to a conference or a journal.
e. Students need to complete the "ethesis" form. Check the guidelines at http://www.calstatela.edu/graduatethesis.
f. Students can also see the previous archive of CS project/thesis at http://csns.calstatela.edu/wiki/content/department/cs/assessment/grad/Culminating_Experience/

VII. COMPREHENSIVE EXAM OPTION

Students taking the comprehensive exam must be advanced to "Candidacy" and have a current GPA of at least 3.0 on their program.   Advancement to Candidacy requires that the student have completed the core requirements, WPE, and most of the electives. A student taking the comprehensive exam can have at most one course remaining on his/her program, not counting those being taken in the same semester as the comprehensive exam.

Registration: Students who elect to complete the comprehensive exam option will need to receive permission for CS 5960 from the Computer Science Graduate Advisor. Registering in CS 5960 is otherwise subject to the same deadlines and rules as for other classes. Students who are not otherwise taking classes may register for CS 596 only after paying the Comprehensive Exam Fee (currently $10.00) at the Cashier's Office. A student may not decide to change to a Thesis Option once he/she has attempted the examination.

Frequency: The Comprehensive Exam, assuming demand, will be offered every Fall and Spring semester. The exact time and date of each exam is set and posted by the graduate advisor. The exam is 3 hours in length and covers the core requirements completed in the program.

Committee: The exam committee is set by the graduate advisor.

Grading: The committee grades the exams as either Satisfactory or Unsatisfactory and reports them to the graduate advisor, who then advises the students of the results in writing. For transcript purposes, the grading symbol to be issued will be either CR or NC.

Re-examination: A student will be given three attempts (not in the same semester) to pass the exam. If the student does not pass after the third attempt, the student will not be allowed a fourth attempt at the exam.

VIII.   Graduation Roadmaps

Graduation roadmaps are suggested academic plans and students should design their own plans to complete the degree requirements in a timely fashion.

- Check the scheduling patterns of the courses and ensue that the CS4xxx prerequisite course is completed prior to the CS5xxx course.
- It is strongly recommended to complete no more than three courses during any term.
- Courses in summer term can be taken to accelerate completion of the requirements.
- Students assigned any pre-requisite courses have to be completed during the first semester as per advisors recommendation.

Plan 1: Graduate/Thesis Option Roadmap

	SUMMER	FALL	SPRING
YEAR 1		CS 5xxx (core)	CS 5xxx (core)
		CS 4xxx/5xxx	CS 4xxx/5xxx
		CS 4xxx/5xxx	CS 4xxx/5xxx
			WPE

	SUMMER	FALL	SPRING
YEAR 2		CS 5xxx (core)	CS 4xxx/5xxx
		CS 4xxx/5xxx	CS 5992
		CS 5991	

Plan 2: Comprehensive Exam Option Roadmap

	SUMMER	FALL	SPRING
YEAR 1		CS 5xxx (core)	CS 5xxx (core)
		CS 4xxx/5xxx	CS 4xxx/5xxx
		CS 4xxx/5xxx	CS 4xxx/5xxx
			WPE

	SUMMER	FALL	SPRING
YEAR 2		CS 5xxx (core)	CS 4xxx/5xxx
		CS 4xxx/5xxx	CS 4xxx/5xxx
		CS 4xxx/5xxx	CS 5996

IX. Applying for Graduation

Certifying that a student has met all graduation requirements is a simple but functional process as described at
http://www.calstatela.edu/sites/default/files/groups/Graduation/Docs/graduation_application_for_graduates.pdf .

1. Students should take note of all the information (application deadlines, fees, diploma, commencement, transcripts, etc.,) as described.

2. Students will review the Academic Requirements report on GET and have a plan to complete the remaining requirements.

3. Students should make an appointment with the Advisor to review the Academic Report on GET and complete the *Graduate Application.* The *Graduate Application* has to be signed off by the Advisor.

4. Students submit the signed **Graduation Application** to the Cashier's Office (ADM 128) and pay the Application ($20) and Diploma ($10) fees. The Cashier's Office will forward the form to the Graduation Office for processing.

5. Degree dates are posted at the end of the semester in which all requirements are met. On completion of the degree requirements, the transcripts on GET indicate the following:

Degree:	Master of Science
Confer Date:	(date)
Plan:	Computer Science

6. **If you do not graduate…**
   If you do not graduate during the term you declared on your **Graduation Application**, then you must file a **Request to Change Graduation Term** form and pay a $25 late filing fee at the Cashier's Office (ADM 128).
   - Make a graduation advising appointment with your major department(s) or college(s)
   - Determine the correct term at the end of which you will complete all graduation requirements
   - Complete and sign the **Request to Change Graduation Term** form; available here: **http://www.calstatela.edu/graduation**
   - Pay the $25 late filing fee to the Cashier's Office (Cashier's Office will forward the form to the Graduation Office for processing)

   Filing of this form is required before you may:
   - Enroll in terms after your missed graduation date
   - Be considered for graduation in a different term

X. Academic Standards

As a student, you are now joining an academic community. The privilege of membership has certain obligations. Academic Integrity is very important. Cheating will not be tolerated. Cheating on any assignment or exam will be taken seriously. 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.

Appendix – Computer Science Courses
(See University Catalog for additional courses and course descriptions)

Computer Science 4000 level courses
- CS 4075 - Concurrent and Distributed Programming
- CS 4112 - Competitive Programming
- CS 4188 - Compilers
- CS 4220 - Current Trends in Web Design and Development
- CS 4222 - Principles of Data Base Systems
- CS 4440 - Introduction to Operating Systems
- CS 4470 - Computer Networking Protocols
- CS 4471 - Computer Networks Configuration and Management
- CS 4540 - Topics in Advanced Computer Science
- CS 4550 - Computer Graphics
- CS 4551 - Multimedia Software Systems
- CS 4555 - Introduction to 3D Computer Game Programming
- CS 4556 - Multiplayer Online Game Design and Development
- CS 4635 - Modeling and Simulation
- CS 4660 - Artificial Intelligence
- CS 4661 - Introduction to Data Science
- CS 4780 - Cryptography and Information Security
- CS 4961 - Software Design Laboratory I
- CS 4962 - Software Design Laboratory II
- CS 4963 - Computer Science Recapitulation
- CS 4990 - Undergraduate Directed Study

Computer Science 5000 level courses
- CS 5035 - Topics in Functional Programming
- CS 5112 - Design and Analysis of Algorithms
- CS 5186 - Theory of Computing
- CS 5188 - Languages and Translators
- CS 5220 - Advanced Topics in Web Programming
- CS 5337 - Advanced Software Engineering
- CS 5390 - Advanced Software Architecture
- CS 5440 - Advanced Topics in Operating Systems
- CS 5470 - Advanced Computer Networks
- CS 5540 - Graduate Topics in Computer Science
- CS 5550 - Advanced Computer Graphics
- CS 5660 - Advanced Topics in Artificial Intelligence
- CS 5661 - Topics in Data Science
- CS 5780 - Advanced Information Security
- CS 5781 - Computer and Network Security
- CS 5875 - Human Issues in Computing
- CS 5960 - Comprehensive Examination
- CS 5980 - Graduate Directed Study
- CS 5991 - Thesis or Project I
- CS 5992 - Thesis or Project II