Department of Computer Science

Graduate Handbook

MS in Computer Science

Fall 2020 Edition

California State University, Fullerton

Fullerton, CA 92834-6870

Revised Spring 2002, Fall 2005 by Allen Holliday

Revised Fall 2006 by The Graduate Committee
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Updated Summer 2009, Fall 2013 by Sandra Boulanger

Revised Fall 2015 by Mariko Molodowitch and Graduate Committee

Minor revisions Summer 2016 by Mariko Molodowitch

Revised Summer 2020 Summer 2020 by Mikhail Gofman and Sandra Boulanger

Contents

Introduction

Computer Science began as an interdisciplinary program at Cal State Fullerton in 1971, and the master's degree program was established a couple of years later. In Spring 2020, more than 400 students were enrolled in the Master's Program in Computer Science.

The program objectives of the master's degree in Computer Science are:

- To prepare you for the increasingly sophisticated application of computers to the needs of industry and society;
- To prepare you for research, teaching, and further graduate programs in computer science;
- To prepare you for leadership roles in your industry career.
- To provide you graduate level course work in computer science that supplements the curriculum in other disciplines.

The courses offered in the program can be roughly grouped into the following areas

1. Computer Applications

2. Computer Systems

3. Software Engineering

4. Theoretical Computer Science

If you wish to take courses without a degree objective, and meet the prerequisites, you may enroll on a space-available basis through Open University run by the University Extended Education.

Computer Science Department

The faculty and staff of the Computer Science Department welcome you into our program. We sincerely wish you good luck on your journey into higher education, and continued success in your career.

If you have questions at any time or need clarification on anything concerning the Computer Science Department, its policies, curriculum, or your progress, please feel free to contact us.

In person:

Computer Science Bldg., Room 522

Telephone: (714) 278-3700

Fax: (714) 278-7168

E-mail: csoffice@ecs.fullerton.edu

Website:
http://www.fullerton.edu/ecs/cs/

Mailing address:

California State University,
Fullerton

Department of Computer Science

P.O. Box 6870

Fullerton, CA 92834-6870

Applying For Admission

To apply to the MS in Computer Science program, submit an application and pay online at https://www2.calstate.edu/apply . The current fee is $70, but is subject to change. If you cannot access the application online you can print out a hard copy from the same website, and mail the application and $70 check or money order (in US currency) made out to CSUF to:

Graduate and International Admissions Coordinator
College of Engineering and Computer Science
California State University, Fullerton
P.O. Box 6870
Fullerton, California 92834-6870

Your application will be received faster and therefore processed more quickly if you apply and pay online. Your application cannot be processed until payment has been received.

For more information specific to graduate admission to Computer Science Master's Program and other Master's Programs offered by the College of Engineering and Computer Science, please check the website: http://www.fullerton.edu/ecs/future/admissions.php

For more general information, please check the CSU Fullerton Admissions and Records website http://www.fullerton.edu/admissions/prospectivestudent/. This has links to websites specific to graduate students and international students.

For international students, the International Programs Office has a useful website at http://internationaladmissions.fullerton.edu/.

Transcripts

You must arrange for the institution where you previously studied to send an official transcript to the address above. If your transcript does not indicate that you have received your bachelor's degree, a degree certificate showing proof that you have received your bachelor's degree is also required. Transcripts and degree certificates issued in languages other than English must be accompanied by a certified English translation.

Graduate Record Examination (GRE), Letters of Recommendations, Personal Statements

You do not need to take the GRE to apply to the Computer Science Graduate Program. Letters of recommendations and Statements of Purpose are also not required.

Evaluation

" It usually takes 3–4 weeks for us to evaluate your application"

After your application and its supporting documents (transcripts, TOEFL score, and so forth) have been received, it usually takes 3–4 weeks for us to evaluate your application. The Graduate Advisor will determine whether the courses you have taken are equivalent to the foundational breadth courses that we offer. This step may take a several weeks, depending on the volume of applications.

The final recommendation, including any breadth requirement needs, is sent by the Graduate Advisor to The Graduate and International Admissions Coordinator, who will inform you of those results.

Admission Deadlines

Deadlines for application can change from year to year. You are strongly encouraged to submit your application as soon as possible after the application period opens. The following are the usual opening dates for applications.

Fall semester:	October 1 of previous year
Spring semester:	August 1 of previous year.

The Graduate and International Admissions Office of the College of Engineering and Computer Science (ECS) will have the latest information on the deadlines. Please check their website: http://www.fullerton.edu/ecs/future/graduate.php.

International Students

"If your native language is not English, you must present results of a TOEFL, IELTS, or PTE exam"

If your native language is not English, you are required to present scores for the Test of English as a Foreign Language (TOEFL). If you have taken the written test, the score must be 550 or better; if you have taken the Internet- based test, the score must be 80 or better. An IELTS (International English Language Testing System) score or a PTE (Pearson Test of English) score may also be submitted for admission purposes, with a minimum acceptable score of 6.5 for IELTS and 58 for PTE.

The TOEFL, IELTS, or PTE score report must be sent directly to CSU Fullerton from the testing organization.

You may contact the International Programs Office (CP-940, see website given at start of Admissions Section) and the University Admissions and Records Office (LH-114 see website given at the start of the Admissions section) for further information on University requirements.

Minimum Admissions Requirements

In addition to the University requirements for all Masters programs, the following additional requirements are in effect.

Minimum GPA of 2.5 for the following:

Applicants who graduated from a U.S. institution with undergraduate degrees in engineering or computer science.

Applicants who graduated from ABET accredited international institutions with undergraduate degrees in engineering or computer science. ABET accreditations will be verified by the ECS Graduate & International Admissions.

Minimum GPA of 3.0 for the following:

Applicants who graduated from a U.S. institution with undergraduate degrees *other than* engineering or computer science.

Applicants with undergraduate degrees from non-ABET accredited international institutions.

Applicants without an undergraduate degree in computer science must have completed at least one course in computer programming with a grade of at least "B-" within the past 2 years

NOTE: Admission to the master's Program in Computer Science has become very competitive. The requirements listed above are minimum requirements, and many applicants who meet them may still not be admitted, depending on the pool of applicants for the year.

Student Portal

When you apply to CSU Fullerton, you are assigned a Campus-Wide Identification number. With it, you can sign onto your Student Portal and check the status of your application. For help, go to: http://admissions.fullerton.edu/prospectivestudent/app_status.php . Please be aware, however, that the tracking of your application is not always up-to-date, especially if the volume of application is large.

Newly Admitted Students

Congratulations! You have been admitted to the Computer Science Master's Program. The following are some useful information to help you get started.

Useful Websites

http://www.fullerton.edu/ California State University Fullerton website. The starting point for searches.

http://www.fullerton.edu/graduate/ Office of Graduate Studies website. There is a link to the Graduate Student Handbook which contains very useful and important information.

http://www.fullerton.edu/international/ International Students and Scholars Office website. This is the office to contact first for information if you are an international student. Use the tab "Arriving at CSUF" to get information about the steps you need to take, starting with applying for a student visa. The "Frequently asked Questions" link on the left can be very helpful.

http://sfs.fullerton.edu/ Student Financial Services website. This is the office to go to for information on tuition and fees, including how payments can be made.

Student Portal and the Student Center

When you first applied to CSU Fullerton, you were assigned a Campus-Wide Identification number, and you may have used it already to log on to your Student Portal. If you have not, you should definitely do so now. For help in logging in, go to:
http://admissions.fullerton.edu/prospectivestudent/app_status.php .

Once you have logged into your Student Portal, you should click on "Titan Online" and then on "Student Center". You need to check your Student Center web page and the CSUF student email account frequently, because these are two primary ways the University will contact you and give you essential information.

Accepting Admission

Once you decide to come to CSUF, you will need to let the University know and send a deposit. The deposit will be credited toward your first semester fees so it is not an extra cost, unless you change your mind and decide not to come. You will do this through your Student Center. The details of the

amount, how to pay, and the deadline should be given in your admission letter, but you can also check the ECS graduate and International Admissions office website for information: http://www.fullerton.edu/ecs/future/graduate.php and the Admissions and Records Office's Frequently Asked Questions about the Enrollment Deposit http://admissions.fullerton.edu/ProspectiveStudent/acceptancedecision.php.

International students should note that their I-20 forms will not be released until you accept your admission.

Registering for Classes

Typically, students start registering for classes approximately two months before the semester starts. This means that new students will start registering for classes **before** they arrive on campus. Important dates and deadlines for a semester including the opening of registration can be found in the Registration Guide for that semester. This can be accessed at http://admissions.fullerton.edu/currentstudent/registration.php.

"Typically, students start registering for classes approximately two months before the semester starts"

Each student is given a specific date and time when her or his registration time window opens. You will not be able to register before that time. Your time will be posted in a box on your Student Center labeled "Appointment Times" a few weeks before registration starts, so you should check your Student Center periodically. However, if you have Holds listed on the Student Center webpage, you may need to get them removed before you can register. To remove a hold, click on the hold to find the office that placed the hold and contact them directly.

The same website above that has the link to the current Registration Guide also has a link to a web tutorial on how to register, as well as a link "Registering for Classes", a step-by-step guide.

Please remember that you will need to pay within 3 days of registering. The website shown above as well as your Student Center has a link to Student Financial Services where you can get information about fees and how payments can be made. International students can use an alternative way of paying explained on the website: http://sfs.fullerton.edu/paymentinformation/IntlPayments.php .

The following are typical questions new graduate students have.

Do I Need to Register for Classes Before I Arrive on Campus?

Yes.

For financial or other reasons, some students would rather wait to register for courses until they are on campus. However, it is better to try and register as soon as possible, especially if

you have certain courses you want or need to enroll in. Recently, the number of students has grown quite large and classes fill very quickly.

The Computer Science Department does its best to make sure that all new graduate students are enrolled in suitable courses, at least two for international students, and at least one for domestic students. (Most international students need to register for two courses to be considered full-time for visa purposes.) So if you are unable to register ahead of time, the Department will try to help you, but the course you get may not have been your first choice.

What Courses Should I Register For?

This depends on whether you were admitted conditionally with some foundational breadth requirement courses that you need to take, or you have no such courses you need to take.

If you were sent a worksheet with breadth courses marked that you need to take, please start with those. Note that CPSC 121, and 131 are a prerequisite chain, and must be taken consecutively, not together. CPSC 131 must be taken before the 200 and 300 level breadth Computer Science courses.

*"CPSC 121, and 131 are a prerequisite chain, and must be taken **consecutively**, not together.*

CPSC 131 must be taken before the 200 and 300 level breadth Computer Science courses"

If you have no breadth courses you need to take, please read the section in this handbook about the Study Plan. This should inform you about what courses you can take that will count towards your Master's program. As a rule, do **not** register for an undergraduate course (400 level or less) if it is similar in content to a course that you have already taken. For example, if you have taken an undergraduate course in Object-Oriented Modeling and Design, using UML, do not register for CPSC 462. All 500 level courses in Computer Science are eligible for the Study Plan.

You may look through the list of 400 level and 500 level (graduate) courses offered for your first semester and see if any are interesting. Course descriptions are available from the Computer Science Department page of the online catalog. (https://catalog.fullerton.edu/preview_program.php?catoid=61&poid=28642&returnto=7397) Check the prerequisites for any course you are interested in: although the system will let you register, it is a very bad idea to take an Advanced Networks course if you have never taken a course in Computer Networks before. Remember that you need to maintain a B average in all 400 and 500 level courses you take.

The above advice is for new students who cannot come to campus before the semester is about to begin. If you can come before the registration period starts, please phone or email the department and see if you can get an advising appointment for personal advice on what courses to register for.

How Many Courses Should I Register For?

Although the general rule is that 3 courses or 9 units each semester is a full-time load for graduate students, international students in the Computer Science Master's program are considered full-time students for visa purposes if they take just 6 units each semester. Generally, for your first semester we advise taking 2 or 3 courses. If you are an international student not used to the educational system in the United States, we recommend taking just 2 courses the first semester.

What If No Courses Show Up in the Schedule/ What if All Courses Are Full?

When looking up courses in the Schedule through Titan Online, if you find no classes listed, please make sure that you have *not* checked the box labeled "Show Open Classes Only". With the box left unchecked, all classes meeting your criteria should show, including classes that are full. Some classes that are full may still accept students on the electronic wait list. If you are really interested in registering for a full class, if it has a wait list, you can select it and check the box "Wait list if the class is full". This will place you on the electronic wait list for the class.

*''If you find no classes listed on Titan Online, please make sure that you have **NOT checked** the box labeled **'Show Open Classes Only'**''*

What Is the Electronic Wait List?

When you are on the electronic wait list through Titan Online, you are **not enrolled or registered** in the class. If a student who is registered in the class drops it, the first student on the wait list will be automatically registered. Note that if no one drops, no one on the wait list will be added. Please read the Registration Guide section on wait listing to understand exactly how it works. For Computer Science courses, **the electronic wait list is no longer valid once classes start**. Even if you are number 1 on the wait list, once classes start, it will no longer be meaningful. The fall 2020 electronic waitlists will be turned off on Monday, August 10.

''The electronic wait list is no longer valid once classes start''

What Is the Paper Wait List / Is It Possible to Add a Class Once Classes Start?

The Computer Science Department has an established process in which an instructor for a class that is full will have students sign a paper wait list on the first day of class. Once the paper wait list is handed in to the office by the instructor, the staff checks everyone on the list and prioritizes them. Then **IF** there are openings in the class because someone did not have prerequisites, did not show up for the first day of class, or drops the class,

'An instructor for a class that is full will have students sign a paper wait list on the first day of class''

the staff will issue permits to add the class according to the priorities. Email will be sent to those who have been given permits, and the instructor will also get a list of the added students, if any.

Note that you must attend the first day of class to have any chance of adding the class. Please also note the **IF**. If everyone in the full class shows up and has the proper prerequisites, no one will get added.

The process of checking and assigning priorities takes time. Please do not keep asking the staff: the more time they spend answering inquiries, the less time they have to work on the wait lists, and the longer it will take.

What If I Change My Mind and Want To Drop a Class or Get Off the Wait List?

To drop a class during the first two weeks, just go through Titan Online. If you want to drop one course so you can take another one, use the "Swap" feature rather than just dropping one, and adding the other.

If you want to get off an electronic wait list, you should go through Titan Online and drop it, just like you would drop a class you were actually registered in. If you are on a paper wait list, but do not want to add the class anymore, contact the CS Department Office and ask that your name be removed. You will not need to do this once the deadline for all adds and drops has passed.

Coming To Campus

*"If you do not attend every class meeting in the first week of classes, the instructor may **drop** you from the class"*

Make sure to schedule your arrival so that you can attend the New Graduate Student Orientations. Generally there is one hosted by the Graduate Studies Office and one hosted by the College of Engineering and Computer Science. The Graduate Studies Orientation focuses on the general graduate student experience, while the ECS Orientation contains material more specific to Computer Science.

Due to COVID-19, the graduate orientation will be held virtually during fall 2020. Please follow the instructions in the emails from the Department.

International students need to check in with the International Programs Office. Their website http://www.fullerton.edu/international/contains valuable information that you should know.

The date classes start is in the Registration Guide for the semester. Please note that even if you are registered for a course, **if you do not attend every class meeting in the first week of classes,** the instructor may drop you from the class. If an emergency occurs and you cannot attend in time, make sure to contact the instructor and the Computer Science Department at csdept@ecs.fullerton.edu.

Graduate Standing

Foundational Breadth Requirement

If you received a Bachelor's Degree in Computer Science from an accredited university, you will not need to take any extra undergraduate courses before starting your master's program. Otherwise, you must have satisfactorily completed a fundamental core of undergraduate courses before being admitted to classified standing. If you need to take such courses, you will have been sent a worksheet similar to the one in Appendix A with check marks showing which courses you need to complete.

If your Bechalor's Degree was not in Computer Science, you will need to complete a set of foundational computer science course before you can receive a classified standing

Please note that these foundational breadth requirement courses are not exactly the same as prerequisites for a course. A prerequisite for a course is there to make sure that you have the background knowledge to help you understand and master the course contents and learning goals.

These breadth requirement courses, however, are not simply meant to make sure you do well in the program. When you get a Master's degree (or a Bachelor's degree, for that matter), there are certain expectations others have for you. They expect that you have basic knowledge in areas long held to be important to computer science.

For example, it is possible to choose your Study Plan courses so that none of them requires CPSC 351 (Operating Systems) as a prerequisite, and the concepts in that course may only be tangentially useful, if at all, while you are taking the courses. You may well end up with a GPA of 4.0. However, an employer who hired a CS graduate and found that he or she had no idea what deadlock or paging was, would not think very highly of the program he or she came from.

Courses to Satisfy the Foundational Breadth Requirement

You may be required to complete one or more courses listed below, unless you have taken courses that are equivalent to them.

Computer Science Courses

CPSC 121 Object-Oriented Programming

CPSC 131 Data Structures

CPSC 240 Computer Organization and Assembly Language

CPSC 323 Compilers and Languages

CPSC 335 Algorithm Engineering

CPSC 351 Operating Systems Concepts

CPSC 362 Foundations of Software Engineering

Mathematics Courses

MATH-150A Calculus I

MATH-150B Calculus II

MATH 270A Mathematical Structures I

MATH 270B Mathematical Structures II

MATH 338 Statistics Applied to Natural Sciences

University Graduate Writing Requirement

The university requires all graduate students to demonstrate their ability to write proficiently in the English language. Starting fall 2020, this requirement will be met automatically when you complete either CPSC 597 (Project) or CPSC-598 (Thesis). One of these courses is required for graduation (please see the section titled *Study Plan*).

Classification

Conditionally Classified Standing

All students are initially admitted as conditionally classified. You are eligible to become classified if you have no foundational breadth requirement courses to take or have successfully completed them.

Classified Standing

When you successfully complete all of the foundational breadth requirement courses, if you had any, you are eligible to be classified. You must make an appointment with an advisor and prepare a formal Study Plan. When the Study Plan has been submitted by the Computer Science Department and approved by the Associate Vice President of Academic Affairs or designee at the CSUF Graduate Studies Office, you will be sent a signed copy of the Study Plan and be officially classified. The University expects you to be classified **before finishing more than 13 units of Study Plan courses**, which means before the end of your second semester.

Planning your progress through the program: Milestones

Many of you have a timeline in mind for getting through the program. Here are the important milestones you must go through in order to progress (Please see Figure 1):

To graduate:

1. *Complete all foundational breadths*
2. *Submit a study plan*
3. *Complete all courses on the study plan and take CPSC 589*
4. *Complete CPSC 597 or CPSC 598*

1. Finish all breadth requirement courses if you were told you needed them. If you needed such courses, you were sent a worksheet listing what you needed to take. Do not take courses for the Study Plan unless you are also finishing all your breadth requirement courses at the same time. All breadth requirement courses must be passed with at least a D.

2. Submit a Study Plan, get it approved, and become a classified graduate student. The breadth requirement courses must be finished before this .[1] This should be done before you take more than 4 courses that will be on the Study Plan. If you have no breadth requirement courses, this will mean it should be done during the first semester or at the latest, before the start of the third semester. Added bonus for becoming classified: you should get an earlier registration time for the next semester if you become classified early enough.

3. Take CPSC 589, the Graduate Seminar.

5. Take CPSC 597 or 598, the project or thesis course. Passing CPSC 589 and being classified are both absolute prerequisites for taking this course.

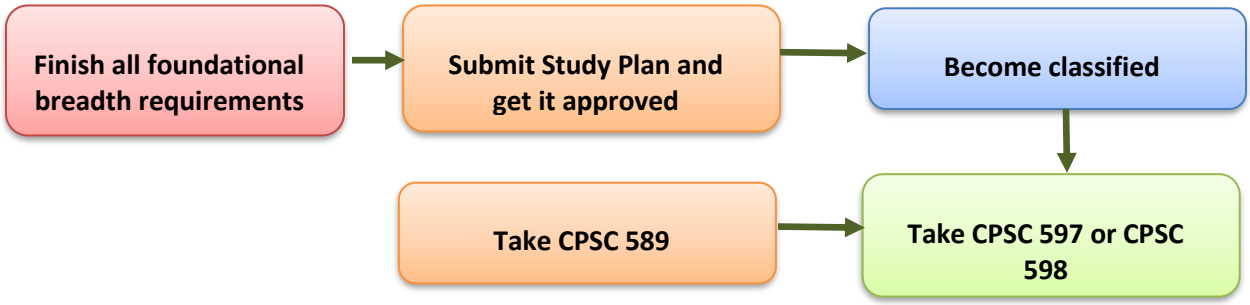

Figure 1 Planning your progress through the program: Milestones

A prerequisite diagram shows the milestones that you need to consider.

The thick arrows are absolute prerequisites. What this means is that if you wish to graduate in four semesters, you must take CPSC 589 in the third semester. If you want to finish in three semesters, you must take CPSC 589 in the second semester. The Department offered CPSC 589

during the summer in 2020, but is **highly unlikely to do so again.** Please plan on taking both CPSC 589 and 597 or 598 during the regular semesters. A word of warning: while students who come with no foundational breadth courses have finished in three semesters, it takes luck as well as hard work to get the courses you want to take at the time you want to take them. It is safer to plan on four semesters to get through the 30-unit Master's program.

Continuous Enrollment

You must remain enrolled for every semester of your graduate program. If circumstances require, you may apply for a Leave of Absence. The form may be obtained from Admissions and Records or online at the Graduate Studies website, and is submitted to the University Graduate Office.

If you do not enroll for courses each semester of your graduate program, and you have not been granted a Leave of Absence, you will be dropped from the graduate program and you must reapply for admission.

*''**You must remain enrolled for every semester** of your graduate program. If circumstances require, you may apply for a Leave of Absence''*

Probation

After you have been admitted, you must maintain a 3.0 Grade Point Average (GPA) for all 400- and 500-level courses taken here. You must also maintain a 3.0 GPA in all courses on your Study Plan.

If you have a GPA lower than this, you will be placed on probation. If you are on probation for more than two consecutive semesters, you are subject to disqualification from the program.

Since the foundational breadth requirement courses are 300-level or below, their grades are not included in the graduate GPA that determines Probationary status. However, you must show satisfactory progress through the breadth courses to remain in the program.

Graduate Study Plan

What is a Study Plan? It is **NOT** just a plan you make of which courses to take when. It is a formal list of the 10 courses (30 units) that will make up your graduate program. It must satisfy certain University and Departmental rules, and every Study Plan must be approved by the Graduate Advisor and the Associate Vice President of Research (or designee). ***It should be submitted before completing more than 13 units of study plan eligible coursework (not including any foundational breadth courses). Each course on the study plan must be completed with a grade of "C" or better***. When you apply for graduation, this is the document that the University will use to decide to award you the Master's Degree. Appendix B shows the Study Plan Worksheet that you will use to make your study plan. Once the study plan has been approved, you must file a "Study Plan Change Request" form with the Computer Science Department if you want to make any changes.

*"**The Study Plan** is **NOT** just a plan you make of which courses to take when. It is a formal list of the 10 courses (30 units) that will make up your graduate program"*

Required Courses

All students are required to complete a set of Required Elective courses, Graduate Seminar in Computer Science (CPSC 598), followed by a Project (CPSC 597) or Thesis (CPSC 598). The details are discussed below.

Required Electives: 9 units (3 courses) from three of the four categories below

- **Computer Applications:**
  - CPSC 531 Advanced Database Management
  - CPSC 566 Advanced Computer Graphics
  - CPSC 583 Expert Systems Design Theory
  - CPSC 585 Artificial Neural networks

- **Computer Systems**
  - CPSC 551 Operating Systems Designs
  - CPSC 552 Cyber Forensics
  - CPSC 558 Advanced Computer networking

- **Software Engineering**
  - CPSC 541 Systems and Software Standards and Requirements
  - CPSC 542 Software Verification and Validation
  - CPSC 543 Software Maintenance
  - CPSC 544 Advanced Software Process
  - CPSC 545 Software Design and Architecture
  - CPSC 546 Modern Software Management
  - CPSC 547 Software Measurement
  - CPSC 548 Professional, Ethical and Legal Issues for Software Engineers

- **Theoretical Computer Science**
  - CPSC 535 Advanced Algorithms

CPSC 589 Seminar in Computer Science

CPSC 597 Project or CPSC 598 Thesis

Graduate Seminar

In the Graduate Seminar (CPSC 589) students will do individual research into topics that can be the basis of a Master degree project or thesis. Research techniques, presentation skills, and contemporary research areas and topics are covered. Students will prepare a project proposal that can be used for their project or thesis. CPSC 589 must be complete before enrolling into CPSC 597 (Project) or CPSC 598 (Thesis).

Project / Thesis

To complete the graduate program, you must complete either CPSC 597 Project or CPSC 598 Thesis. A project is a significant development undertaking that shows originality and independent thinking. A thesis is a written description of the systematic study of a significant problem covering the gathering and analysis of information and including a conclusion or recommendation.

You can enroll into CPSC 597 from your portal.

To enroll in CPSC 598, you must submit a CPSC 598 Thesis Proposal form to the Computer Science Department Office. This form must be signed by a supervising full-time faculty member and by a second faculty reviewer **no later than the two weeks before the last day of instruction of the preceding semester**. Permission to enroll in CPSC 598 may be withheld if you submit a proposal after this deadline. The CPSC 598 proposal cover page can be found at https://www.fullerton.edu/ecs/cs/_resources/docs/Proposal%20Cover.docx

To enroll in CPSC 598, you must submit a CPSC 598 Thesis Proposal form to the Computer Science Department Office no later than two weeks before the last day of instruction of the preceding semester

Again, you will not be able to register online for CPSC 598 course until the Computer Science Department Office grants permission to do so. Email will be sent to your CSUF student account when this is done.

NOTE: If Project/Thesis is the only course left during your last semester, you will need to fill out a Reduced Course Load (RCL) form (found here https://bit.ly/3gknuex), obtain the signature of Department Chair, and submit the signed form to the International Student Services.

Elective Courses

You must take five additional courses; at least two of these courses must be at the 500-level**. Any 400 level course on the study plan cannot be similar in content to a course taken as an undergraduate.**

You should choose elective courses in at least two different areas. The following are groupings of some 400 and 500 level courses. Please note that **courses not listed may still be selected as electives**. In particular, these lists may not cover newly created courses. Depending on the focus, a course may be listed in more than one area.

*"Your Study Plan **cannot** include any 400 level elective courses whose content is similar to a course you took as an undergraduate and was credited toward your bachelor's degree"*

1. **Software Engineering:**
   - CPSC 463 Software Testing
   - CPSC 464 Software Architecture
   - CPSC 466 Software Process
   - CPSC 541 Systems and Software Standards and Requirements
   - CPSC 542 Software Verification and Validation
   - CPSC 543 Software Maintenance
   - CPSC 544 Advanced Software Process
   - CPSC 545 Software Design and Architecture
   - CPSC 546 Modern Software Management
   - CPSC 547 Software Measurement
   - CPSC 548 Professional, Ethical, and Legal Issues for Software Engineers

2. **Databases & Web Programming:**
   - CPSC 431 Database and Applications
   - CPSC-449 Web Back-End Engineering
   - CPSC 531 Advanced Database Management

3. **Computer Networks & Security:**
   - CPSC 452 Cryptography
   - CPSC 454 Cloud Computing and Security

- CPSC 455 Web Security
- CPSC 456 Network Security Fundamentals
- CPSC 458 Malware Analysis
- CPSC 459 Blockchain Technologies
- CPSC 471 Computer Communications
- CPSC 552 Cyber Forensics
- CPSC 558 Advanced Computer Networking

4. **Systems:**
    - CPSC 411 Mobile Device Application Programming
    - CPSC 531 Advanced Database Management
    - CPSC 551 Operating Systems Design
    - CPSC 558 Advanced Computer Networking

5. **Machine Intelligence:**
    - CPSC 481 Artificial Intelligence
    - CPSC 483 Introduction to Machine Learning
    - CPSC 583 Expert Systems Design Theory
    - CPSC 585 Artificial Neural Networks

6. **Theoretical Computer Science:**
    - CPSC 439 Theory of Computation
    - CPSC 535 Advanced Algorithms

7. Bioinformatics:

- CPSC 485 Computational Bioinformatics
- CPSC 583 Expert Systems Design Theory
- CPSC 585 Artificial Neural Networks

8. Computer Graphics & Game programming:

- CPSC 484 Principles of Computer Graphics
- CPSC 486 Game Programming
- CPSC 489 Game Development Project
- CPSC 566 Advanced Computer Graphics

Courses offered by other departments related to the student's objectives in Computer Science may be included on the Study Plan if approved by the Graduate Advisor.

Independent Graduate Research

You may take CPSC 599 Independent Graduate Research to fulfill part of your electives. This course allows you to pursue topics of special interest beyond those of a regular course. It cannot cover the same topic as your project or thesis.

You must submit an Application for Independent Study to the department office, which will supply the form. The application must include a plan for the course of study and objectives, and must be approved by a supervising full-time faculty member and by the department chair.

You may take up to three units per semester, and apply a maximum of three units towards the degree. The University allows a maximum of six units, but the Computer Science Department allows only three units.

You will not be able to register online for this course until the Computer Science Department Office grants permission to do so. Email will be sent to your CSUF student account when this is done.

Transfer Credit

At least 21 semester units must be taken in residence. Transfer credits and Cal State Fullerton extension credits are not residence units.

No more than nine units of transferable course work can be accepted from another institution and applied to the thirty required units on the Study Plan.

Duration of Study

All study plan courses should be completed within 10 semesters. If you find that this is not possible, you must file for a two-year extension.

The 10 semester time limit starts when you take the first course on your study plan. It does not include time spent on taking foundational breadth courses.

Grade Point Average

The University requires a 3.0 GPA for all 400 and 500 level courses taken here. You must also maintain a 3.0 GPA in all courses on your Study Plan. If you have a GPA lower than this, you will be placed on probation. If you are on probation for more than two consecutive semesters you are subject to disqualification from the program. Each course on the study plan must be completed with a grade of "C" or better while maintaining a 3.0 GPA. If a student receives a grade less than a "C" in a Study Plan course, that course must be repeated and passed with a "C" or better. A course may be repeated only once, and both grades will be included in the GPA. A maximum

*The University requires a **3.0 GPA** for all 400 and 500 level courses taken here with a grade of 'C' or better in each constituent course.*

of 6 units on your study plan may be repeated.

Scheduling Guidelines

Some 400 level and 500 level classes are offered every semester, while others are offered only every second semester or even less frequently. You should always check the official schedule or contact the Computer Science Department Office to make sure that a particular course is actually being offered when you want to take it.

Internship

Many students are interested in doing internships while pursuing their Master's degree. While the Computer Science Department encourages students doing internship, we do not have a formal program that places students in internships. Interested students should visit the Career Center in Langsdorf Hall Room 208. (http://www.fullerton.edu/career/students/) They have listings for both on-campus and off-campus jobs, and general information about internships. International students should also consult the International Office for the latest rules and regulations about CPT and OPT. Once an internship offer is given, students may enroll in EGGN 495, the internship course. It can be taken for the fall, spring or summer term. It is a variable unit course, so it can be taken for one unit at a time, or all three units at once. You should discuss how many units to sign up for with the faculty in charge of the internship course.

For all OPT/CPT questions please contact Dr. Sang June Oh (sjoh@fullerton.edu)

Applying For Graduation

You should file a Request for Graduation Check through Titan Online accessed from your Student Portal one semester before your expected date of graduation. The Graduation Check and your Graduate Study Plan will be sent to the Computer Science Department during that semester.

The Graduate Advisor will determine if your study plan has been satisfactorily completed, and will send a recommendation to the University Graduate Office, who will then inform you of the results.

''If you do not keep your study plan up to date, your graduation may be delayed''

If you change your study plan, you must file a Request for Change in Study Plan form, which you can obtain from the Computer Science Department or download from the Office of Graduate Studies website (https://bit.ly/2QkV9Kc). If you do not keep your study plan up to date, your graduation could be delayed.

Full-Time Faculty

Please see http://www.fullerton.edu/ecs/cs/faculty/ for up-to-date information on faculty.

Course Descriptions

For the most up-to-date course listings and descriptions, please consult the online Catalog at http://catalog.fullerton.edu/. Computer Science courses are most easily accessed from the Computer Science Department page in the catalog (https://bit.ly/3hpvn3q).

Appendix A. Foundational Breadth Requirement Worksheet

This worksheet is used to plan and record the foundational breadth course of study leading to classified graduate standing, shown on the next page.

Name: _____ **Semester:** _____

CWID: _____ **Date:** _____

Foundational Breadth Requirement Evaluation

The courses with a **mark** in front of them are those that you **need to complete**

Need to take	Course	Met By
	CPSC 121 Object-Oriented Programming	
	CPSC 131 Data Structures	
	CPSC 240 Computer Architecture and Assembly Language	
	CPSC 323 Compilers and Languages	
	CPSC 335 Algorithm Engineering	
	CPSC 351 Operating System Concepts	
	CPSC 362 Foundations of Software Engineering	
	MATH 150A Calculus I	
	MATH 150A Calculus II	
	MATH 270A Mathematical Structures I (Discrete Math)	
	MATH 270B Mathematical Structures II (Linear Algebra)	
	MATH 338 Statistics Applied to Natural Sciences	

Based on your transcripts, we believe that you must complete one or more foundational breadth courses before you may take any graduate courses. They are marked in the above table. If you feel that this is not correct, please provide detailed information (catalog description, course syllabus, or similar information) for our further evaluation.

Evaluator:

Appendix B. Graduate Study Plan Worksheet

The standard form for creating a Graduate Study Plan is shown on the next page.

CALIFORNIA STATE UNIVERSITY
FULLERTON
Department of Computer Science

Study Plan **Master of Science in Computer Science**

Name _____ Student ID No. _____ Date _____
Address _____ Home Phone: _____
_____ ZIP _____ Work Phone: _____

The following preclassification requirements have been met:

1. ☐ BA ☐ BS ☐ Other from _____ Month/Year _____
   Undergraduate major _____
2. ☐ Minimum GPA of 2.5, regardless of the visa status, from domestic (US) institutions with undergrad degree in engineering or computer science OR
   ☐ Minimum GPA of 2.5 from ABET accredited international institutions with undergrad degree in engineering or computer science OR
   ☐ Minimum GPA of 3.0 from domestic (US) institutions with undergrad degree other than engineering or computer science OR
   ☐ Minimum GPA of 3.0 if undergrad degree is from non-ABET accredited international institutions.
3. ☐ If undergrad degree is not in computer science, completed one course in computer programing with a grade of B- within the past two years.
4. Satisfactory completion of the following courses or equivalent including prerequisites:
   ☐ CPSC 121 ☐ CPSC 323 ☐ CPSC 362 ☐ MATH 270A
   ☐ CPSC 131 ☐ CPSC 335 ☐ MATH 270B
   ☐ CPSC 240 ☐ CPSC 351 ☐ MATH 338

Writing Requirement has been/will be met by ☐ **CPSC 597** ☐ **CPSC 598**

ALL STATE AND UNIVERSITY REQUIREMENTS ARE TO BE MET INCLUDING FIVE-YEAR LIMIT

Study Plan Requirements	*Units*	*Grade*	*Sem/Yr*	*Ext.*	*Comments*
REQUIRED ELECTIVES (9 Units) (3 units each from three of the four categories below)					
Computer Applications					
One of: CPSC 531, 566 583 or 585					
Computer Systems					
One of: CPSC 551, 552 or 558					
Software Engineering					
One of: 541, 542, 543, 544, 545, 546, 547, 548					
Theoretical Computer Science					
CPSC 535					
ELECTIVE COURSES (15 units 400/500—Maximum 9 units at 400-level)					
SEMINAR/PROJECT/THESIS (6 units)					
CPSC 589 Seminar in Computer Science	3				
CPSC 597 Project or 598 Thesis	3				
Total Units Required	30	Minimum 21 units 500-level			

Minimum 15 units Computer Science

CLASSIFIED STANDING recommended by committee (prerequisites met and Study Plan approved):

Reviewed by dept. staff (if required) _____ Date _____
Graduate Program Adviser _____ Date _____
Reviewed in Graduate Office _____ Date _____
CLASSIFIED GRADUATE STANDING GRANTED _____ Date _____
Associate Vice President, Academic Programs

Rev. 8/20 Rec'd Graduate Studies Office: Copies Sent: