USCViterbi

School of Engineering
Department of Computer Science

M.S. Computer Science
Graduate Student Handbook

Spring 2018

Dear Computer Science Student,

Welcome to the Computer Science Department at USC! We are the Master's Student Advisors, Flor Martínez and Art Perez. Our offices are located in Salvatori Hall (SAL-104).

Master students with last names A-Ma, your Advisor will be <u>Flor Martínez.</u>

Master students with last names Mb-Z, your Advisor will be <u>Art Perez.</u>

<u>**Advisement Appointments**</u>

To schedule an advisement appointment, please visit myViterbi.usc.edu and click on the "Advisement Appointment (CS) tool".

<u>Registration for Spring 2018 Courses</u>

Spring 2018 Newly Admitted Computer Science Students: please <u>do not use</u> the D-Clearance (department approval) request system for your first semester registration. Make sure submit your request for courses through the course preferences system. Please contact your advisor if you have not received the link.

Keep in mind that we grant courses based on availability. Make sure to check the online schedule of classes for courses that are already closed before submitting your request.

The following is the link to the online schedule of classes: http://classes.usc.edu/

The Computer Science Department's website (www.cs.usc.edu) provides information about the requirements for all of our programs. You can click on "Academics" and then go to "M.S. Programs" to view the links for program requirements.

In addition, if you are seeking specific resources, please visit the USC website during your free time. The search engine is particularly useful because you can enter queries, such as, "registration" or "tuition" or "housing" and a list of links will appear that provide you with relevant contact information.

Please view the schedule of classes. You are eligible to register for classes when you have access to register for classes through web registration and have resolved all holds on your account. If you are an ALI student, you will need to register for courses in person at the Registration Office, TRO-101. (ALI students are international students who need to take ALI courses because they did not meet minimum test score requirements on the TOEFL exam).

You will be notified via email when your CSCI course d-clearance has been granted.

January 5ᵗʰ, is the last day to settle all your fees. There is a $100 late fee per week for any unsettled fees appearing on your account after August 18ᵗʰ.

January 8ᵗʰ, is the first day of class. All students should attend the first day of class. In the past, some students have arrived a week after the first day of class and were unable to register for some of their desired courses.

EE 450 Placement Exam

Please note that CSCI 558L requires the passing of the placement exam for "Introduction Computer Networks (EE 450)." For additional information about the EE 450 placement exam please visit the following link:

http://minghsiehee.usc.edu/placement-exams/

If EE 450 was not completed at USC with a grade of "C" or higher, then you are required to pass the placement exam to satisfy the prerequisite requirements.

Orientation & Obtaining New Student Information

Please visit the following link to learn about getting starting at USC. This link is provided by the Student Affairs Department, known as the **Graduate and Professional Programs Office (GAPP)** of the Viterbi School of Engineering. On the GAPP website you will find useful information for newly admitted students, including registration information for the USC Graduate Student Orientation and the Viterbi Engineering Graduate Student Orientation:
http://gapp.usc.edu/students/orientation

Please register and attend **the Viterbi New Master's Student Welcome.** We strongly urge you to arrive at USC at least one week before the first day of classes to settle tuition fees, housing confirmations, course registration, etc.

American Language Institute (ALI) Students / (International Student English) ISE exam

If your TOEFL score is not 90 with 20/20/20/20 on each section, then you will need to take the ISE exam. However, upon verification that your TOEFL scores are 90 with 20/20/20/20 on each section, then you will be exempted from the ISE exam by ALI.

If you did not receive sufficient scores on your **TOEFL exam (for international students),** you are required to take the ISE (International Student Entrance) exam. You can register for the ISE exam by registering on the ALI (American Language Institute) website: http://ali.usc.edu/. Some students retake the TOEFL exam and receive better scores. If this is your case, you need to contact ALI to see if your restriction hold can be removed based on

improved results. Otherwise, you will NOT receive authorization to register for your CS courses until you obtain the results from your ISE exam. ALI informed us that the results should be available a week after you take the test. Your ALI restriction hold (ALI01) will not allow you to register for courses via web registration. You will need to register for courses at the Registration Office (TRO-101) after you see us for advisement.

DEN (Distance Education Network) Students

The Office of Graduate and Professional Programs (GAPP) manages enrollment in DEN courses. DEN students can obtain D-Clearances (department approval) for CS courses through their DEN Profile and the D-Clearance Request Form located in DEN Tools. (You can create and access your DEN Profile at https://gapp.usc.edu/den/current-students.) You can check the status of submitted D-Clearance requests via the D-Clearance Status link also located in DEN Tools. DEN sections of CS courses are designated as "DEN@Viterbi" in the "Room" column on the Schedule of Classes. You usually will contact your CS Advisor if you have questions regarding your program requirements. Otherwise, if you have questions about enrollment in DEN courses, please send an email to Patty Rinehart at ptrinida@usc.edu.

DEN sections are reserved for DEN Off-campus students. On-campus students MUST submit a petition to take a 'DEN section as an on-campus student' to the GAPP Office located at OHE-106. Petitions to register in a DEN section as an on-campus student are reviewed on a case-by-case basis and registration is not guaranteed. Petition decisions will be emailed to the student and if approved, D-Clearance will be issued by the GAPP Office. CS Advisors cannot grant access to DEN Off-campus courses.

Conditions of Admission

If you received a **letter with conditions of admission**, please be prepared to present the letter or discuss these conditions when you meet with your advisor. These conditions were placed by the admissions committee and serve to reemphasize the importance of performing well during your first semester. If the letter indicates specific courses you need to take, then you MUST take the courses during your first semester. If you are going to waive a course for your first semester, you will need to present official undergraduate transcripts to show that you took the course in your undergraduate studies. However, this does not mean you will not need to take the course later on. You will still need to take all necessary courses to satisfy your degree requirements. Due to these conditions, you will have a restriction hold on your account (ADM 20) and this hold will not be removed until you email your advisor in the second semester and indicate that you have satisfied the admission conditions. This hold will not prevent you from registering for courses.

Prior Degree Verification

Check your OASIS account to find out if Degree Verification is required for you: https://camel2.usc.edu/OASIS/

If you have an "Activity Restriction," identified as an ADM40 or RNR40, you must have your prior degree(s) verified. ADM40 and RNR40 holds will not prevent initial registration, but you must resolve the degree verification by the end of your first semester.

Domestic Students: If your prior degree was completed at a U.S. or Canadian institution then you need to submit your final, official transcripts with degree conferral date to the USC Registrar's Degree Progress Office. You can hand deliver your sealed transcripts in their original envelope to TRO-101 or have your institution mail them directly to USC:

 University of Southern California
 Degree Progress Department
 900 Childs Way, JHH 010
 Los Angeles, CA 90089-0912

International Students: The University of Southern California now requires that ALL prior degrees from international institutions must be verified through the International Education Research Foundation (IERF).

If your degree was completed outside of the U.S. or Canada, you are required to complete International Degree Verification. Please read the following information carefully:

- There is a fee for this service.
- Verification can be completed prior to arriving on campus.
- Once all documents are received, evaluation will be completed within 7 days.
- Service provider will transmit results directly to USC via secure websites.
- A special USC website has been established by the service provider, initiate the process through this website: www.ierf.org/usc

What happens if a student does not complete Degree Verification?

- Students are STRONGLY encouraged to start the process as early as possible.
- Documents submitted with the graduate application are not enough to satisfy the degree verification requirement.
- Failure to complete verification prior to end of first term of enrollment will result in a restriction that prevents registration transactions.
- This means that registration for the following semester cannot take place.
- Late registration can result in late fees being added to your account.

International Education Research Foundation (IERF)
- IERF - $100 fee.
- Original documents required.
- Students are responsible for shipping their original documents to IERF.
- IERF will mail the documents back via standard US Postal Service.

- Upgraded shipping options are available for a fee.
- Website for USC applicants: www.ierf.org/usc

Complete information can be found at: www.usc.edu/degreeprogress
Follow the link to "On-Line Services" then "Verification of a Prior Degree from an International Institution".

For any questions, please email dprogss@usc.edu. Please be sure to include your 10-digit USC ID number.

Passport Verification (PPV)

International students need to visit the **Office of International Services** for passport verification. Otherwise, you will not be able to register for your courses because you will have a restriction hold (STU50) on your account. Please visit the Office of International Services (OIS) in Parking Structure D (PSD), Suite 101to verify your passport and resolve this hold. You can sign up for passport verification and get more information by visiting the following link: http://ois.usc.edu/new-students/firstweeks/passport-verification-ppv/

The CS Department does not handle Visa's or I-20's. You will need to contact OIS in regards to any I-20 questions, at (213) 740-2666, Fax: (213) 740-5194, or email: ois@usc.edu

ENGR 595, CPT, and Internships

All international students who wish to do an internship are required to enroll in ENGR 595A: Professional Writing and Communication for Internships. ENGR 595A will cover topics such as resume writing, cover letters, business etiquette in the United States and much more! Students must complete this course BEFORE beginning their internship. It is recommended that you enroll in this course during your 1st semester. After completing ENGR 595A, students enroll in ENGR 595B for their internship experience. Student can subsequently enroll in ENGR 595C for their second internship experience and ENGR 595D for their third internship experience (if applicable).

Internship courses (ENGR 595abcd) are not eligible for elective credit toward the degree. This policy and courses only apply to students starting in Fall 2017 and beyond.

Directed Research and Colloquium

All graduate students have the option to engage in and explore computer science research and receive credit toward their degree programs. There are two course options available for students. You may complete one or both. See an advisor for more details.

Option 1: CSCI 590 Directed Research, which can be taken for 1 or 2 units at a time. Students engage in supervised research projects with a computer science faculty member. A maximum of 2 units of CSCI 590 Directed Research can be applied toward the degree. Additional information about Directed Research can be found on the department website at: https://www.cs.usc.edu/students/directed-research

Option 2: CSCI 591 Computer Science Research Colloquium, which can be taken for 1 unit at a time and is repeatable for a second unit. Exploration and critical assessment of research activities in computer science. This course serves as a forum for current research presentations from academia and industry. A maximum of 2 units of CSCI 591 Computer Science Research Colloquium can be applied toward the degree.

Thesis Option

With the approval of a supervising professor, qualified students may be allowed to pursue a thesis option. Students pursuing the thesis option must satisfy all of the policies and course requirements for the master's degree and, in addition, must enroll in a minimum of two semesters of CSCI 594a, CSCI 594b, CSCI 594z for a maximum of 4 units. The thesis must comply with all requirements set by the USC Graduate School.

Total units required for the M.S. in Computer Science (General) degree with thesis is 32.

For specialized degree programs, the total unit requirement is 36.

Thesis units do not count towards elective units.

If you are in a CS specialization, please check with your advisor to determine if a thesis can be added to your program of study.

General Policies You'll Need to Know

Degree Requirements: To learn about the course requirements for your graduate program, please visit the CS M.S. Program's main resource page at: http://www.cs.usc.edu/students/ms-students/

Prerequisites: Prerequisite courses are courses that need to be completed prior to registering for an advanced course. To learn about prerequisites for specific courses, please review the course descriptions in the academic catalogue and the CS department's policy on prerequisites and out of sequence courses. If courses are taken out of the proper order, they become ineligible for degree credit.

Registration Calendar: To view important registration dates and course offerings, please visit the following: Spring 2018 Registration Calendar and Spring 2018 CSCI Course Schedule.

Good Academic Standing: All graduate students are required to maintain a cumulative grade point average (GPA) of 3.0 ("B" average), as well as a 3.0 ("B" average) in your applied major courses. You may be dismissed from the program if this is not achieved.

Approved Non-CS Courses: CS master students are allowed to take up to 4 units of approved non CS courses to count towards their CS master degree. A list of approved courses is available at: https://www.cs.usc.edu/students/ms-students/approved-non-cs-courses/

Deficiency Courses: A class number with an "X" means that it is a deficiency course (usually taken by undergraduate students). These courses do not count towards the CS master degree (such as: CS 455x).

400-level Unit Courses: CS master students are allowed to take up to **4 units** of approved 400 level courses; however, some must be taken before the advanced course. For example, CS 420 must be taken before CS 520 because CS 420 is a prerequisite for CS 520. Deficiency courses will not be counted or accepted toward the 4 units. Always check with your advisor before choosing a 400 level course. A list of approved courses is available at: https://www.cs.usc.edu/students/ms-students/approved-400-level-courses/

Holds: A registration hold is usually given for several reasons and should be resolved as soon as possible. Some holds may prevent you from registering for classes. For example, you may have been admitted into the program with special conditions (such as maintaining a 3.0 GPA during first semester, or completing specific courses during the first semester, etc.). When you satisfy these conditions, you may email your academic advisor to request that the hold be removed.

Leaves of Absence: Graduate students are expected to be enrolled in courses every Fall and Spring semester. If you need to take a semester off, you must apply for a Leave of Absence. International Students contact GAPP to apply for Leave of Absence. Domestic Students, contact your assigned Graduate Advisor. Enrollment during the Summer is optional.

Substituting Courses: Please note that CSCI 571, 561, and 585 cannot be substituted by taking advanced courses. CSCI 570 – Algorithms can be substituted with CSCI 670 but students must choose one of those courses. Any exceptions to your degree requirements must be approved by the department. Please talk to your advisor if you have any questions about your curriculum.

Course Registration: Students should only be only enrolled in 2 CS/INF courses per semester. CSCI 590 and 591 do not count towards this limit.

We look forward to meeting you very soon and we hope you are excited to begin the Master of Science in Computer Science program at USC!

Please feel free to email us if you have any questions.

Fight On!

Flor Martínez
Art Perez
csdept@usc.edu
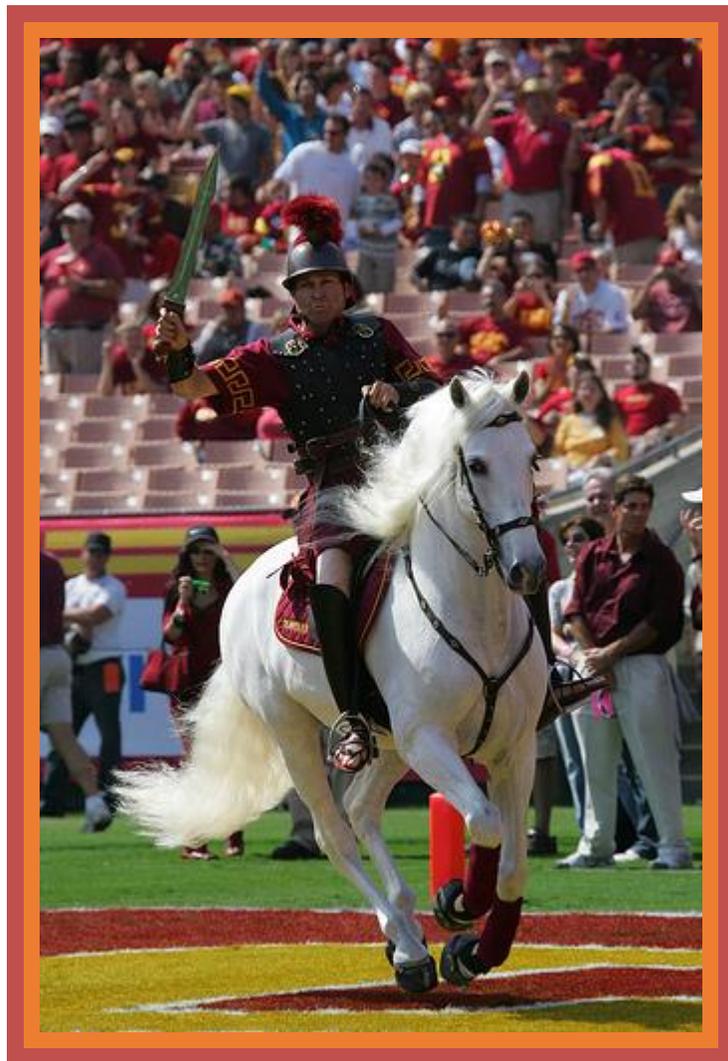
Academic Year 2018

Spring Semester 2018

Open Registration	Thu-Fri	January 4-5
Tuition & Fee Settlement Deadline	Fri	January 5
Classes Begin	Mon	January 8
Martin Luther King's Birthday	Mon	January 15
President's Day	Mon	February 19
Spring Recess	Sun-Sun	March 11-18
Classes End	Fri	April 27
Study Days	Sat-Tue	April 28-May 1
Exams	Wed-Wed	May 2-9
Commencement	Fri	May 11

Summer Session 2018

Registration	Mon-Tue	May 14-15
Classes Begin	Wed	May 16
Memorial Day	Mon	May 28
Independence Day	Wed	July 4
Classes End	Tue	August 7

http://academics.usc.edu/calendar

Master of Science in Computer Science

Degree Requirements and Specializations
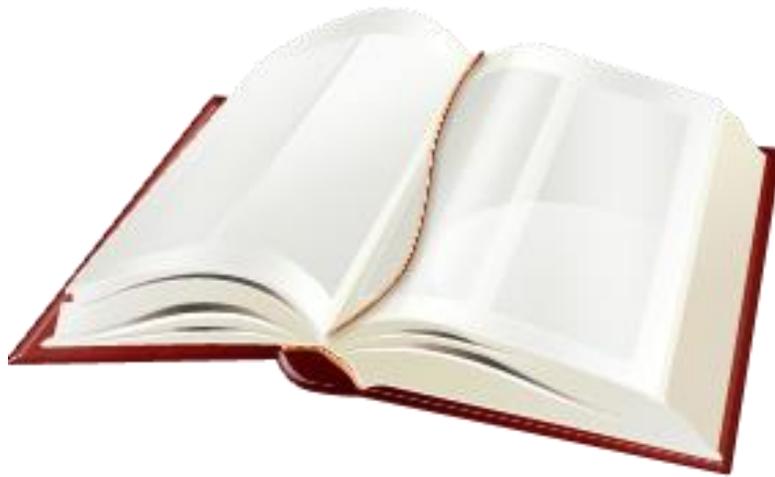
Master of Science in Computer Science (General) - 28 units

You must take the following course (4 units):		Units
CSCI 570	Analysis of Algorithms	4

Choose 2 of the following courses (8 units):		Units
CSCI 561	Foundations of Artificial Intelligence	4
CSCI 571	Web Technologies	4
CSCI 585	Database Systems	4

Choose additional 16 units of CSCI courses (only one course may be 400-level)*		Units
CSCI 400-599	Select any CSCI elective course from the department's offerings. Only one course may be 400-level.	16

Important Notes:
- **A maximum of 2 units of CSCI 590 and a maximum of 2 units of CSCI 591 may be applied.**

- **Furthermore, only one course may be 400-level, and up to two courses may be 600-level.**

- **With adviser approval, one non Computer Science Course may be selected from the approved list. See department website for details.**

- **Thesis courses (CSCI 594a, CSCI 594b, CSCI 594z) and Internship courses (ENGR 595a, ENGR 595b, ENGR 595z) are not eligible for elective credit.**

- ***Students must complete a minimum of 24 units of CSCI coursework.**

Thesis Option (32 units)
With the approval of a supervising professor, qualified students may be allowed to pursue a thesis option. Students pursuing the thesis option must satisfy all of the policies and course requirements for the master's degree and, in addition, must enroll in a minimum of two semesters of CSCI 594a, CSCI 594b, CSCI 594z for a maximum of 4 units. The thesis must comply with all requirements set by the Graduate School. Students interested in a thesis while enrolled in a CS specialization should consult with their department adviser.

Total units required for the M.S. Computer Science (General) degree with thesis is 32.

Master of Science in Computer Science (Game Development) - 32 units

You must take the following course (4 units)		Units
CSCI 570	Analysis of Algorithms	4

Choose 1 of the following courses (4 units)		Units
CSCI 561	Foundations of Artificial Intelligence	4
CSCI 571	Web Technologies	4
CSCI 585	Database Systems	4

Game Development – Required Core Courses (12 units)		Units
CSCI 423	Native Console Multiplayer Game Development (NEW)	4
CSCI 522	Game Engine Development	4
CSCI 580	3D Graphics & Rendering	4

Project Classes (6 units)		Units
CSCI 529AB	Advanced Game Projects	4-2

Game Development Electives - Complete 6 units from the following options:		Units
CSCI 424	Game Engine Tool Development	4
CSCI 425	Immersive Game Development	4
CSCI 520	Computer Animation and Simulation	4
CSCI 523	Networked Games	4
CSCI 524	Networked Artificial Intelligence	4
CSCI 526	Advanced Mobile Devices and Game Consoles	4
CSCI 499/599	Special Topics (Advisor Approval Required)	4
CTIN 401L	Interface Design for Games	2
CTIN 403L	Advanced Visual Design for Games	2
CTIN 404L	Usability Testing for Games	2
CTIN 405L	Design and Technology for Mobile Experiences	2
CTIN 406L	Sound Design for Games	2
CTIN 444	Audio Expression	2
CTIN 456	Game Design for Business	2
CTIN 458	Business and Management of Games	2
CTIN 459	Game Industry Workshop	4
CTIN 462	Critical Theory and Analysis of Games	4
CTIN 463	Anatomy of a Game	4
CTIN 464	Game Studies Seminar (max 4)	2-2
CTIN 482	Designing Online Multiplayer Game Environments	2
CTIN 486	Immersive Design Workshop	2
CTIN 488	Game Design Workshop	4
CTIN 492L	Experimental Game Topics	4
CSCI 590	Directed Research (1-2 units, max 2)	1-2, max 2
CSCI 591	Computer Science Colloquium (1 unit, max 2)	1, max 2

Master of Science in Computer Science (High Performance Computing & Simulations) 32 units

You must take the following two required courses course (8 units)		Units
CSCI 570	Analysis of Algorithms	4

Choose 2 of the following courses (8 units)		Units
CSCI 561	Foundations of Artificial Intelligence	4
CSCI 571	Web Technologies	4
CSCI 585	Database Systems	4

High Performance Computing & Simulations - Required Core Courses (4 units)		Units
CSCI 596	Scientific Computing and Visualization	4

Technical Elective Courses

Select either (option 1) 2 courses from Group A and 1 course from Group B, or (option 2) 1 course from Group A and 2 courses from Group B. Total Group units will be 9-11 units

A. Computer Science Group		Units
CSCI 520	Computer Animation and Simulation	4
CSCI 551*	Computer Communications	4
CSCI 558L	Internetworking and Distributed Systems Laboratory	3
CSCI 580	3-D Graphics and Rendering	4
CSCI 599	Special Topics (Advisor Approval Required)	4
CSCI 653	High Performance Computing and Simulations	4

B. Computational Science/Engineering Application Group		Units
AME 535a*	Introduction to Computational Fluid Dynamics, or	3
AME 535b*	Introduction to Computational Fluid Dynamics	3
CE 529a*	Finite Element Analysis	3
CHE 502	Numerical Methods for Diffusive and Convective Transport	3
EE 553*	Computational Solution of Optimization Problems	3
MASC 575*	Basics of Atomistic Simulations of Materials	3
MATH 501	Numerical Analysis and Computing	3
MATH 578a	Computational Molecular Biology	3
PHYS 516	Methods of Computational Physics	3
PTE 582*	Fluid Flow and Transport Processes in Porous Media	3
EE 653	Advanced Topics in Microarchitecture	3
EE 657*	Parallel and Distributed Computing	3
EE 659*	Interconnection Networks	3

Complete the remaining units from the group list above or the following:		Units
CSCI 5XX|6XX	CSCI 500- or 600-level course	4
CSCI 590	Directed Research (1-2, max 2)	1-2
CSCI 591	Computer Science Colloquium (1 unit, max 2)	1

Master of Science in Computer Science (Data Science) - 32 units

You must take the following course (4 units)		Units
CSCI 570	Analysis of Algorithms	4

Data Science - Required Core Courses (8 units)		Units
CSCI 585	Database Systems	4
CSCI 561	Foundations of Artificial Intelligence	4

Group Electives (3 courses – minimum 1 course from each of the two groups)		Units
Group 1 – Data Systems		
CSCI 548	Information Integration on the Web	4
CSCI 572	Information Retrieval and Web Search Engines	4
CSCI 653	High Performance Computing and Simulation	4
CSCI 586	Database Systems Interoperability	4
CSCI 587	Geospatial Information Management	4
CSCI 685	Advanced Topics in Database Systems	4
INF 551	Foundations of Data Management	4
Group 2 – Data Analysis		
CSCI 567	Machine Learning	4
CSCI 573	Probabilistic Reasoning	4
CSCI 686	Advanced Big Data Analytics	4
ISE 520	Optimization: Theory and Algorithms	3
MATH 467	Theory and Computational Methods for Optimization	4
MATH 574	Applied Matrix Analysis	3
INF 553	Foundations and Applications of Data Mining	4

Additional Electives		Units
	Any 500 or 600 level course in CSCI (including additional group electives or special topics)	
MATH 458	Numerical Methods	4
MATH 501	Numerical Analysis and Computation	3
MATH 502ab	Numerical Analysis	3
MATH 505a	Applied Probability	3
MATH 601	Optimization Theory and Techniques	3
MATH 650	Seminar in Statistical Consulting	3
INF 554	Information Visualization	4
INF 558	Building Knowledge Graphs	4
INF 552	Machine Learning for Data Informatics	4
CSCI 590	Directed Research (1-2, max 2)	1-2, max 2
CSCI 591	Computer Science Colloquium (1 unit, max 2)	1, max 2

- **A maximum of 3 INF courses can be taken toward the CS data science degree.**

- **Students who change to CS general can only count 1 non-CS course (including INF) towards the general program.**

Master of Science in Computer Science (Computer Security) - 32 units

You must take the following course (4 units)		Units
CSCI 570	Analysis of Algorithms	4

Computer Security - Required Core Courses (16 units)		Units
CSCI 530	Security Systems	4
CSCI 531	Applied Cryptography	4
CSCI 551	Computer Communications	4
CSCI 555	Advanced Operating Systems	4

Choose 2 of the following courses (8 units)		Units
CSCI 561	Foundations of Artificial Intelligence	4
CSCI 571	Web Technologies	4
CSCI 585	Database Systems	4

Complete 4 units from one or more of the following options:		Units
CSCI 556	Introduction to Cryptography	4
CSCI 577A	Software Engineering	4
CSCI 578	Software Architectures	4
CSCI 599	Special Topics (Advisor Approval Required)	4
CSCI 590	Directed Research (1-2 units, max 2)	1-2, max 2
CSCI 591	Computer Science Colloquium (1 unit, max 2)	1, max 2

Master of Science in Computer Science (Software Engineering) - 32 units

You must take the following course (4 units)		Units
CSCI 570	Analysis of Algorithms	4

Choose 2 of the following courses (8 units)		Units
CSCI 561	Foundations of Artificial Intelligence	4
CSCI 571	Web Technologies	4
CSCI 585	Database Systems	4

Software Engineering – Take all four of the following Core Courses (16 units)		Units
CSCI 510	Software Management and Economics	4
CSCI 577A	Software Engineering	4
CSCI 577B	Software Engineering	4
CSCI 578	Software Architecture	4

Software Engineering Electives – Complete 1 of the following courses (4 units)		Units
CSCI 512	Testing and Analysis of Software Systems	4
CSCI 568	Requirements Engineering	4
CSCI 599	Special Topics (Advisor Approval Required)	4
CSCI 590	Directed Research (1-2 units, max 2)	1-2, max 2
CSCI 591	Computer Science Colloquium (1 unit, max 2)	1, max 2

Master of Science in Computer Science (Intelligent Robotics) - 32 units

You must take the following course (4 units)		Units
CSCI 570	Analysis of Algorithms	4

Intelligent Robotics – Required Core Courses (8 units)		Units
CSCI 561	Foundations of Artificial Intelligence	4
CSCI 545	Robotics	4

Choose 1 of the following courses (4 units)		Units
CSCI 571	Web Technologies	4
CSCI 585	Database Systems	4

Complete 16 units from the following courses:		Units
CSCI 445*	Introduction to Robotics	4
CSCI 534	Affective Computing	4
CSCI 540	Self-Organization	4
CSCI 567	Machine Learning	4
CSCI 573	Probabilistic Reasoning	3
CSCI 599	Special Topics	4
CSCI 590	Directed Research (1-2 units, max 2)	1-2, max 2
CSCI 591	Computer Science Colloquium (1 unit, max 2)	1, max 2
CSCI 646	Coordinated Mobile Robotics	4

- **If you are planning to take CSCI 445, it must be taken BEFORE CSCI 545**

- **Alternate Robotics / AI related courses may be substituted in the elective area.**

Master of Science in Computer Science (Multimedia and Creative Technologies) - 32 units

You must take the following course (4 units)		Units
CSCI 570	Analysis of Algorithms	4

Choose 2 of the following courses (8 units)		Units
CSCI 561	Foundations of Artificial Intelligence	4
CSCI 571	Web Technologies	4
CSCI 585	Database Systems	4

You must take the following four courses (16 units)*		Units
CSCI 420	Computer Graphics	4
CSCI 520	Computer Animation and Simulation	4
CSCI 576	Multimedia Systems Design	4
CSCI 580	3D Graphics and Rendering	4

Complete the remaining units from one of the following options:		Units
CSCI 590	Directed Research (1-2 units, max 2)	1-2, max 2
CSCI 591	Computer Science Colloquium (1 unit, max 2)	1, max 2
NON-CS	NON CS Course (such as EE, ISE, etc. from approved list)	3-4
600-LEVEL CS	600-level CSCI Course (advisor approval required)	4
500-LEVEL CS	Additional 500-level CSCI course	4

- ***CSCI 420 should be taken before CSCI 520 and CSCI 580.**

Master of Science in Computer Science (Computer Networks) - 32 units

You must take the following course (4 units)		Units
CSCI 570	Analysis of Algorithms	4

Choose 2 of the following courses (8 units)		Units
CSCI 561	Foundations of Artificial Intelligence	4
CSCI 571	Web Technologies	4
CSCI 585	Database Systems	4

Computer Networks – Required Core Courses (14 units)		Units
EE 450	Introduction to Computer Networks	3
CSCI 551	Computer Communications	4
CSCI 555	Advanced Operating Systems	4
CSCI 558	Internetworking and Distributed Systems Laboratory	3

You must take 6 units from the following:		Units
CSCI 530	Security Systems	4
CSCI 531	Applied Cryptography	4
CSCI 556	Introduction to Cryptography	4
CSCI 590	Directed Research (1-2 units, max 2)	1-2, max 2
CSCI 591	Computer Science Colloquium (1 unit, max 2)	1, max 2
CSCI 599	Special Topics (Advisor Approval Required)	4
EE 532	Wireless Internet and Pervasive Computing	3
EE 550	Design and Analysis of Computer Communication Networks	3
EE 555	Broadband Computer Architectures	3
EE 558	Optical Fiber Communication Systems	3
EE 579	Wireless and Mobile Networks Design and Laboratory	3

- **CSCI 402 is a prerequisite for CSCI 551, 555, and 558L. CSCI 402 is automatically waived for graduate computer science students.**

Master of Science in Computer Science (Scientists & Engineers) - 37 units

37 program units.
33 degree applicable units. (up to 11 units of 400-level courses)

Preparatory Programming Requirement You must take the following course in your 1st semester (4 units)		Units
CSCI 455x	Introduction to Programming Systems Design	4

CSCI 455x is a preparatory requirement for this program and should be completed in the first semester. The units for this course do not count toward the 33 units required for the degree.

Foundational Requirements You must take CSCI 402 and one of the following courses (7-8 units)		Units
CSCI 402	Operating Systems	4
EE 450	Computer Networks **OR**	3
EE 457	Computer Systems Organization	4

Breadth Courses You must take the following courses (16 units)		Units
CSCI 570	Analysis of Algorithms	4
CSCI 561	Foundations of Artificial Intelligence	4
CSCI 585	Database Systems	4
CSCI 571	Web Technologies	4

Recommended Elective Courses* Select two courses, 7-8 units, from approved 500 or 600 level courses from Computer Science		Units
CSCI 577A	Software Engineering	4
CSCI 577B	Software Engineering	4
CSCI 576	Multimedia Systems Design	4
CSCI 580	3D Graphics and Rendering	4

Remaining 1-2 units can be completed with the following:		Units
CSCI 590	Directed Research (1-2 units, max 2)	1-2, max 2
CSCI 591	Computer Science Colloquium (1 unit, max 2)	1, max 2

*These are recommended electives and are not required. You can choose any graduate computer science courses of interest.