MS IN COMPUTER SCIENCE

In Workflow

1. CSC Committee Chair (tdk@csus.edu; haiquan.chen@csus.edu)
2. CSC Chair (jouyang@csus.edu)
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11. Registrar's Office (k.mcfarland@csus.edu)

Approval Path

1. Mon, 17 Feb 2025 20:02:00 GMT
   Haiquan Chen (haiquan.chen): Approved for CSC Committee Chair
2. Mon, 17 Feb 2025 20:53:31 GMT
   Jinsong Ouyang (jouyang): Rollback to CSC Committee Chair for CSC Chair
3. Fri, 21 Feb 2025 16:56:51 GMT
   Haiquan Chen (haiquan.chen): Rollback to Initiator
4. Mon, 24 Feb 2025 16:47:32 GMT
   Haiquan Chen (haiquan.chen): Approved for CSC Committee Chair
5. Mon, 24 Feb 2025 18:50:11 GMT
   Jinsong Ouyang (jouyang): Approved for CSC Chair
6. Fri, 28 Feb 2025 17:40:09 GMT
   Masoud Ghodrat Abadi (abadi): Approved for ECS College Committee Chair
7. Fri, 28 Feb 2025 19:27:31 GMT
   Behnam Arad (arad): Approved for ECS Dean

History

1. May 4, 2018 by clmig-jwehrheim
2. Jan 30, 2020 by Haiquan Chen (haiquan.chen)
3. Feb 18, 2021 by Jinsong Ouyang (jouyang)
4. Aug 4, 2022 by 302822325
5. Aug 10, 2022 by 302822325
6. Sep 11, 2023 by Haiquan Chen (haiquan.chen)

Date Submitted: Fri, 21 Feb 2025 17:16:29 GMT

Viewing: MS in Computer Science

Last approved: Mon, 11 Sep 2023 15:57:20 GMT

Last edit: Fri, 21 Feb 2025 17:16:28 GMT

Changes proposed by: Haiquan Chen (219700833)

Academic Group: (College)

Engineering & Computer Science

Academic Organization: (Department)

Computer Science

Catalog Year Effective:
2026-2027 Catalog

Individual(s) primarily responsible for drafting the proposed degree major program:

Name (First Last)	Email	Phone 999-999-9999
Haiquan Chen	haiquan.chen@csus.edu	916-278-6087

Type of Program:
Major

Program Change Type:
Non-Substantive

Delivery Format:
Fully Face to Face

Title of the Program:
MS in Computer Science

Designation: (degree terminology)
Master of Science

Briefly describe the program proposal (new or change) and provide a justification:
Due to the faculty shortage, we are unable to regularly offer necessary graduate courses based on the current breadth requirement on a regular basis. We reduce the number of breadth areas from three to two, therefore allowing students to obtain the highly demanded certificates for specialization areas (such as AI, DS, and cybersecurity) in the current job market.

The elective (previously called breadth) requirement (9 units) and degree requirement (30 units) remain the same

The two breadth areas, "Networks and Communications" and "System Software", have been consolidated into "System and Networks"

Add the following new courses to the elective requirement: CSC296S, CSC296P, CSC296Z

University Learning Goals

Graduate (Masters) Learning Goals:
Disciplinary knowledge
Communication
Critical thinking/analysis
Information literacy
Professionalism
Intercultural/Global perspectives

Program Learning Outcomes

Program Learning Outcomes

Learning Outcome
1. Master, integrate, and apply advanced knowledge and skills to solve complex computer science problems.
2. Communicate research findings, original work, technical and non-technical support materials in writing and via oral presentation to a variety of audiences.
3. Demonstrate the ability to be creative and analytical, and to contribute to the field of computer science.
4. Demonstrate the ability to obtain, assess, and analyze developments and advancements in computer science.
5. Adhere to ethical standards of the profession when conducting academic and professional activities.
6. Apply intercultural and/or global perspectives to solve problems, inform research, and make contributions to the field.

Learning Outcomes Display

Course Code	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO 6
CSC 200						
CSC 201						
CSC 205						
CSC 206						
CSC 209						
CSC 290						
CSC 237						
CSC 242						
CSC 273						
CSC 280						
CSC 212						
CSC 219						
CSC 238						
CSC 244						
CSC 258						
CSC 250						
CSC 252						
CSC 253						
CSC 254						
CSC 215						
CSC 296R						
CSC 230						
CSC 231						
CSC 232						
CSC 233						
CSC 234						
CSC 235						
CSC 236						
CSC 239						
CSC 245						
CSC 251						
CSC 255						
CSC 275						
CSC 296P						
CSC 296Z						

CSC 500						
CSC 502						

Will this program be required as part of a teaching credential program, a single subject, or multiple subject waiver program (e.g., Liberal Studies, Biology) or other school personnel preparation program (e.g., School of Nursing)?

No

Catalog Description:

Total units required for MS: 30

Program Description

The Computer Science Department offers Master's Degree programs in Computer Science and Software Engineering, Certificates of Advanced Study for students enrolled in the Computer Science program, and a Master's Degree joint program in Computer Engineering.

The primary goal of each of these programs is to prepare students to serve as effective professional computer specialists in a society which increasingly depends on computer usage and technology.

A secondary goal is to prepare interested students for research, teaching, or further study toward the Ph.D. in Computer Science. The programs also enable individuals with background in other areas to obtain the skills and knowledge necessary to enter and advance in employment in computer-related industries.

Completion of the Master of Science in Computer Science requires advanced coursework in a minimum of three of the following areas: computer architecture/computer engineering, database management systems, information assurance and security, intelligent systems, networks and communications, software engineering, and systems software. Students must obtain approval from the department to take more than one course in one area.

Teaching associateships are occasionally available for qualified graduate students; these students assist in instruction of undergraduate courses, supervision of laboratory work, and aid faculty members in research projects. Interested persons should apply in the Department office.

Due to the large number of graduate students in Computer Science who are employed, most graduate level courses are offered in the late afternoon or evening.

Admission Requirements: Course prerequisites and other criteria for admission of students to the degree major program, and for their continuation in it.

Admission Requirements

Admission as a classified graduate student requires:

- a baccalaureate degree;
- a minimum 3.0 GPA in the last 60 units attempted;
- GRE general test;
- mathematical preparation including two semesters of calculus and one semester of calculus-based probability and statistics corresponding to Sacramento State courses:

Code	Title	Units
MATH 30	Calculus I	4
MATH 31	Calculus II	4
STAT 50	Introduction to Probability and Statistics	4

- Computer Science lower-division preparation including programming proficiency, discrete structures, machine organization, and UNIX and PC-based program development environment proficiency corresponding to Sacramento State courses (see the following) and as evidenced by a pass on the graduate student placement test or a baccalaureate degree in Computer Science;

Code	Title	Units
CSC 15	Programming Concepts and Methodology I	3
CSC 20	Programming Concepts and Methodology II	3
CSC 28	Discrete Structures for Computer Science	3
CSC 35	Introduction to Computer Architecture	3
CSC 60	Introduction to Systems Programming in UNIX	3

- Computer Science advanced preparation as evidenced by a 3.25 GPA in the following Sacramento State upper division Computer Science courses or their equivalent elsewhere:

Code	Title	Units
CSC 130	Data Structures and Algorithm Analysis	3
CSC 131	Computer Software Engineering	3
CSC 134	Database Management Systems	3
CSC 135	Computability and Formal Languages	3

CSC 137	Computer Organization	3
CSC/CPE 138	Computer Networking Fundamentals	3
CSC 139	Operating System Principles	3

Applicants with deficiencies in the admission requirements area are advised to remove any such deficiencies before applying.

Admission Procedures

Applicants must complete a university application and a separate departmental application by the posted application deadline dates for the term applying. *For more admissions information and application deadlines, please visit the Office of Graduate Studies* website *(*http://www.csus.edu/gradstudies/*)*:

- an online application for admission;
- two sets of official transcripts from all colleges and universities attended, *other than Sacramento State;* and
- official GRE general test scores.

Minimum Units and Grade Requirement for the Degree

Units Required for the MS: 30

Minimum Cumulative GPA: 3.0. No grade below "C" may count toward the degree.

Note: Only those courses completed within seven years prior to date of graduation will satisfy course requirements.

Advancement to Candidacy

Each student must file an application for Advancement to Candidacy, indicating a proposed program of graduate study. This procedure should begin as soon as the classified graduate student has:

- removed any deficiencies in admission requirements;
- completed at least 12 units of graduate level (200 series) Computer Science courses with a minimum 3.0 GPA; and
- taken a Graduate Writing Intensive (GWI) course in their discipline within the first two semesters of coursework at California State University, Sacramento.

Students must have been advanced to candidacy before they can register for Master's thesis or project. Advancement to Candidacy forms are available on the Office of Graduate Studies website. The student fills out the form after planning a degree program in consultation with a Computer Science graduate advisor. The completed form must be signed by the Graduate Coordinator or the Department Chair and is then returned to the Office of Graduate Studies for approval.

As defined by policy http://www.csus.edu/umanual/acadaff/fsm00010.htm, a change in units constitutes a substantive change to the program. If your changes constitute a substantive change, please refer back to the "Program Change Type" field above to ensure that "Substantive" is selected.

Program Requirements: (If new courses are being created as part of a new program, it will be useful to propose courses first.)

Program Requirements

Code	Title	Units
Required Courses (16 Units)		**16**
CSC 200	Professional Writing in Computer Science	3
CSC 201	Programming Language Principles	3
CSC 205	Computer Systems Structure [1]	3
CSC 206	Algorithms And Paradigms	3
CSC 209	Research Methodology	1
CSC 290	Preparation for Culminating Experience	3
Elective Requirement (9 Units)		
Select three courses from at least TWO of the following areas:		9
Computer Architecture/Computer Engineering		
CSC 237	Microprocessor Systems Architecture	
CSC 242	Computer-Aided Systems Design and Verification	
CSC/EEE 273	Hierarchical Digital Design Methodology	
CSC/EEE 280	Advanced Computer Architecture	
Data Science		
CSC 212	Bioinformatics: Data Integration and Algorithms	
CSC 219	Machine Learning	
CSC 238	Human-Computer Interface Design	
CSC 244	Database System Design	
CSC 258	Distributed Systems	
Information Assurance and Security		
CSC 250	Computer Security	

CSC 252	Cryptography Theory and Practice	
CSC 253	Computer Forensics	
CSC 254	Network Security	
CSC 258	Distributed Systems	
Artificial Intelligence		
CSC 215	Artificial Intelligence	
CSC 219	Machine Learning	
CSC 296R	Computer Vision	
CSC 296S Deep Learning		
Software Engineering		
CSC 230	Software System Engineering	
CSC 231	Software Engineering Metrics	
CSC 232	Software Requirements Analysis and Design	
CSC 233	Advanced Software Engineering Project Management	
CSC 234	Software Verification and Validation	
CSC 235	Software Architecture	
CSC 236	Formal Methods in Secure Software Engineering	
CSC 238	Human-Computer Interface Design	
System and Networks		
CSC 239	Advanced Operating Systems Principles and Design	
CSC 245	Performance Modeling and Evaluation	
CSC 250	Computer Security	
CSC 251	Principles of Compiler Design	
CSC 255	Computer Networks	
CSC 258	Distributed Systems	
CSC 275	Advanced Data Communication Systems	
CSC 296P	Theory and Practice of Parallel Programming with GPUs	
CSC 296Z	Computer Graphics Theories and Algorithms	
Restricted Electives (3 Units)		
Select 3 units [2]		3
Culminating Requirement (2 Units)		
Select one of the following:		2
CSC 500	Master's Thesis [3]	
CSC 502	Master's Project [3]	
Total Units		**30**

[1] Students whose undergraduate preparation has covered a significant amount of the material in CSC 205 or CSC 206 may be given a waiver by the Department from taking one or more of these courses. In this case, for each course waived with department approval, the student must take three additional units from the list below.

[2] Students should choose their electives according to the following guidelines:

1. Any 200-level CSC courses not already used to satisfy the Breadth Requirement, with the exception of CSC 295 and CSC 299. Students not required to take CSC 205 or CSC 206 must, for each course waived, take an additional three units in this category.
2. Undergraduate upper division elective courses whose topics are not covered by any 200-level CSC courses as long as they have not been used towards another degree. (A maximum of 3 undergraduate units may be used in any graduate program.) Prior to taking any of these electives, students must obtain approval from the department.
3. Related 200-level courses from outside the Computer Science Department may only be taken with prior department approval and may not have been used in another program.

[3] Students are required to conduct an oral defense of their master's projects or their master's thesis. The recommended department-level deadline in each semester for submitting an MS project or thesis signed by the committee chair and its members to the Graduate Coordinator's office is 10 working days prior to the University deadline.

For graduate programs, the number of declared undergraduate major and the degree production over the preceding years of the corresponding baccalaureate program:

The number of undergraduate majors in Fall 2022, Fall 2023, and Fall 2024 are 781, 864, and 903, respectively.

The number of degrees conferred in the baccalaureate program in 2021-22, 2022-23 and 2023-24 are 296, 282, and 356, respectively.

Fiscal Impact to Change an Existing Program

Indicate programmatic or fiscal impact which this change will have on other academic units' programs, and describe the consultation that has occurred with affected units:

NA

Provide a fiscal analysis of the proposed changes:

NA

How will the above changes be accommodated within the department/College existing fiscal resources?

NA

Will the proposed changes require additional resources?

No

What additional space, equipment, operating expenses, library, computer, or media resources, clerical/technical support, or other resources will be needed?

NA

Reviewer Comments:

Jinsong Ouyang (jouyang) (Mon, 17 Feb 2025 20:53:31 GMT): Rollback: Please see my email.

Haiquan Chen (haiquan.chen) (Fri, 21 Feb 2025 16:56:51 GMT): Rollback: see email

Key: 149