MS IN COMPUTER SCIENCE

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

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:
  - MATH 30 Calculus I
  - MATH 31 Calculus II
  - STAT 50 Introduction to Probability and Statistics
- 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;

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSC 15</td>
<td>Programming Concepts and Methodology I</td>
<td>3</td>
</tr>
<tr>
<td>CSC 20</td>
<td>Programming Concepts and Methodology II</td>
<td>3</td>
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</tbody>
</table>

- 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:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Units</th>
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</thead>
<tbody>
<tr>
<td>CSC 130</td>
<td>Data Structures and Algorithm Analysis</td>
<td>3</td>
</tr>
<tr>
<td>CSC 131</td>
<td>Computer Software Engineering</td>
<td>3</td>
</tr>
<tr>
<td>CSC 134</td>
<td>Database Management Systems</td>
<td>3</td>
</tr>
<tr>
<td>CSC 135</td>
<td>Computing Theory and Programming Languages</td>
<td>3</td>
</tr>
<tr>
<td>CSC 137</td>
<td>Computer Organization</td>
<td>3</td>
</tr>
<tr>
<td>CSC/CPE 138</td>
<td>Computer Networking Fundamentals</td>
<td>3</td>
</tr>
<tr>
<td>CSC 139</td>
<td>Operating System Principles</td>
<td>3</td>
</tr>
</tbody>
</table>

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
Program Requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Units</th>
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<tbody>
<tr>
<td><strong>Required Courses (13 Units)</strong></td>
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<td>16</td>
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<tr>
<td>CSC 200</td>
<td>Programming Language Principles</td>
<td>3</td>
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<tr>
<td>CSC 201</td>
<td>Data Models for Database Management Systems ¹</td>
<td>3</td>
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<tr>
<td>CSC 204</td>
<td>Computer Systems Structure ¹</td>
<td>3</td>
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<tr>
<td>CSC 205</td>
<td>Algorithms And Paradigms</td>
<td>3</td>
</tr>
<tr>
<td>CSC 206</td>
<td>Research Methodology</td>
<td>1</td>
</tr>
<tr>
<td><strong>Breadth Requirement (9 Units)</strong></td>
<td>Select one course from three of the following areas:</td>
<td>9</td>
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<tr>
<td>CSC 237</td>
<td>Microprocessor Systems Architecture</td>
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<tr>
<td>CSC 242</td>
<td>Computer-Aided Systems Design and Verification</td>
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<tr>
<td>CSC/EEE 273</td>
<td>Hierarchical Digital Design Methodology</td>
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<tr>
<td>CSC/EEE 280</td>
<td>Advanced Computer Architecture</td>
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<tr>
<td><strong>Database Management Systems</strong></td>
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<tr>
<td>CSC 212</td>
<td>Bioinformatics: Data Integration and Algorithms</td>
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<tr>
<td>CSC 244</td>
<td>Database System Design</td>
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<td><strong>Information Assurance and Security</strong></td>
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<tr>
<td>CSC 250</td>
<td>Computer Security</td>
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<td>CSC 252</td>
<td>Cryptography Theory and Practice</td>
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<tr>
<td>CSC 253</td>
<td>Computer Forensics</td>
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<tr>
<td>CSC 254</td>
<td>Network Security</td>
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<tr>
<td><strong>Intelligent Systems</strong></td>
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<tr>
<td>CSC 214</td>
<td>Knowledge-Based Systems</td>
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<tr>
<td>CSC 215</td>
<td>Artificial Intelligence</td>
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<tr>
<td>CSC 219</td>
<td>Machine Learning</td>
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<tr>
<td><strong>Networks and Communications</strong></td>
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<tr>
<td>CSC 255</td>
<td>Computer Networks</td>
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<td>CSC 258</td>
<td>Distributed Systems</td>
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<tr>
<td>CSC 275</td>
<td>Advanced Data Communication Systems</td>
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<tr>
<td><strong>Software Engineering</strong></td>
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<tr>
<td>CSC 230</td>
<td>Software System Engineering</td>
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<td>CSC 231</td>
<td>Software Engineering Metrics</td>
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<td>CSC 232</td>
<td>Software Requirements Analysis and Design</td>
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<tr>
<td>CSC 233</td>
<td>Advanced Software Engineering Project Management</td>
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<tr>
<td>CSC 234</td>
<td>Software Verification and Validation</td>
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<tr>
<td>CSC 235</td>
<td>Software Architecture</td>
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<tr>
<td>CSC 236</td>
<td>Formal Methods in Secure Software Engineering</td>
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<tr>
<td>CSC 238</td>
<td>Human-Computer Interface Design</td>
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<tr>
<td><strong>System Software</strong></td>
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<tr>
<td>CSC 239</td>
<td>Advanced Operating Systems Principles and Design</td>
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<td>CSC 245</td>
<td>Performance Modeling and Evaluation</td>
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<tr>
<td>CSC 250</td>
<td>Computer Security</td>
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<tr>
<td>CSC 251</td>
<td>Principles of Compiler Design</td>
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<tr>
<td><strong>Restricted Electives</strong></td>
<td></td>
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</tbody>
</table>

Select 0-3 units

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<thead>
<tr>
<th>Code</th>
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<th>Units</th>
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<tbody>
<tr>
<td>CSC 500</td>
<td>Master’s Thesis</td>
<td>3</td>
</tr>
<tr>
<td>CSC 502</td>
<td>Master’s Project</td>
<td>3</td>
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<tr>
<td><strong>Total Units</strong></td>
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<td>27</td>
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¹ Students whose undergraduate preparation has covered a significant amount of the material in CSC 204, 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 204, 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 6 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 make an oral presentation of their master’s project or conduct an oral defense of 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.