# Bachelor of Science in Computer Science Roadmap

120 Total Units Required  
Minimum Number of Units in the Major: 71

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>First Semester</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MATH 226</td>
<td>Calculus I</td>
<td>4</td>
</tr>
<tr>
<td><strong>GE Area A: Oral Communication (A1) or Critical Thinking (A3)</strong></td>
<td></td>
<td>3</td>
</tr>
<tr>
<td><strong>GE Area A: Written English Communication (A2)</strong></td>
<td></td>
<td>3</td>
</tr>
<tr>
<td><strong>GE Area C: Arts (C1) or Humanities (C2)</strong></td>
<td></td>
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</tr>
<tr>
<td><strong>GE Area D: U.S. History (D2) or U.S. and California Government (D3)</strong></td>
<td></td>
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</tr>
<tr>
<td>Units</td>
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<td>16</td>
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<tr>
<td><strong>Second Semester</strong></td>
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</tr>
<tr>
<td>BIOL 100 or BIOL 176</td>
<td>Human Biology or Science and Politics of Stem Cell Biology</td>
<td>3</td>
</tr>
<tr>
<td>CSC 210</td>
<td>Introduction to Computer Programming</td>
<td>3</td>
</tr>
<tr>
<td>MATH 227</td>
<td>Calculus II</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 220</td>
<td>General Physics with Calculus I</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 222</td>
<td>General Physics with Calculus I Laboratory</td>
<td>1</td>
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<tr>
<td>Units</td>
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<tr>
<td><strong>Third Semester</strong></td>
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</tr>
<tr>
<td>CSC 220</td>
<td>Data Structures</td>
<td>3</td>
</tr>
<tr>
<td>CSC 230</td>
<td>Discrete Mathematical Structures for Computer Science</td>
<td>3</td>
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<tr>
<td>PHYS 230</td>
<td>General Physics with Calculus II</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 232</td>
<td>General Physics with Calculus II Laboratory</td>
<td>1</td>
</tr>
<tr>
<td><strong>GE Area A: Oral Communication (A1) or Critical Thinking (A3)</strong></td>
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<td>3</td>
</tr>
<tr>
<td><strong>GE Area A: Written English Communication (A2)</strong></td>
<td></td>
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</tr>
<tr>
<td>or Written English Communication II (A4)</td>
<td></td>
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<tr>
<td>Units</td>
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<tr>
<td><strong>Fourth Semester</strong></td>
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<tr>
<td>CSC 256</td>
<td>Machine Structures</td>
<td>3</td>
</tr>
<tr>
<td>CSC 340</td>
<td>Programming Methodology</td>
<td>3</td>
</tr>
<tr>
<td>CSC 412</td>
<td>Advanced Software Lab</td>
<td>1</td>
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<tr>
<td>MATH 324</td>
<td>Probability and Statistics with Computing</td>
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</tr>
<tr>
<td><strong>GE Area A: Written English Communication II (A4) if not already satisfied</strong></td>
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<tr>
<td>or SF State Studies or University Elective</td>
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</tr>
<tr>
<td><strong>GE Area D: U.S. History (D2) or U.S. and California Government (D3)</strong></td>
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<tr>
<td>Units</td>
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<td>13</td>
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<tr>
<td><strong>Fifth Semester</strong></td>
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<tr>
<td>CSC 300GW</td>
<td>Ethics, Communication, and Tools for Software Development - GWAR</td>
<td>3</td>
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<tr>
<td>CSC 413</td>
<td>Software Development</td>
<td>3</td>
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<tr>
<td>CSC 510</td>
<td>Analysis of Algorithms I</td>
<td>3</td>
</tr>
<tr>
<td>MATH 325</td>
<td>Linear Algebra</td>
<td>3</td>
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</table>
### Bachelor of Science in Computer Science Roadmap

<table>
<thead>
<tr>
<th>GE Area C: Arts (C1)</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
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### Sixth Semester

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Units</th>
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<tbody>
<tr>
<td>CSC 415</td>
<td>Operating System Principles</td>
<td>3</td>
</tr>
<tr>
<td>CSC 520</td>
<td>Theory of Computing</td>
<td>3</td>
</tr>
<tr>
<td>or CSC 656</td>
<td>or Computer Organization</td>
<td></td>
</tr>
<tr>
<td>GE Area C: Humanities: Literature (C3)</td>
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</tr>
<tr>
<td>GE Area D: Social Sciences (D1)</td>
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<tr>
<td>GE Area UD–B: Upper Division Physical and/or Life Sciences (Consider SF State Studies Course)</td>
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### Seventh Semester

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Units</th>
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<tbody>
<tr>
<td>CSC 600</td>
<td>Programming Paradigms and Languages</td>
<td>3</td>
</tr>
<tr>
<td>Major Elective (12 Units Total) – Take Two</td>
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<tr>
<td>GE Area UD–C: Upper Division Arts and/or Humanities (Consider SF State Studies Course)</td>
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</tr>
<tr>
<td>GE Area UD–D: Upper Division Social Sciences (Consider SF State Studies Course)</td>
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### Eighth Semester

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Units</th>
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</thead>
<tbody>
<tr>
<td>CSC 648</td>
<td>Software Engineering</td>
<td>3</td>
</tr>
<tr>
<td>Major Elective (12 Units Total)</td>
<td>3</td>
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</tr>
<tr>
<td>SF State Studies or University Elective – Take Three</td>
<td>10</td>
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### Total Units

<table>
<thead>
<tr>
<th>Units</th>
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<tbody>
<tr>
<td>120</td>
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</tbody>
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1. To avoid taking additional units, it is recommended that you meet LLD and SF State Studies requirements (AERM, GP, ES, SJ) within your GE or major.

2. ENG 114 can only be taken if you complete Directed Self-Placement (DSP) and select ENG 114; if you choose ENG 104/ENG 105 through DSP you will satisfy A2 upon successful completion of ENG 105 in the second semester; multilingual students may be advised into alternative English courses.

3. CSC 648 serves as the major capstone course.