As of Fall 2021, lower division substitutions are not accepted. Students should plan to take C S 303E and C S 313E for the Elements of Computing certificate at UT. However, we will honor the following courses as substitutions for C S 303E if taken prior or during the Summer 2021 semester: MIS 304: Intro to Problem Solving & Programming, EE 312: Software Design & Implementation 1, COE 301: Introduction to Computer Programming, BME 303: Introduction to Computing, and SDS 322: Introduction to Scientific Programming. We will also honor EE 422C: Software Design & Implementation 2 as a substitution for C S 313E if taken prior or during Summer 2021.

If a student would like to petition a non-approved substitution course for the Elements certificate, please fill out the Elements Course Substitution Form and include the syllabus for the semester that you took that the course was taken. The student must be registered for the course and have received or will be expecting to receive a C-, or better, letter grade. Transfer courses will need to be completed and transferred into UT prior to the evaluation process. These petitions are not guaranteed for approval and the student will be sent a SAN once the Elements faculty advisor makes a final decision.

### Upper Division Course Substitutions

<table>
<thead>
<tr>
<th>Substitution Course</th>
<th>Elements Equivalent</th>
<th>Approved Through</th>
</tr>
</thead>
<tbody>
<tr>
<td>SDS 335: Scientific and Technical Computing</td>
<td>CS 323E: Scientific Programming*</td>
<td>Summer 2024</td>
</tr>
<tr>
<td>PHY 329: Introductory Computational Physics</td>
<td>CS 323E: Scientific Programming*</td>
<td>Summer 2024</td>
</tr>
<tr>
<td>ME 318M: Programming &amp; Engineering Computational Methods</td>
<td>CS 323E: Scientific Programming*</td>
<td>Summer 2024</td>
</tr>
<tr>
<td>M 348: Scientific Computation in Numerical Analysis</td>
<td>CS 323E: Scientific Programming*</td>
<td>Summer 2024</td>
</tr>
<tr>
<td>CHE 348: Numerical Methods in Chem Engineering &amp; Problem Solving</td>
<td>CS 323E: Scientific Programming*</td>
<td>Summer 2024</td>
</tr>
<tr>
<td>MIS 325: Database Management</td>
<td>CS 327E: Elements of Databases</td>
<td>Summer 2024</td>
</tr>
<tr>
<td>MIS 333K: Web Application Development</td>
<td>CS 329E: Elements of Web Programming</td>
<td>Summer 2024</td>
</tr>
<tr>
<td>BCH 339N: Systems Biology &amp; Bioinformatics</td>
<td>CS 329E: Elements of Data Analytics**</td>
<td>Summer 2024</td>
</tr>
<tr>
<td>M 375T: Predictive Analysis</td>
<td>CS 329E: Elements of Data Analytics**</td>
<td>Summer 2024</td>
</tr>
<tr>
<td>SDS 322E: Elements of Data Science***</td>
<td>CS 329E: Elements of Data Analytics**</td>
<td>Summer 2024</td>
</tr>
<tr>
<td>PGE 323M: Reservoir Engineering III</td>
<td>Upper Division Elements Elective</td>
<td>Summer 2024</td>
</tr>
<tr>
<td>PGE 379/383: High Performance Computing</td>
<td>Upper Division Elements Elective</td>
<td>Summer 2024</td>
</tr>
<tr>
<td>CH 354M/393L: Intro to Computational Methods in Chemistry</td>
<td>Upper Division Elements Elective</td>
<td>Summer 2024</td>
</tr>
</tbody>
</table>

*Only ONE substitution for C S 323E: Scientific Programming may count towards the certificate

** Only ONE substitution for C S 329E: Elements of Data Analytics may count towards the certificate

***Course name was previously SDS 348: Computational Biology & Bioinformatics