MAJOR IN COMPUTER SCIENCE, SOFTWARE ENGINEERING CONCENTRATION

Requirements
Effective Fall 2023

A minimum grade of C (2.000) is required in CO 150 and in all CS, CIS, DSCI, MATH, and STAT courses which are required for graduation.

Freshman

<table>
<thead>
<tr>
<th>Course</th>
<th>AUCC</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CO 150</td>
<td>1A</td>
<td>3</td>
</tr>
<tr>
<td>MATH 156 or 160</td>
<td>1B</td>
<td>4</td>
</tr>
</tbody>
</table>

Select one group from the following:\(^2\)

**Group A:**
- CS 150A or 150B: Culture and Coding: Java (GT-AH3)
- CS 162 or 164: CS1—Introduction to Java Programming
- CS 163: CS1—Computational Thinking with Java

**Group B:**
- Arts and Humanities (http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#arts-and-humanities)
- CS 152: Python for STEM
- CS 162 or 164: CS1—Introduction to Java Programming
- CS 163: CS1—No Prior Programming Experience
- CS 201/PHIL 201: Ethical Computing Systems (GT-AH3)

Select at least two courses totaling a minimum of 7 credits from the following (one course must be or include the sequenced laboratory):

- AA 100: Introduction to Astronomy (GT-SC2)
- ANTH 120: Human Origins and Variation (GT-SC2)
- BZ 110: Principles of Animal Biology (GT-SC2)
- BZ 120: Principles of Plant Biology (GT-SC1)
- CHEM 107: Fundamentals of Chemistry (GT-SC2)
- CHEM 111: General Chemistry I (GT-SC2)
- CHEM 120: Exploring Earth - Physical Geology (GT-SC2)
- GEOL 122: The Blue Planet - Geology of Our Environment (GT-SC2)
### Major in Computer Science, Software Engineering Concentration

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>GEOL 124</td>
<td>Geology of Natural Resources (GT-SC2)</td>
<td>3A</td>
</tr>
<tr>
<td>&amp; GEOL 121</td>
<td></td>
<td></td>
</tr>
<tr>
<td>GEOL 150</td>
<td>Physical Geology for Scientists and Engineers</td>
<td>3A</td>
</tr>
<tr>
<td>HONR 292A</td>
<td>Honors Seminar: Knowing in the Sciences</td>
<td>3A</td>
</tr>
<tr>
<td>LIFE 102</td>
<td>Attributes of Living Systems (GT-SC1)</td>
<td>3A</td>
</tr>
<tr>
<td>LIFE 103</td>
<td>Biology of Organisms-Animals and Plants (GT-SC1)</td>
<td>3A</td>
</tr>
<tr>
<td>LIFE 201A</td>
<td>Introductory Genetics: Applied/Population/Conservation/Ecological (GT-SC2)</td>
<td>3A</td>
</tr>
<tr>
<td>LIFE 201B</td>
<td>Introductory Genetics: Molecular/Immunological/Developmental (GT-SC2)</td>
<td>3A</td>
</tr>
<tr>
<td>LIFE 220/LAND 220</td>
<td>Fundamentals of Ecology (GT-SC2)</td>
<td>3A</td>
</tr>
<tr>
<td>NR 150</td>
<td>Oceanography (GT-SC2)</td>
<td>3A</td>
</tr>
<tr>
<td>PH 121</td>
<td>General Physics I (GT-SC1)</td>
<td>3A</td>
</tr>
<tr>
<td>PH 122</td>
<td>General Physics II (GT-SC1)</td>
<td>3A</td>
</tr>
<tr>
<td>PH 141</td>
<td>Physics for Scientists and Engineers I (GT-SC1)</td>
<td>3A</td>
</tr>
<tr>
<td>PH 142</td>
<td>Physics for Scientists and Engineers II (GT-SC1)</td>
<td>3A</td>
</tr>
</tbody>
</table>

Diversity, Equity, and Inclusion (http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#diversity-equity-inclusion) 1C 3

Elective 1-5

**Total Credits** 30

### Sophomore

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CS 165</td>
<td>CS2--Data Structures</td>
<td>4</td>
</tr>
<tr>
<td>CS 220</td>
<td>Discrete Structures and their Applications</td>
<td>4</td>
</tr>
</tbody>
</table>

Select one group from the following: 4-5

**Group A**

- CS 214: Software Development
- CT 301: C++ Fundamentals

**Group B**

- CS 253: Software Development with C++

Select one course from the following: 4

- CS 250: Computer Systems Foundations
- CS 270: Computer Organization

Select one course from the following: 3-4

- DSCI 369: Linear Algebra for Data Science
- MATH 369: Linear Algebra I

Select one course from the following: 1-3

- STAT 301: Introduction to Applied Statistical Methods
- STAT 302A: Statistics Supplement: General Applications
- STAT 307: Introduction to Biostatistics
- STAT 315: Intro to Theory and Practice of Statistics

Historical Perspectives (http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#historical-perspectives) 3D 3

Social and Behavioral Sciences (http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#social-behavioral-sciences) 3C 3

Elective 0-4

**Total Credits** 30

### Junior

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CS 314</td>
<td>Software Engineering</td>
<td>4A,4B</td>
</tr>
<tr>
<td>CS 320</td>
<td>Algorithms--Theory and Practice</td>
<td>3</td>
</tr>
<tr>
<td>CS 356</td>
<td>Systems Security</td>
<td>3</td>
</tr>
<tr>
<td>CS 370</td>
<td>Operating Systems</td>
<td>3</td>
</tr>
</tbody>
</table>

Select one course from the following: 3-4
CS 312  Modern Web Applications
CS 345  Machine Learning Foundations and Practice
CS course numbered 400- or above, excluding 480-499
CIS 320  Project Management for Information Systems  3
Advanced Writing (http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#advanced-writing)  2
Electives  8-9

Total Credits  30

Senior

CS 414  Object-Oriented Design  4C  4
CS 415  Software Testing  4
CIS 360  Systems Analysis and Design  3

Depth course - select two courses from the following:  8

CS 430  Database Systems
CS 435  Introduction to Big Data
CS 440  Introduction to Artificial Intelligence
CS 453  Introduction to Compiler Construction
CS 455  Introduction to Distributed Systems
CS 462  Engaging in Virtual Worlds
CS 464  Principles of Human-Computer Interaction

Electives  4  11

Total Credits  30

Program Total Credits:  120

1 MATH 156 recommended for computer science majors who do not already have MATH 160 credit.
2 Recommended sequence for most incoming students is Group A: CS 150B to CS 164.
3 CS 192 or other seminar course is a recommended elective for incoming, first semester, students.
4 Select enough elective credits to bring the program total to a minimum of 120 credits, of which at least 42 must be upper-division (300- to 400-level).