MAJOR IN COMPUTER SCIENCE, HUMAN-CENTERED COMPUTING CONCENTRATION

Requirements
Effective Fall 2023

A minimum grade of C (2.000) is required in CO 150 and in all CS, DSCI, MATH, STAT, and Technical Elective 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:

Group A:

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CS 150A or 150B</td>
<td>3B</td>
</tr>
<tr>
<td>CS 162 or 164</td>
<td>3B</td>
</tr>
</tbody>
</table>

Group B:

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arts and Humanities</td>
<td>3B</td>
</tr>
<tr>
<td>CS 152</td>
<td>3B</td>
</tr>
<tr>
<td>CS 162 or 164</td>
<td>3B</td>
</tr>
</tbody>
</table>

Group C:

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arts and Humanities</td>
<td>3B</td>
</tr>
<tr>
<td>CS 163</td>
<td>3B</td>
</tr>
<tr>
<td>CS 201/PHIL 201</td>
<td>3B</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>AA 100</td>
<td>3A</td>
</tr>
<tr>
<td>ANTH 120</td>
<td>3A</td>
</tr>
<tr>
<td>&amp; ANTH 121</td>
<td>3A</td>
</tr>
<tr>
<td>BZ 110</td>
<td>3A</td>
</tr>
<tr>
<td>&amp; BZ 111</td>
<td>3A</td>
</tr>
<tr>
<td>BZ 120</td>
<td>3A</td>
</tr>
<tr>
<td>CHEM 107</td>
<td>3A</td>
</tr>
<tr>
<td>&amp; CHEM 108</td>
<td>3A</td>
</tr>
<tr>
<td>CHEM 111</td>
<td>3A</td>
</tr>
<tr>
<td>&amp; CHEM 112</td>
<td>3A</td>
</tr>
<tr>
<td>GEOL 120</td>
<td>3A</td>
</tr>
<tr>
<td>&amp; GEOL 121</td>
<td>3A</td>
</tr>
<tr>
<td>GEOL 122</td>
<td>3A</td>
</tr>
<tr>
<td>&amp; GEOL 121</td>
<td>3A</td>
</tr>
<tr>
<td>GEOL 124</td>
<td>3A</td>
</tr>
<tr>
<td>&amp; GEOL 121</td>
<td>3A</td>
</tr>
</tbody>
</table>
## Major in Computer Science, Human-Centered Computing Concentration

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<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>
<tr>
<td>Diversity, Equity, and Inclusion <a href="http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#diversity-equity-inclusion">Diversity, Equity, and Inclusion</a></td>
<td>1C</td>
<td></td>
</tr>
<tr>
<td>Electives</td>
<td></td>
<td>3-5</td>
</tr>
</tbody>
</table>

### Total Credits

**26-34**

#### 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>
<tr>
<td>Select one group from the following:</td>
<td>4-5</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Group A</td>
<td></td>
</tr>
<tr>
<td></td>
<td>CS 214 Software Development</td>
<td></td>
</tr>
<tr>
<td></td>
<td>CT 301 C++ Fundamentals</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Group B</td>
<td></td>
</tr>
<tr>
<td></td>
<td>CS 253 Software Development with C++</td>
<td></td>
</tr>
<tr>
<td>Select one course from the following:</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td></td>
<td>CS 250 Computer Systems Foundations</td>
<td></td>
</tr>
<tr>
<td></td>
<td>CS 270 Computer Organization</td>
<td></td>
</tr>
<tr>
<td>Select one course from the following:</td>
<td>3-4</td>
<td></td>
</tr>
<tr>
<td></td>
<td>DSCI 369 Linear Algebra for Data Science</td>
<td></td>
</tr>
<tr>
<td></td>
<td>MATH 369 Linear Algebra I</td>
<td></td>
</tr>
<tr>
<td>Select one course from the following:</td>
<td>1-3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>STAT 301 Introduction to Applied Statistical Methods</td>
<td></td>
</tr>
<tr>
<td></td>
<td>STAT 302A Statistics Supplement: General Applications</td>
<td></td>
</tr>
<tr>
<td></td>
<td>STAT 307 Introduction to Biostatistics</td>
<td></td>
</tr>
<tr>
<td></td>
<td>STAT 315 Intro to Theory and Practice of Statistics</td>
<td></td>
</tr>
<tr>
<td>Social and Behavioral Sciences <a href="http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#social-behavioral-sciences">Social and Behavioral Sciences</a></td>
<td>3C</td>
<td></td>
</tr>
<tr>
<td>Historical Perspectives <a href="http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#historical-perspectives">Historical Perspectives</a></td>
<td>3D</td>
<td></td>
</tr>
<tr>
<td>Electives</td>
<td></td>
<td>0-4</td>
</tr>
</tbody>
</table>

### Total Credits

**26-34**

#### 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 345</td>
<td>Machine Learning Foundations and Practice</td>
<td>3</td>
</tr>
<tr>
<td>CS 370</td>
<td>Operating Systems</td>
<td>3</td>
</tr>
<tr>
<td>Select one course from the following:</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>CS 310H/IDEA 310H Design Thinking Toolbox: Mixed Reality Design</td>
<td></td>
</tr>
<tr>
<td></td>
<td>CS 312 Modern Web Applications</td>
<td></td>
</tr>
</tbody>
</table>
Any CS course numbered 400- or above excluding CS 480-499
Technical Electives (see list below) 6
Advanced Writing (http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/advanced-writing) 2 3
Electives 6

Total Credits 30

Senior

CS 464 Principles of Human-Computer Interaction 4C 4

Select two courses from the following: 8

CS 410 Introduction to Computer Graphics
CS 440 Introduction to Artificial Intelligence
CS 445 Introduction to Machine Learning
CS 462 Engaging in Virtual Worlds

CS course numbered 300- or above, excluding 380-399 and 480-499 3
Technical Electives (see list below) 3
Electives 4 12

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).

Technical Electives

Select a minimum of 9 credits, of which 6 credits must be upper-division.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Any IDEA course numbered 300- or above, excluding 380-399 and 480-499</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Any STAT course numbered 300- or above, excluding 301, 302A, 307, 315, 380-399 and 480-499</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IDEA 210 Introduction to Design Thinking (GT-AH1)</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>PSY 252 Mind, Brain, and Behavior</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>PSY 253 Human Factors and Engineering Psychology</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>PSY 452 Cognitive Psychology</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>PSY 454 Biological Psychology</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>PSY 456 Sensation and Perception</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>PSY 458 Cognitive Neuroscience</td>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>