MAJOR IN COMPUTER SCIENCE, COMPUTER SCIENCE CONCENTRATION

The Computer Science#general concentration is a broad program that prepares students for any introductory position in the computer science field and many other fields, including business, natural sciences, health, research, engineering, defense and more.

This concentration offers students options to customize their knowledge and skill set on top of core computer science concepts, allowing them to tailor their education to their passions. Students can focus on a specific research area (https://compsci.colostate.edu/research/) in their 400-level coursework or take a breadth focus – a little bit of everything – for a broader perspective. Students can also complete a second major or minor, producing a highly interdisciplinary degree.

This concentration allows students to build on multiple different skill sets from across the other concentrations. The knowledge, skill set and focus students create within this concentration varies depending on the courses taken.

Learning Objectives

Upon successfully completing this program, students will be able to:

1. Leverage teamwork to develop innovative, logical approaches to solving complex real-world problems.
2. Analyze and improve processes and outcomes.
3. Communicate technical skills verbally and in writing.
4. Confidently pursue graduate studies or professional employment in computer science.

Potential Occupations

This broad concentration is easily applicable to numerous industries and careers. Based on the courses chosen, potential occupations may be listed below, in other concentrations and as cross-disciplinary careers.

Potential occupations include: software engineer, mobile app developer, data scientist, big data engineer, machine learning engineer, virtual and augmented reality developer, cybersecurity analyst, bioinformatics engineer, computational chemist, mixed-reality artist, data journalist and many more.

Requirements Effective Fall 2025

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

Freshman

		AUCC	Credits
CO 150	College Composition (GT-CO2)	1A	3
CS 201/PHIL 201	Ethical Computing Systems (GT-AH3)	3B	3
MATH 156 or 160[1]	Mathematics for Computational Science I (GT-MA1) Calculus for Physical Scientists I (GT-MA1)	1B	4
Select one group from the following:[2]			5-9
Group A			
CS 150A or 150B	Culture and Coding: Java (GT-AH3) Culture and Coding: Python (GT-AH3)	3B	
CS 162 or 164	CS1--Introduction to Java Programming CS1--Computational Thinking with Java		
Group B			
CS 152	Python for STEM		
CS 162 or 164	CS1--Introduction to Java Programming CS1--Computational Thinking with Java		
Arts and Humanities (https://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#arts-and-humanities)		3B	
Group C			
CS 163	CS1---No Prior Programming Experience		
Arts and Humanities (https://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#arts-and-humanities)		3B	
Select at least two courses totaling a minimum of 7 credits from the following (one course must be or include the sequenced laboratory):			7
AA 100 & AA 101	Introduction to Astronomy (GT-SC2)	3A	
ANTH 120 & ANTH 121	Human Origins and Variation (GT-SC2)	3A	

BZ 110 & BZ 111	Principles of Animal Biology (GT-SC2)	3A	
BZ 120	Principles of Plant Biology (GT-SC1)	3A	
CHEM 107 & CHEM 108	Fundamentals of Chemistry (GT-SC2)	3A	
CHEM 111 & CHEM 112	General Chemistry I (GT-SC2)	3A	
GEOL 120 & GEOL 121	Geology and Society (GT-SC2)	3A	
GEOL 122 & GEOL 121	Geoscience--Climate and Environmental Change (GT-SC2)	3A	
GEOL 124 & GEOL 121	Earth Resources and Sustainability (GT-SC2)	3A	
GEOL 150	Dynamic Earth (GT-SC2)	3A	
HONR 292A	Honors Seminar: Knowing in the Sciences	3A	
LIFE 102	Attributes of Living Systems (GT-SC1)	3A	
LIFE 103	Biology of Organisms-Animals and Plants (GT-SC1)	3A	
LIFE 201A	Introductory Genetics: Applied/Population/Conservation/Ecological (GT-SC2)	3A	
LIFE 201B	Introductory Genetics: Molecular/Immunological/Developmental (GT-SC2)	3A	
LIFE 220/LAND 220	Fundamentals of Ecology (GT-SC2)	3A	
NR 150	Oceanography (GT-SC2)	3A	
PH 121	General Physics I (GT-SC1)	3A	
PH 122	General Physics II (GT-SC1)	3A	
PH 141	Physics for Scientists and Engineers I (GT-SC1)	3A	
PH 142	Physics for Scientists and Engineers II (GT-SC1)	3A	
1C (https://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#aucc)		1C	3
Electives[3]			1-5
	Total Credits		**30**

Sophomore

CS 165	CS2--Data Structures		4
CS 220	Discrete Structures and the Applications		4
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 (https://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#historical-perspectives)		3D	3

Social and Behavioral Sciences (https://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#social-behavioral-sciences)		3C	3
Electives			0-4
	Total Credits		**30**
Junior			
CS 314	Software Engineering	4A,4B	3
CS 320	Algorithms--Theory and Practice		3
CS 370	Operating Systems		3
Two CS courses numbered 300- or above, excluding 380-399 and 480-499			6-8
Advanced Writing (https://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#advanced-writing)		2	3
Electives			10-12
	Total Credits		**30**
Senior			
Capstone Course - select one course from the following:			4
CS 410	Introduction to Computer Graphics	4C	
CS 414	Object-Oriented Design	4C	
CS 420	Introduction to Analysis of Algorithms	4C	
CS 425	Introduction to Bioinformatics Algorithms	4C	
CS 430	Database Systems	4C	
CS 435	Introduction to Big Data	4C	
CS 440	Introduction to Artificial Intelligence	4C	
CS 445	Introduction to Machine Learning	4C	
CS 453	Introduction to Compiler Construction	4C	
CS 454	Principles of Programming Languages	4C	
CS 455	Introduction to Distributed Systems	4C	
CS 456	Modern CyberSecurity	4C	
CS 457	Computer Networks and the Internet	4C	
CS 458	Blockchain Principles and Applications	4C	
CS 462	Engaging in Virtual Worlds	4C	
CS 464	Principles of Human-Computer Interaction	4C	
CS 465	Multimodal Interaction for 3D User Interfaces	4C	
CS 470	Computer Architecture	4C	
CS 475	Parallel Programming	4C	
Two CS courses numbered 400- or above, excluding 480-499			8
Select one group from the following - Technology Focus or Minor/Second Major:			10
Group A - Technology Focus			
Technology Focus Electives (6 credits) - see list below			
CS course numbered 400- or above, excluding 480-499, not taken elsewhere in the program (4 credits)			
Group B - Minor or Second Major [4]			
Electives[5]			8
	Total Credits		**30**
	Program Total Credits:		**120**

Technology Focus Electives

If Group A - Technology Focus is selected Senior year, select at least 6 credits from the list below, not taken elsewhere in the program. At least 3 credits must be upper-division (300- to 400-level).

Code	Title	Credits
BZ 350	Molecular and General Genetics	4
BZ 360	Bioinformatics and Genomics	4
CIS 320	Project Management for Information Systems	3
CS 300-379		
CS 400-479		

CT 300-379 excluding CT 301		
CT 400-479		
DSCI 235	Data Wrangling	2
DSCI 300-379 excluding DSCI 369		
DSCI 400-479		
ECE 452	Computer Organization and Architecture	3
ENGR 422	Technology Entrepreneurship	3
IDEA 300-379		
IDEA 400-479		
JTC 372	Web Design and Development	3
JTC 472	Advanced Web Design and Development	3
MATH 161	Calculus for Physical Scientists II (GT-MA1)	4
MATH 256	Mathematics for Computational Science II	4
MATH 300-379 excluding MATH 369		
MATH 400-479		
MGT 330	Creativity, Innovation, and Value Creation	3
MGT 340	Fundamentals of Entrepreneurship	3
MGT 420	New Venture Creation	3
PHIL 410	Gödel's Incompleteness Theorems	3
PHIL 411	Logic in Philosophy and Beyond	3
PHIL 415	Logic and Scientific Method	3
PSY 252	Mind, Brain, and Behavior	3
PSY 352	Learning and Memory	3
PSY 452	Cognitive Psychology	3
PSY 454	Biological Psychology	3
PSY 456	Sensation and Perception	3
PSY 458	Cognitive Neuroscience	3
STAT 300-379 excluding STAT 301, STAT 302A, STAT 307, STAT 315		
STAT 400-479		

[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] Of the 21 credits for the minor or second major, none may be from CS.

[5] 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).

Major Completion Map

Distinctive Requirements for Degree Program:

To prepare for first semester: The curriculum for the Computer Science major assumes students enter college prepared to take calculus. Entering students who are not prepared to take calculus will need to fulfill pre-calculus requirements in the first semester. All students must maintain a C (2.000) or better in CO 150 and in all CS, DSCI, MATH, STAT and departmental Technology Focus Elective courses which are required for graduation.

Freshman

Semester 1		**Critical**	**Recommended**	**AUCC**	**Credits**
CO 150	College Composition (GT-CO2)			1A	3
First course from Group A, B, or C (See options in Concentration Requirements Tab)			X	3B	3
Department Approved Science (See list on Concentration Requirements Tab)				3A	3
1C (https://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#aucc)		X		1C	3
Elective					1
MATH 124 and MATH 126 may be necessary for some students to fulfill pre-calculus requirements.		X			
	Total Credits				**13**

Semester 2		**Critical**	**Recommended**	**AUCC**	**Credits**
CS 201/PHIL 201	Ethical Computing Systems (GT-AH3)			3B	3
MATH 156 or 160	Mathematics for Computational Science I (GT-MA1) Calculus for Physical Scientists I (GT-MA1)			1B	4
Remaining course(s) from Group A, B, or C (See options in Concentration Requirements Tab)		X			2-6
Department Approved Science with Lab (See list on Concentration Requirements Tab)				3A	4
Electives					0-4
CO 150 must be completed by the end of Semester 2 with a grade of C or better.		X			
	Total Credits				**17**

Sophomore

Semester 3		**Critical**	**Recommended**	**AUCC**	**Credits**
CS 165	CS2--Data Structures		X		4
CS 220	Discrete Structures and the Applications		X		4
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 (https://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#historical-perspectives)				3D	3
Electives					0-4
	Total Credits				**14-16**

Semester 4		**Critical**	**Recommended**	**AUCC**	**Credits**
Select one group from the following:		X			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:		X			4
CS 250	Computer Systems Foundations		X		
CS 270	Computer Organization		X		
Select one course from the following:					3-4
DSCI 369	Linear Algebra for Data Science	X			
MATH 369	Linear Algebra I	X			
Social and Behavioral Sciences (https://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#social-behavioral-sciences)				3C	3
CS 165 and CS 220 must be completed by the end of Semester 4.		X			
MATH 156 or MATH 160 and MATH 369 or DSCI 369 must be completed by the end of Semester 4.		X			
	Total Credits				**14-16**

Junior

Semester 5		**Critical**	**Recommended**	**AUCC**	**Credits**
CS 314	Software Engineering		X	4A,4B	3
CS 320	Algorithms--Theory and Practice		X		3
Advanced Writing (https://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#advanced-writing)				2	3
Electives					5-6
CS 253 and (CS 250 or CS 270) must be completed by the end of Semester 5.		X			
	Total Credits				**14-15**

Semester 6		**Critical**	**Recommended**	**AUCC**	**Credits**
CS 370	Operating Systems				3
Two CS courses numbered 300- or above, excluding 380-399 and 480-499			X		6-8
Electives					5-6
CS 314 and CS 320 and CS 370 must be completed by the end of Semester 6.		X			
	Total Credits				**15-16**

Senior

Semester 7		**Critical**	**Recommended**	**AUCC**	**Credits**
Capstone Course (See Capstone Course List on Concentration Requirements tab)		X		4C	4
CS course numbered 400- or above, excluding 480-499			X		4
Technology Focus or Minor/Second Major courses					6

At least 2 Upper-Division CS classes must be completed by the end of Semester 7.	X			
Total Credits				**14**
Semester 8	**Critical**	**Recommended**	**AUCC**	**Credits**
CS course numbered 400- or above, excluding 480-499	X			4
Technology Focus or Minor/Second Major courses	X			4
Electives	X			8
The benchmark courses for the 8th semester are the remaining courses in the entire program of study.	X			
Total Credits				**16**
Program Total Credits:				**120**