MAJOR IN MATHEMATICS, COMPUTATIONAL MATHEMATICS CONCENTRATION

The Computational Mathematics Concentration prepares students both for careers in industry and graduate work in mathematics. The course work in this concentration emphasizes mathematics that underlies the computational sciences.

Requirements
Effective Fall 2023

A minimum grade of 'C' (2.000) is required in all mathematics, statistics, and computer science courses that are required for graduation.

Freshman

		AUCC	Credits
CO 150	College Composition (GT-CO2)	1A	3
MATH 192	First Year Seminar in Mathematical Sciences		1
Select one group from the following:			5-9
Group A:			
CS 150B	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 (http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#arts-humanities)		3B	
Select one course from the following:			4
MATH 156	Mathematics for Computational Science I (GT-MA1)	1B	
MATH 160	Calculus for Physical Scientists I (GT-MA1)	1B	
Select one course from the following:			4
MATH 161	Calculus for Physical Scientists II (GT-MA1)	1B	
MATH 256	Mathematics for Computational Science II		
Biological and Physical Sciences (http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#biological-physical-sciences)		3A	3
Diversity, Equity, and Inclusion (http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#diversity-equity-inclusion)		1C	3
Historical Perspectives (http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#historical-perspectives)		3D	3
Elective[3]			0-4
	Total Credits		**30**

Sophomore

CS 165	CS2--Data Structures	4
Select one course from the following:		2-4
CS 220	Discrete Structures and their Applications	
MATH 235	Introduction to Mathematical Reasoning	
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:		3
STAT 303/ECE 303	Introduction to Communications Principles	
STAT 315	Intro to Theory and Practice of Statistics	

Arts and Humanities (http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#arts-humanities)		3B	3
Biological and Physical Sciences (http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#biological-physical-sciences)		3A	4
Social and Behavioral Sciences (http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#social-behavioral-sciences)		3C	3
Electives[3]			5-8
	Total Credits		**30**

Junior

Select one course from the following:			3
MATH 360	Mathematics of Information Security	4A	
MATH 366	Introduction to Abstract Algebra	4A	
Select one course from the following:			3
CS 320	Algorithms--Theory and Practice	4B	
MATH 317	Advanced Calculus of One Variable	4B	
Mathematical Sciences Electives[1]			9
Mathematical/Computer Science Electives[2]			6
Electives[3]			9
	Total Credits		**30**

Senior

JTC 300	Strategic Writing and Communication (GT-CO3)	2	3
Select one Capstone Course:			3
MATH 435	Projects in Applied Mathematics	4C	
MATH 460	Information and Coding Theory	4C	
Mathematical Science Electives[1]			3
Mathematical/Computer Science Electives[2]			6
Electives[3]			15
	Total Credits		**30**
	Program Total Credits:		**120**

1 Select a total of 12 additional credits from upper-division Mathematics courses except courses ending in -80 to -99.

2 Select 12 additional credits from MATH 261, ECE 311, ECE 312, upper-division Mathematics, Computer Science, Data Science, or Statistics courses, except courses ending in -80 to -99 and except for MATH 369, DSCI 369, STAT 301, and STAT 307.

3 Select enough elective credits to bring 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 Major in Mathematics, Computational Mathematics Concentration 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. MATH 117, MATH 118, MATH 124, MATH 125, MATH 126. A minimum grade of C is required in all mathematics, statistics, and computer science courses that are required by the major.

Freshman

Semester 1		**Critical**	**Recommended**	**AUCC**	**Credits**
CO 150	College Composition (GT-CO2)	X		1A	3
MATH 192	First Year Seminar in Mathematical Sciences	X			1
First Course from Group A or B:					2-3
CS 150B or 152	Culture and Coding: Python (GT-AH3) Python for STEM	X		3B	
Select one of the following courses:		X			4
MATH 156	Mathematics for Computational Science I (GT-MA1)			1B	
MATH 160	Calculus for Physical Scientists I (GT-MA1)			1B	

Diversity, Equity, and Inclusion (http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#diversity-equity-inclusion)		X		1C	3
Pre-Calculus Requirements must be completed by the end of Semester 1, if needed (MATH 117, MATH 118, MATH 124, MATH 125, MATH 126).		X			
	Total Credits				**13-14**
Semester 2		**Critical**	**Recommended**	**AUCC**	**Credits**
Select one course from the following:		X			4
MATH 161	Calculus for Physical Scientists II (GT-MA1)			1B	
MATH 256	Mathematics for Computational Science II				
Remaining Course(s) from Group A or B:					2-7
Group A:					
CS 162 or 164	CS1--Introduction to Java Programming CS1--Computational Thinking with Java				
Group B:					
CS 162 or 164	CS1--Introduction to Java Programming CS1--Computational Thinking with Java				
Arts and Humanities (http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#arts-humanities)			X	3B	
Historical Perspectives (http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#historical-perspectives)				3D	3
Biological and Physical Sciences (http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#biological-physical-sciences)			X	3A	3
Elective					0-4
Calculus Series Part I must be completed by the end of Semester 2.		X			
	Total Credits				**16-17**
Sophomore					
Semester 3		**Critical**	**Recommended**	**AUCC**	**Credits**
CS 165	CS2--Data Structures				4
Select one course from the following:		X			2-4
CS 220	Discrete Structures and their Applications				
MATH 235	Introduction to Mathematical Reasoning				
Select one course from the following:		X			3-4
DSCI 369	Linear Algebra for Data Science				
MATH 369	Linear Algebra I				
Arts and Humanities (http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#arts-humanities)			X	3B	3
	Total Credits				**12-15**
Semester 4		**Critical**	**Recommended**	**AUCC**	**Credits**
Select one course from the following:		X			3
STAT 303/ ECE 303	Introduction to Communications Principles				
STAT 315	Intro to Theory and Practice of Statistics				
Biological and Physical Sciences (http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#biological-physical-sciences)				3A	4
Social and Behavioral Sciences (http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#social-behavioral-sciences)			X	3C	3
Electives					5-8
Calculus series Part II must be completed by the end of Semester 4.		X			
	Total Credits				**15-18**
Junior					
Semester 5		**Critical**	**Recommended**	**AUCC**	**Credits**
Select one of the following courses:		X			3
MATH 360	Mathematics of Information Security			4A	
MATH 366	Introduction to Abstract Algebra			4A	

Mathematical Science Electives		X			6
Mathematical/Computer Science Electives		X			3
Elective					3
	Total Credits				**15**
Semester 6		**Critical**	**Recommended**	**AUCC**	**Credits**
Select one of the following courses:		X			3
CS 320	Algorithms--Theory and Practice			4B	
MATH 317	Advanced Calculus of One Variable		X	4B	
Mathematical Sciences Electives		X			3
Mathematical/Computer Science Electives		X			3
Electives			X		6
	Total Credits				**15**
Senior					
Semester 7		**Critical**	**Recommended**	**AUCC**	**Credits**
JTC 300	Strategic Writing and Communication (GT-CO3)	X		2	3
Mathematical Science Electives		X			3
Mathematical/Computer Science Electives		X			3
Electives			X		6
	Total Credits				**15**
Semester 8		**Critical**	**Recommended**	**AUCC**	**Credits**
Select one capstone course:		X			3
MATH 435	Projects in Applied Mathematics			4C	
MATH 460	Information and Coding Theory			4C	
Mathematical/Computer Science Electives		X			3
Electives			X		9
The benchmark courses for the 8th semester are the remaining courses in the entire program of study.		X			
	Total Credits				**15**
	Program Total Credits:				**120**