

MAJOR IN MATHEMATICS, COMPUTATIONAL MATHEMATICS CONCENTRATION

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.

The Computational Mathematics Concentration prepares students both for careers in industry and graduate work in mathematics. The course

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 (https://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		
1C (https://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#aucc)		1C	3
Biological and Physical Sciences (https://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#biological-physical-sciences)		3A	3
Historical Perspectives (https://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 the 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 (https://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#arts-humanities)		3B	3

Biological and Physical Sciences (https://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#biological-physical-sciences)	3A	4
Social and Behavioral Sciences (https://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	
1C (https://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#aucc)	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
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 (https://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#arts-humanities)			X	3B	
Historical Perspectives (https://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#historical-perspectives)				3D	3
Biological and Physical Sciences (https://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
CS 220	Discrete Structures and the Applications				
MATH 235	Introduction to Mathematical Reasoning				
Select one course from the following:					X
DSCI 369	Linear Algebra for Data Science				3-4
MATH 369	Linear Algebra I				
Arts and Humanities (https://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
STAT 303/ ECE 303	Introduction to Communications Principles				3
STAT 315	Intro to Theory and Practice of Statistics				
Biological and Physical Sciences (https://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#biological-physical-sciences)				3A	4
Social and Behavioral Sciences (https://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
MATH 360	Mathematics of Information Security			4A	
MATH 366	Introduction to Abstract Algebra			4A	
Mathematical Science Electives					X
Mathematical/Computer Science Electives					X

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