

MAJOR IN MATHEMATICS, APPLIED MATHEMATICS CONCENTRATION

The Applied Mathematics concentration prepares students for careers as applied mathematicians working in business, government, and industry. It is recommended that students supplement the core mathematical program with courses in their chosen application area; for example, engineering, public health, finance, electronics, or geology. Course

requirements emphasize mathematical foundations as well as the application of mathematics in other disciplines. In particular, students receive training in numerical analysis, mathematical modeling, statistics, and computing, as well as a solid preparation for further study.

Requirements Effective Fall 2023

A minimum grade of C 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 160	Calculus for Physical Scientists I (GT-MA1)	1B	4
MATH 161	Calculus for Physical Scientists II (GT-MA1)	1B	4
MATH 192	First Year Seminar in Mathematical Sciences		1
1C (https://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#aucc)		1C	3
Arts and Humanities (https://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#arts-humanities)		3B	6
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
Elective			3
Total Credits			30

Sophomore

MATH 261	Calculus for Physical Scientists III		4
PH 141	Physics for Scientists and Engineers I (GT-SC1)	3A	5
PH 142	Physics for Scientists and Engineers II (GT-SC1)	3A	5
STAT 315	Intro to Theory and Practice of Statistics		3
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:			4
MATH 340	Intro to Ordinary Differential Equations		
MATH 345	Differential Equations		
Select four credits from the following:			4
CS 150B	Culture and Coding: Python (GT-AH3)	3B,3B	
CS 152	Python for STEM		
CS 162	CS1–Introduction to Java Programming		
CS 164	CS1–Computational Thinking with Java		
MATH 151	Mathematical Algorithms in Matlab I		
STAT 158	Introduction to R Programming		
Total Credits			30-33

Junior

MATH 317	Advanced Calculus of One Variable	4B	3
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MATH 450	Introduction to Numerical Analysis I	4A	3
MATH 451	Introduction to Numerical Analysis II		3
Select two courses from the following:			6
MATH 301	Introduction to Combinatorial Theory		
MATH 331	Introduction to Mathematical Modeling		
MATH 332	Partial Differential Equations		
MATH 360	Mathematics of Information Security		
Biological and Physical Sciences (https://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#biological-physical-sciences) ¹		3A	3
Mathematical Sciences ²			3
Related Area ³			6
Elective			3
Total Credits			30
Senior			
JTC 300	Strategic Writing and Communication (GT-CO3)	2	3
MATH 435	Projects in Applied Mathematics	4C	3
Select one course from the following:			3
MATH 417	Advanced Calculus I		
MATH 419	Introduction to Complex Variables		
MATH 430/ECE 430	Fourier and Wavelet Analysis with Apps		
MATH 460	Information and Coding Theory		
Mathematical Sciences ²			6
Related Area ³			6
Electives ⁴			6-9
Total Credits			27-30
Program Total Credits:			120

¹ Select from the list of courses (in a department other than Physics) in category 3A in the AUCC.

² Select from upper-division MATH, CS, STAT courses, except those ending in -80 to -99.

³ A coherent set of courses outside the Mathematics Department in which mathematics is applied, approved by the concentration coordinator.

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).

Major Completion Map

Distinctive Requirements for Degree Program:

TO PREPARE FOR FIRST SEMESTER: The curriculum for the Major in Mathematics, Applied 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)			1A	3
MATH 160	Calculus for Physical Scientists I (GT-MA1)		X	1B	4
MATH 192	First Year Seminar in Mathematical Sciences				1
Arts and Humanities (https://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#arts-humanities)				3B	3
Historical Perspectives (https://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#historical-perspectives)				3D	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					14

Semester 2		Critical	Recommended	AUCC	Credits
MATH 161	Calculus for Physical Scientists II (GT-MA1)		X	1B	4
TC	(https://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#aucc)			1C	3
Arts and Humanities	(https://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#arts-humanities)			3B	3
Social and Behavioral Sciences	(https://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#social-behavioral-sciences)			3C	3
Elective					3
CO 150, MATH 160	must be completed by the end of Semester 2.	X			
Total Credits					16
Sophomore					
Semester 3		Critical	Recommended	AUCC	Credits
MATH 261	Calculus for Physical Scientists III		X		4
PH 141	Physics for Scientists and Engineers I (GT-SC1)		X	3A	5
STAT 315	Intro to Theory and Practice of Statistics				3
Select four credits	from the following:				4
CS 150B	Culture and Coding: Python (GT-AH3)			3B,3B	
CS 152	Python for STEM				
CS 162	CS1–Introduction to Java Programming				
CS 164	CS1–Computational Thinking with Java				
MATH 151	Mathematical Algorithms in Matlab I				
STAT 158	Introduction to R Programming				
MATH 161	must be completed by the end of Semester 3.	X			
Total Credits					16
Semester 4		Critical	Recommended	AUCC	Credits
PH 142	Physics for Scientists and Engineers II (GT-SC1)			3A	5
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:				4
MATH 340	Intro to Ordinary Differential Equations				
MATH 345	Differential Equations				
MATH 261, PH 141	must be completed by the end of Semester 4.	X			
Total Credits					14-17
Junior					
Semester 5		Critical	Recommended	AUCC	Credits
MATH 450	Introduction to Numerical Analysis I		X	4A	3
Select two courses	from the following:				6
MATH 301	Introduction to Combinatorial Theory				
MATH 331	Introduction to Mathematical Modeling				
MATH 332	Partial Differential Equations				
MATH 360	Mathematics of Information Security				
Related Area (See Concentration Coordinator)					3
Elective					3
MATH 369	must be completed by the end of Semester 5.	X			
Total Credits					15
Semester 6		Critical	Recommended	AUCC	Credits
MATH 317	Advanced Calculus of One Variable		X	4B	3

MATH 451	Introduction to Numerical Analysis II		X		3
Biological and Physical Sciences (https://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#biological-physical-sciences)				3A	3
Mathematical Science Elective					3
Related Area (See Concentration Coordinator)					3
MATH 340 or MATH 345 must be completed by the end of Semester 6.			X		
Total Credits					15
Senior					
Semester 7		Critical	Recommended	AUCC	Credits
Mathematical Science Elective					6
Related Area (See Concentration Coordinator)					3
Electives					6
MATH 450 must be completed by the end of Semester 7.			X		
Total Credits					15
Semester 8		Critical	Recommended	AUCC	Credits
JTC 300	Strategic Writing and Communication (GT-CO3)	X		2	3
MATH 435	Projects in Applied Mathematics	X		4C	3
Select one course from the following:		X			3
MATH 417	Advanced Calculus I				
MATH 419	Introduction to Complex Variables				
MATH 430/ ECE 430	Fourier and Wavelet Analysis with Apps				
Related Area (See Concentration Coordinator)		X			3
Elective		X			0-3
The benchmark courses for the 8th semester are the remaining courses in the entire program of study.		X			
Total Credits					12-15
Program Total Credits:					120