MAJOR IN DATA SCIENCE, MATHEMATICS CONCENTRATION

Requirements
Effective Fall 2023

Freshman

		AUCC	Credits
CO 150	College Composition (GT-CO2)	1A	3
CS 150B	Culture and Coding: Python (GT-AH3)	3B	3
CS 164	CS1--Computational Thinking with Java		4
DSCI 100	First Year Seminar in Data Science		1
DSCI 369	Linear Algebra for Data Science		4
MATH 156[1]	Mathematics for Computational Science I (GT-MA1)	1B	4
STAT 158	Introduction to R Programming		1
STAT 315	Intro to Theory and Practice of Statistics		3
Biological and Physical Sciences (http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#biological-physical-sciences)		3A	4
Diversity, Equity, and Inclusion (http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#diversity-equity-inclusion)		1C	3
	Total Credits		**30**

Sophomore

		AUCC	Credits
CS 165	CS2--Data Structures		4
CS 220	Discrete Structures and their Applications		4
DSCI 235	Data Wrangling		2
MATH 151	Mathematical Algorithms in Matlab I		1
MATH 256[1]	Mathematics for Computational Science II		4
STAT 341	Statistical Data Analysis I		3
STAT 342	Statistical Data Analysis II		3
Biological and Physical Sciences (http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#biological-physical-sciences)		3A	3
Historical Perspectives (http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#historical-perspectives)		3D	3
Social and Behavioral Sciences (http://catalog.colostate.edu/general-catalog/all-university-core-curriculum/aucc/#social-behavioral-sciences)		3C	3
	Total Credits		**30**

Junior

		AUCC	Credits
CS 201/PHIL 201	Ethical Computing Systems (GT-AH3)	3B	3
DSCI 320	Optimization Methods in Data Science		3
DSCI 335	Inferential Reasoning in Data Analysis		3
DSCI 336	Data Graphics and Visualization		1
Select one course from the following:			3
CO 300	Writing Arguments (GT-CO3)	2	
CO 301B	Writing in the Disciplines: Sciences (GT-CO3)	2	
CO 302	Writing in Digital Environments (GT-CO3)	2	
JTC 300	Strategic Writing and Communication (GT-CO3)	2	
Data Science Electives (Select at least 6 credits from the Data Science Electives List below)[2]			6-9

Math Electives (Select two courses from the Math Electives List below)			6
Electives			3
Total Credits			**28-31**
Senior			
DSCI 445	Statistical Machine Learning	4B	3
DSCI 478	Capstone Group Project in Data Science	4A,4C	4
Data Science Electives (Select at least six credits from the Data Science Electives List below not taken in Junior year)[2]			6-9
Math Electives (Select two courses from the Math Electives List not taken in Junior year)			6
Electives[3]			10
Total Credits			**29-32**
Program Total Credits:			**120**

Data Science Electives List [2]

Code	Title	AUCC	Credits
Select a minimum of 15 total credits from the list below:			
CS 214	Software Development		3
CS 250	Computer Systems Foundations		4
CS 270	Computer Organization		4
CS 314	Software Engineering		3
CS 320	Algorithms--Theory and Practice		3
CS 370	Operating Systems		3
CS 435	Introduction to Big Data		4
CS 440	Introduction to Artificial Intelligence		4
CT 301	C++ Fundamentals		2
DSCI 473	Introduction to Geometric Data Analysis		2
DSCI 475	Topological Data Analysis		2
ECON 202	Principles of Microeconomics (GT-SS1)	3C	3
ECON 204	Principles of Macroeconomics (GT-SS1)	3C	3
ECON 304	Intermediate Macroeconomics		3
ECON 306	Intermediate Microeconomics		3
ECON 435	Intermediate Econometrics		3
STAT 400	Statistical Computing		3
STAT 420	Probability and Mathematical Statistics I		3
STAT 421	Introduction to Stochastic Processes		3
STAT 430	Probability and Mathematical Statistics II		3
STAT 440	Bayesian Data Analysis		3
STAT 460	Applied Multivariate Analysis		3

Math Electives List

Code	Title	Credits
Select four courses from the list below:		
MATH 301	Introduction to Combinatorial Theory	3
MATH 317	Advanced Calculus of One Variable	3
MATH 331	Introduction to Mathematical Modeling	3
MATH 332	Partial Differential Equations	3
MATH 345	Differential Equations	4
MATH 360	Mathematics of Information Security	3
MATH 417	Advanced Calculus I	3
MATH 430/ECE 430	Fourier and Wavelet Analysis with Apps	3

MATH 455	Mathematics in Biology and Medicine	3
MATH 460	Information and Coding Theory	3

[1] The calculus requirement for the major may alternatively be satisfied by completion of MATH 160, MATH 161, and MATH 261.

[2] A minimum of 15 total credits must be selected from the Data Science Electives in the Junior and Senior years.

[3] 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).