

# MASTER OF DATA SCIENCE

## Collaborative program with the Department of Computer Science

This professional master's degree program consists of 33 credit hours of coursework including a six credit hour practicum project. The program is designed primarily for those with previous degrees or experience in computer science, statistics, mathematics, the natural or social sciences, or business, and who are interested in preparing for a career as a data science professional in business and industry. Full-time students may complete the program in one year, including one summer term.

## Admission Requirements

Applicants should have a bachelor's degree from an accredited university with a minimum cumulative GPA of 3.0/4.0. A combined verbal and quantitative GRE examination score of at least 304 and an analytical writing score of at least 3.0 are required. The GRE requirement may be waived for students with a bachelor's degree from an accredited college or university in the United States with a cumulative GPA of at least 3.0/4.0.

Prerequisites include knowledge of a high level programming language at the level of CS 201 (object-oriented programming is required), a data structures and algorithms course at the level of CS 331, multivariate calculus at the level of MATH 251, linear algebra at the level of MATH 332, and probability and statistics at the level of MATH 474. Information on these courses is available in this bulletin. Proficiency and placement exams are also available.

Students with an insufficient background in computer science and/or mathematics will be required to take the relevant prerequisite courses and earn at least a "B" grade in each. These prerequisite courses do not count toward the 33 credit hour requirement.

## Curriculum

Coursework includes 18 credit hours of required core courses, nine credit hours of elective courses, and six credit hours of CSP 572 Data Science Practicum. At least nine credit hours must be taken of 400- or 500-level CS or CSP courses and nine credit hours of 400- or 500-level MATH courses, not including the CSP 572 Data Science Practicum.

Up to six credit hours of 400-level undergraduate coursework may be used toward degree requirements.

Code	Title	Credit Hours
<b>Data Science Core Courses (15)</b>		
MATH 563 or MATH 564	Mathematical Statistics Applied Statistics	3
CS 584 or MATH 569	Machine Learning Statistical Learning	3
SCI 511 or SCI 522	Project Management Public Engagement Scientists	3
CSP 571	Data Preparation and Analysis	3
Select a minimum of one course from the following: 3		
CS 525	Advanced Database Organization	3
CS 554	Data-Intensive Computing	3
CSP 554	Big Data Technologies	3
<b>Data Science Capstone (6)</b>		
CSP 572	Data Science Practicum	6
<b>Data Science Electives (12)</b>		
Select 9 to 12 credit hours of Data Science Electives		12
<b>Total Credit Hours</b>		<b>33</b>

## Data Science Electives

Code	Title	Credit Hours
Computational Fundamentals		
CS 425	Database Organization	3
CS 430	Introduction to Algorithms	3
CS 450	Operating Systems	3
CS 520	Data Integration Warehousing	3
CS 525	Advanced Database Organization	3
CS 528	Data Privacy and Security	3
CS 535	Dsgn and Anlys of Algorithms	3
CS 546	Parallel and Distributed Proc	3
CS 553	Cloud Computing	3
CS 554	Data-Intensive Computing	3
CS 589	Software Testing and Anlys	3
CSP 554	Big Data Technologies	3
Computer Science Applications		
CS 422	Data Mining	3
CS 512	Computer Vision	3
CS 513	Geospatial Vision/Visualizatio	3
CS 522	Advanced Data Mining	3
CS 529	Information Retrieval	3
CS 556	Cyber-Physical Sys: Lang & Sys	3
CS 557	Cyber-Physical Sys Sec/Dsgn	3
CS 577	Deep Learning	3
CS 578	Interact/Trans Mach Learning	3
CS 579	Online Social Network Analysis	3
CS 581	Advanced Artificial Intelligen	3
CS 583	Probabilistic Graphical Models	3
CS 584	Machine Learning	3
CS 585	Natural Language Processing	3

Mathematics, Probability, and Statistics

MATH 454	Graph Theory and Applications	3	MATH 569	Statistical Learning	3
MATH 481	Intro to Stochastic Processes	3	MATH 527	Machine Learning in Finance:	3
MATH 483	Design and Analysis of Exprmnt	3	MATH 574	Bayesian Computational Stats	3
MATH 486	Mathematical Modeling I	3	Mathematical and Scientific Computing		
MATH 487	Mathematical Modeling II	3	BIOL 550	Bioinformatics	3
MATH 522	Mathematical Modeling	3	MATH 577	Computational Mathematics I	3
MATH 532	Linear Algebra	3	MATH 578	Computational Mathematics II	3
MATH 535	Optimization I	3	MATH 590	Meshfree Methods	3
MATH 540	Probability	3	PHYS 440	Computational Physics	3
MATH 542	Stochastic Processes	3	Professional Skills		
MATH 546	Introduction to Time Series	3	SCI 511	Project Management	3
MATH 565	Monte Carlo Methods in Fin	3	SCI 522	Public Engagement Scientists	3
MATH 566	Multivariate Analysis	3	ID 420	Fundamentals of Design	3
MATH 567	Adv Design of Experiments	3	COM 525	User Experience Research/Eval	3

## Master of Data Science Curriculum

					Year 1
Semester 1	Credit Hours	Semester 2	Credit Hours	Semester 3	Credit Hours
CS 525, 554, or CSP 554		3 CS 584 or MATH 569		3 CSP 572	6
MATH 563 or 564		3 CSP 571		3	
SCI 511 or CS 587		3 Data Science Elective		3	
		<b>9</b>			<b>6</b>
					<b>Year 2</b>
Semester 1	Credit Hours				
SCI 522		3			
Data Science Elective		3			
Data Science Elective		3			
		<b>9</b>			

**Total Credit Hours: 33**