COMPUTATIONAL AND DATA SCIENCES, BS

Banner Code: SC-BS-CDS

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The aim of this degree is to provide students with technical skills and knowledge for rigorously investigating physical and social phenomena. The BS is a transformative approach that integrates science at George Mason University based on the combination of real-world computer science skills, data acquisition and analysis, scientific modeling, applied mathematics, and simulation. As an interdisciplinary STEM-designated program, this degree addresses the current central role of computation in the areas of "big data," modeling, and simulation. Graduates of the program will possess the computational, scientific, and mathematical skills necessary for participating effectively as members of the scientific simulation and data analysis groups that are of increasing importance in the federal and public sectors, and in high technology firms. Additionally, graduates of the program will be well prepared to pursue graduate studies.

Admissions & Policies

Admissions

University-wide admissions policies can be found in the Undergraduate Admissions Policies section of this catalog.

To apply for this program, please complete the George Mason University Admissions Application (https://www2.gmu.edu/admissions-aid/apply-now).

Policies

Students must fulfill all Requirements for Bachelor's Degrees, including the Mason Core.

The university's writing intensive requirement for the major will be met upon successful completion of CDS 302 Scientific Data and Databases.

For policies governing all undergraduate programs, see AP.5 Undergraduate Policies.

Requirements

Degree Requirements

Total credits: minimum 120

Students should refer to the Admissions & Policies tab for specific policies related to this program.

Core Required Courses

Code	Title	Credits
CDS 130	Computing for Scientists (Mason Core)	3
CDS 151	Data Ethics in an Information Society (Mason Core)	1
CDS 230	Modeling and Simulation I	3
CDS 301	Scientific Information and Data Visualization	3
CDS 302	Scientific Data and Databases [1]	3
CDS 303	Scientific Data Mining	3
Total Credits		16

[1] Fulfills the writing intensive requirement.

Extended Core Courses

Code	Title	Credits
Select 18 credits from the following:		18
CDS 101 & CDS 102	Introduction to Computational and Data Sciences (Mason Core) and Introduction to Computational and Data Sciences Lab (Mason Core)	
CDS 201	Introduction to Computational Social Science	
CDS 205	Introduction to Agent-based Modeling and Simulation	
CDS 251	Introduction to Scientific Programming	
CDS 290	Topics in Computational and Data Sciences	
CDS 292	Introduction to Social Network Analysis	
CDS 403	Machine Learning Applications in Science	
CDS 411	Modeling and Simulation II	
CDS 486	Topics in Computational and Data Sciences	
CSI 500	Computational Science Tools	
CSI 501	Introduction to Scientific Programming	
Total Credits		18

Mathematics Courses

Code	Title	Credits
Select 10-11 credits from the following:		10-11
MATH 113	Analytic Geometry and Calculus I (Mason Core)	
MATH 114	Analytic Geometry and Calculus II	
MATH 125	Discrete Mathematics I (Mason Core)	
MATH 203	Linear Algebra	
MATH 446	Numerical Analysis I	
Total Credits		10-11

Statistics Courses

Code	Title	Credits
Select 6 credits from the following:		6
STAT 250	Introductory Statistics I (Mason Core)	

STAT 350	Introductory Statistics II	
STAT 344	Probability and Statistics for Engineers and Scientists I	
STAT 346	Probability for Engineers	
Total Credits		6

Science and Engineering Courses

Code	Title	Credits
Select 6 credits from either one of the following:		6
	Additional Mason Core: Natural Science or Mason Core: Information Technology courses.	
	Any course offered by the College of Science or the Volgenau School of Engineering.	
Total Credits		6

Mason Core and Elective Credits

In order to meet a minimum of 120 credits, this degree requires an additional 63-64 credits, which may be applied toward any remaining Mason Core requirements (outlined below), Requirements for Bachelor's Degrees, and elective courses. Students are strongly encouraged to consult with their advisors to ensure that they fulfill all requirements.

Elective Course Suggestions

Code	Title	Credits
CDS 410	Numerical Analysis II	3
or MATH 447	Numerical Analysis II	
CDS 421	Computational Data Science	3
CDS 461	Molecular Dynamics and Monte Carlo Simulations	3
CDS 487	Electronic Structure Computations	3
CDS 490	Directed Study and Research	1-3
CDS 491	Internship	1-3
CDS 492	Capstone in Data Science	3

Mason Core

Some Mason Core requirements may already be fulfilled by the major requirements listed above. Students are strongly encouraged to consult their advisors to ensure they fulfill all remaining Mason Core requirements.

Code	Title	Credits
Foundation Requirements		
Written Communication (ENGH 101)		3
Oral Communication		3
Quantitative Reasoning		3
Information Technology and Computing		3
Exploration Requirements		
Arts		3
Global Understanding		3
Literature		3
Natural Science		7
Social and Behavioral Sciences		3
Western Civilization/World History		3
Integration Requirements		
Written Communications (ENGH 302)		3
Writing-Intensive [1]		3
Synthesis/Capstone [2]		3
Total Credits		40

[1] Most programs include the writing-intensive course designated for the major as part of the major requirements; this course is therefore not counted towards the total required for Mason Core.

[2] Minimum 3 credits required.

Accelerated Master's

Computational and Data Sciences, BS/ Computational Science, Accelerated MS

Overview

This option enables enthusiastic, highly qualified, undergraduates to obtain the Computational and Data Sciences, BS and the Computational Science, MS within the accelerated time frame of five years. The program requires 144 credits total, allowing students to undertake graduate coursework during their final year in the bachelor's degree. Upon completion of this 144 credit BS/MS combined program, students are exceptionally well prepared for undertaking doctoral studies or entering the professional workforce.

For more detailed information, see AP.6.7 Bachelor's/Accelerated Master's Degrees. For policies governing all graduate degrees, see AP.6 Graduate Policies.

Application Requirements

Applicants to all graduate programs at George Mason University must meet the admission standards and application requirements for graduate study as specified in the Graduate Admission Policies section of this catalog[1]. Application information for this Accelerated Master's program can be found on the Department of Computational and Data Sciences (http://cos.gmu.edu/cds/academic-programs) website. Applicants must have an overall undergraduate GPA of at least 3.00 and have completed at least 90 credits. Additionally, applicants will have completed the following courses with a GPA of 3.00 or better:

Code	Title	Credits
CDS 230	Modeling and Simulation I	3
CDS 205	Introduction to Agent-based Modeling and Simulation	3
or CDS 251	Introduction to Scientific Programming	
CDS 301	Scientific Information and Data Visualization	3
CDS 302	Scientific Data and Databases	3
CDS 303	Scientific Data Mining	3
CDS 411	Modeling and Simulation II	3
Select one from the following:		3
CDS 461	Molecular Dynamics and Monte Carlo Simulations	
CDS 490	Capstone Course in Computational and Data Science	
CSI 500	Computational Science Tools	
Total Credits		21

Students must maintain an overall GPA of 3.00 or higher in graduate coursework and should consult with their faculty advisor to coordinate

their academic goals within the modeling and simulation or data science emphases of the Computational Science, MS.

[1]   GRE-general scores are waived for graduates of BS degrees from any program in the College of Science or the Volgenau School of Engineering at George Mason University.

Reserve Graduate Credit

While in undergraduate status, a student may take a maximum of six graduate credits as reserve graduate credits and apply those credits to a master's program. Reserve graduate credits are not counted toward the 120 credits required in the undergraduate degree.