Computational Science, MS

Banner Code: SC-MS-COMP

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The master’s addresses the growing demand for trained computational scientists and engineers, and data scientists. It combines a solid foundation in computational science skills with courses in a variety of scientific and engineering computer-intensive areas where modeling and simulation, data analysis, and high performance computing play a central role.

Working with an advisor, a student may choose to pursue an area of emphasis. The areas of emphasis are:

- Computer Modeling and Simulation: Intended for students who wish to learn computational solution techniques for modeling and simulation of scientific and engineering phenomena.
- Data Science: Intended for students who wish to learn computational methods for acquiring, extracting, and analyzing large-scale data obtained by observations, experiments, modeling, and database searches.

Students may also combine areas of emphasis to create their own customized curriculum under the guidance of the graduate coordinator.

Most of the courses are offered in the late afternoon or early evening to accommodate students with full-time employment outside of the university.

Admissions & Policies

Admissions

University-wide admissions policies can be found in the Graduate 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).

Eligibility

Applicants should have academic backgrounds in computational, physical or biological sciences, engineering, mathematics, or computer science. They should have an undergraduate degree from a regionally accredited institution with a GPA of at least 3.00 in their last 60 credits of study. In addition, applicants should have taken at least one course in differential equations and have facility in using a high-level computer programming language.

Application Requirements

To apply, prospective students should complete the George Mason University Admissions Application (https://www2.gmu.edu/admissions-aid/apply-now), supply two copies of official transcripts from each university attended, a current résumé, and an expanded goals statement. Applicants should also provide three letters of recommendation and an official report of scores on the GRE-GEN. The GRE-SUB is recommended if it is given in the student’s undergraduate major. The GRE requirement will be waived if the student holds a BS degree from any program in George Mason’s College of Science, Volgenau School of Engineering, or a master’s degree from a regionally accredited U.S. institution. TOEFL scores are required of all international applicants. A TOEFL score of 570 (paper-based test) or 230 (computer-based test) or 88 points total and a minimum of 20 points in each section (Internet-based test) is required for international students. The ETS code for Mason is 5827. For more information visit Admission of International Students.

Policies

For policies governing all graduate degrees, see AP.6 Graduate Policies.

Requirements

Degree Requirements

Total credits: 30

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

Core Courses

Select 6 credits from the following: 6

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
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<tbody>
<tr>
<td>CSI 690</td>
<td>Numerical Methods</td>
</tr>
<tr>
<td>CSI 695</td>
<td>Scientific Databases</td>
</tr>
<tr>
<td>CSI 702</td>
<td>High-Performance Computing</td>
</tr>
<tr>
<td>CSI 703</td>
<td>Scientific and Statistical Visualization</td>
</tr>
</tbody>
</table>

Total Credits 6

Computational Extended Core

Select 15 credits from any graduate-level CSI, CDS, or CSS courses 15

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
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<tbody>
<tr>
<td>CSI</td>
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</tr>
<tr>
<td>CDS</td>
<td></td>
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<tr>
<td>CSS</td>
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</tbody>
</table>

Total Credits 15

1 Not including the following research courses: CSI 796 Directed Reading and Research, CSI 798 Research Project, CSI 799 Master’s Thesis, CSI 898 Research Colloquium in Computational Sciences and Informatics, CSI 899 Colloquium in Computational Sciences and Informatics, CSI 991 Seminar in Scientific Computing, CSI 996 Doctoral Reading and Research, or from courses previously taken.

Electives

Select 9 credits of electives 1,2,3 9

Total Credits 9

1 Typically chosen from computational sciences and informatics, chemistry, mathematics, physics, engineering, information technology, and statistics courses.
Students should create a curriculum plan for an area of emphasis or combined areas of emphases in consultation with their academic advisor.

No more than 6 credits may be chosen from areas outside of CSI.

Elective credits may also include:

- CSI 796 Directed Reading and Research 1-6
- CSI 798 Research Project 1-3
- CSI 799 Master’s Thesis 1-6

### 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. 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:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CDS 230</td>
<td>Modeling and Simulation I</td>
<td>3</td>
</tr>
<tr>
<td>CDS 205</td>
<td>Introduction to Agent-based Modeling and Simulation</td>
<td>3</td>
</tr>
<tr>
<td>or CDS 251</td>
<td>Introduction to Scientific Programming</td>
<td></td>
</tr>
<tr>
<td>CDS 301</td>
<td>Scientific Information and Data Visualization</td>
<td>3</td>
</tr>
<tr>
<td>CDS 302</td>
<td>Scientific Data and Databases</td>
<td>3</td>
</tr>
<tr>
<td>CDS 303</td>
<td>Scientific Data Mining</td>
<td>3</td>
</tr>
<tr>
<td>CDS 411</td>
<td>Modeling and Simulation II</td>
<td>3</td>
</tr>
<tr>
<td>Select one from the following:</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>CDS 461</td>
<td>Molecular Dynamics and Monte Carlo Simulations</td>
<td></td>
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<tr>
<td>CDS 490</td>
<td>Directed Study and Research</td>
<td></td>
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<tr>
<td>CSI 500</td>
<td>Computational Science Tools</td>
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</tbody>
</table>

**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.