Master of Data Science (MDS) Degree, Online Program

Program Learning Outcomes for the MDS Degree

Upon completing the MDS degree, students will be able to:

1. Develop a graduate-level understanding of the computational and statistical foundations of Data Science.
2. Through in-depth study, obtain mastery of either one of the core methods of Data Science or one application area of Data Science.
3. Apply Data Science techniques to solve difficult, real world problems, beginning with raw and dirty data, and ending with actionable insights that are effectively communicated to a lay client.

Requirements for the MDS Degree, Online Program

The MDS degree is a non-thesis master's degree. For general university requirements, please see Non-Thesis Master's Degrees (https://ga.rice.edu/graduate-students/academic-policies-procedures/regulations-procedures-non-thesis-masters-degrees/). For additional requirements, regulations, and procedures for all graduate programs, please see All Graduate Students (https://ga.rice.edu/graduate-students/academic-policies-procedures/regulations-procedures-all-degrees/).

Students pursuing the MDS degree must complete:

- A minimum of 10-13 courses (31-32 credit hours), depending on course selection, to satisfy degree requirements.
- A minimum of 31 credit hours of graduate-level study (graduate semester credit hours, coursework at the 500-level or above).
- A minimum of 24 graduate semester credit hours credit hours must be taken at Rice University.
- A minimum of 24 graduate semester credit hours must be taken in standard or traditional courses (with a course type of lecture, seminar, laboratory, lecture/laboratory).
- A minimum residency enrollment of one fall or spring semester of part-time graduate study at Rice University.
- A maximum of 2 courses (6 graduate semester credit hours) from transfer credit. For additional departmental guidelines regarding transfer credit, see the Policies tab.
- The requirements for one area of specialization (see below for areas of specialization). The MDS degree program offers four areas of specialization:
  - Business Analytics (p. 2), or
  - Image Processing (p. 2), or
  - Machine Learning (p. 2), or
  - Breadth (p. 2). (The Master of Data Science (MDS) breadth is an area of specialization comprised of electives from the other areas of specialization.)
- A minimum overall GPA of 2.67 or higher in all Rice coursework.
- A minimum program GPA of 2.67 or higher in all Rice coursework that satisfies requirements for the non-thesis master's degree.

The courses listed below satisfy the requirements for this degree program. In certain instances, courses not on this official list may be substituted upon approval of the program's academic advisor, or where applicable, the department or program's Director of Graduate Studies. Course substitutions must be formally applied and entered into Degree Works by the department or program's Official Certifier (https://registrar.rice.edu/facstaff/degreeworks/officialcertifier/). Additionally, these must be approved by the Office of Graduate and Postdoctoral Studies. Students and their academic advisors should identify and clearly document the courses to be taken.

**Summary**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credit Hours</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Total Credit Hours Required for the MDS Degree</td>
<td>31-32</td>
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</tbody>
</table>

**Degree Requirements**

**Core Requirements**

**Big Data**

- Select 1 course from the following:
  - COMP 543 GRADUATE TOOLS AND MODELS - DATA SCIENCE
  - COMP 553 BIG DATA MANAGEMENT FOR DATA SCIENCE
  - COMP 643 BIG DATA

**Data Visualization**

- COMP 665 DATA VISUALIZATION

**Machine Learning**

- Select 1 course from the following:
  - COMP 540 STATISTICAL MACHINE LEARNING
  - COMP 642 MACHINE LEARNING
  - ELEC 578 INTRODUCTION TO MACHINE LEARNING

**Programming**

- COMP 614 COMPUTER PROGRAMMING FOR DATA SCIENCE

**Statistics**

- COMP 680 STATISTICS FOR COMPUTING AND DATA SCIENCE

**Elective Requirements**

- Select 1 course from the following:
  - COMP 622 ETHICS AND ACCOUNTABILITY IN DATA SCIENCE
  - COMP 628 CYBERSECURITY
  - COMP 644 DATA PRIVACY & SECURITY

**Area of Specialization**

- Select 1 from the following Areas of Specialization (see Areas of Specialization below):
  - Business Analytics
  - Image Processing
  - Machine Learning
  - Breadth

**Capstone**

The courses listed below satisfy the requirements for this degree program. In certain instances, courses not on this official list may be substituted upon approval of the program's academic advisor, or where applicable, the department or program's Director of Graduate Studies. Course substitutions must be formally applied and entered into Degree Works by the department or program's Official Certifier (https://registrar.rice.edu/facstaff/degreeworks/officialcertifier/). Additionally, these must be approved by the Office of Graduate and Postdoctoral Studies. Students and their academic advisors should identify and clearly document the courses to be taken.
DSCI 535  APPLIED MACHINE LEARNING AND DATA SCIENCE PROJECTS  4

Total Credit Hours  31-32

Footnotes and Additional Information
1 Students in either program (online or on-campus) will be allowed to take up to 9 credit hours in the other modality (on-campus or online) with permission from the program advisors.

Areas of Specialization
Students must complete a minimum of 3 courses (minimum of 9 credit hours) from one Area of Specialization.

Area of Specialization: Business Analytics

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<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credit Hours</th>
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<tbody>
<tr>
<td>BUSI 711</td>
<td>FOUNDATIONS OF MARKETING</td>
<td>1.5</td>
</tr>
<tr>
<td>BUSI 712</td>
<td>DATA-DRIVEN MARKETING</td>
<td>1.5</td>
</tr>
<tr>
<td>BUSI 721</td>
<td>FOUNDATIONS OF FINANCE</td>
<td>1.5</td>
</tr>
<tr>
<td>BUSI 722</td>
<td>DATA-DRIVEN FINANCE</td>
<td>1.5</td>
</tr>
<tr>
<td>BUSI 731</td>
<td>FOUNDATIONS OF OPERATIONS MANAGEMENT</td>
<td>1.5</td>
</tr>
<tr>
<td>BUSI 732</td>
<td>DATA-DRIVEN OPERATIONS</td>
<td>1.5</td>
</tr>
</tbody>
</table>

Total Credit Hours  9

Area of Specialization: Image Processing

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credit Hours</th>
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</thead>
<tbody>
<tr>
<td>ELEC 546 / COMP 546</td>
<td>INTRODUCTION TO COMPUTER VISION</td>
<td>3</td>
</tr>
<tr>
<td>ELEC 549</td>
<td>COMPUTATIONAL PHOTOGRAPHY</td>
<td>3</td>
</tr>
<tr>
<td>ELEC 585 / BIOE 591</td>
<td>FUNDAMENTALS OF MEDICAL IMAGING I</td>
<td>3</td>
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Total Credit Hours  9

Area of Specialization: Machine Learning

Select a minimum of 3 courses (minimum of 9 credit hours) from the following:

<table>
<thead>
<tr>
<th>Code</th>
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<tr>
<td>COMP 514</td>
<td>OPTIMIZATION: ALGORITHMS, COMPLEXITY, AND APPROXIMATIONS</td>
<td></td>
</tr>
<tr>
<td>COMP 573</td>
<td>PROFESSIONAL DEVELOPMENT FOR BIOMEDICAL INFORMATICS</td>
<td></td>
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<tr>
<td>ELEC 575</td>
<td>LEARNING FROM SENSOR DATA</td>
<td></td>
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<tr>
<td>ELEC 576 / COMP 576</td>
<td>A PRACTICAL INTRODUCTION TO DEEP MACHINE LEARNING</td>
<td></td>
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</table>

Total Credit Hours  9

Area of Specialization: Breadth

Select a minimum of 3 courses (minimum of 9 credit hours) from the following:

<table>
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</thead>
<tbody>
<tr>
<td>BUSI 711</td>
<td>FOUNDATIONS OF MARKETING</td>
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</table>

Policies for the MDS Degree, Online Program

Department of Computer Science Graduate Program Handbook
The General Announcements (GA) is the official Rice curriculum. As an additional resource for students, the department of Computer Science publishes a graduate program handbook, which can be found here: https://gradhandbooks.rice.edu/2021_22/Computer_Science_Graduate_Handbook.pdf

Financial Aid
No financial aid is available from Rice University or the Computer Science Department for students in the MDS degree program.

Transfer Credit
For Rice University's policy regarding transfer credit, see Transfer Credit (https://ga.rice.edu/graduate-students/academic-policies-procedures/regulations-procedures-all-degrees/#transfer). Some departments and programs have additional restrictions on transfer credit. Students are encouraged to meet with their academic program's advisor when considering transfer credit possibilities.

Departmental Transfer Credit Guidelines
Students pursuing the MDS degree should be aware of the following departmental transfer credit guidelines:

- No more than 2 courses (6 credit hours) of credit from another U.S. or international universities of similar standing at Rice may apply towards the degree. Transferred courses must be comparable in content and depth to the corresponding course at Rice, and must not have counted toward another degree.
- Request for transfer credit will be considered by the Computer Science Graduate Committee Chair, and the instructor of the equivalent Rice course.
Additional Information
For additional information, please see the Graduate Programs website at https://www.cs.rice.edu/academics/graduate-programs (https://www.cs.rice.edu/academics/graduate-programs/) or contact the department at gradapp@rice.edu.

Opportunities for the MDS Degree, Online Program
Additional Information
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