

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 \(https://ga.rice.edu/graduate-students/academic-policies-procedures/regulations-procedures-non-thesis-masters-degrees/\)](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 \(https://ga.rice.edu/graduate-students/academic-policies-procedures/regulations-procedures-all-degrees/\)](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 (31-35 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](#) (p. 3) 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). (Breadth is an area of specialization comprised of electives from the other areas of specialization.)
- A [Professional Development](#) (p. 2) requirement.
- 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 \(https://registrar.rice.edu/facstaff/degreeworks/officialcertifier/\)](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

Code	Title	Credit Hours
Total Credit Hours Required for the MDS Degree		31-35

Degree Requirements

Code	Title	Credit Hours
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Core Requirements ¹

Big Data		
<i>Select 1 course from the following:</i>		3

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	3

Machine Learning		
<i>Select 1 course from the following:</i>		3

COMP 642	MACHINE LEARNING	
ELEC 578	INTRODUCTION TO MACHINE LEARNING	

Programming		
COMP 614	COMPUTER PROGRAMMING FOR DATA SCIENCE	3

Statistics		
COMP 680	STATISTICS FOR COMPUTING AND DATA SCIENCE	3

Elective Requirements ¹

<i>Select 1 course from the following:</i>		3-4
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COMP 566	AI ETHICS	
COMP 580	PROBABILISTIC ALGORITHMS AND DATA STRUCTURE	
COMP 582 / ELEC 512	GRADUATE DESIGN AND ANALYSIS OF ALGORITHMS	
COMP 621	SYSTEMS SOFTWARE	
COMP 622	DATA ETHICS	
COMP 628	CYBERSECURITY	
COMP 644	DATA PRIVACY & SECURITY	
COMP 682	PRINCIPLES OF ALGORITHMS AND SOFTWARE AREA	

Area of Specialization ¹

<i>Select 1 from the following Areas of Specialization (see Areas of Specialization below):</i>		9
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Business Analytics

Image Processing
Machine Learning
Breadth
Professional Development
Select 1 from the following: 0-3
A Professional Development course (see course list below)
A relevant internship 10 weeks to 6 months in length. Students are responsible for obtaining and selecting an internship that best aligns with their career goals.
Current or past post-baccalaureate relevant work experience of at least 10 weeks.
Capstone ¹
DSCI 535 / APPLIED MACHINE LEARNING AND DATA 4
COMP 549 SCIENCE PROJECTS
Total Credit Hours 31-35

Footnotes and Additional Information

¹ Students admitted into 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

Code	Title	Credit Hours
Select all of the following:		
BUSI 711 & BUSI 712	DATA-DRIVEN MARKETING I and DATA-DRIVEN MARKETING II	3
BUSI 721 & BUSI 722	DATA-DRIVEN FINANCE I and DATA-DRIVEN FINANCE II	3
BUSI 731 & BUSI 732	FOUNDATIONS OF OPERATIONS MANAGEMENT and QUANTITATIVE OPERATIONS	3
Total Credit Hours		9

Area of Specialization: Image Processing

Code	Title	Credit Hours
Select a minimum of 3 courses (minimum of 9 credit hours) from the following: 9		
COMP 646	DEEP LEARNING FOR VISION AND LANGUAGE	
ELEC 542	GENERATIVE AI FOR IMAGE SYNTHESIS	
ELEC 546 / COMP 546	INTRODUCTION TO COMPUTER VISION	
ELEC 549	COMPUTATIONAL PHOTOGRAPHY	
Total Credit Hours		9

Area of Specialization: Machine Learning

Code	Title	Credit Hours
Select a minimum of 3 courses (minimum of 9 credit hours) from the following: 9		

COMP 514	OPTIMIZATION: ALGORITHMS, COMPLEXITY, AND APPROXIMATIONS
COMP 559	MACHINE LEARNING WITH GRAPHS
COMP 631	INTRODUCTION TO INFORMATION RETRIEVAL
COMP 641	GRADUATE SEMINAR ON INTERACTIVE MACHINE LEARNING
COMP 646	DEEP LEARNING FOR VISION AND LANGUAGE
COMP 647	DEEP LEARNING
COMP 652	NATURAL LANGUAGE PROCESSING
COMP 653	STATISTICAL MACHINE LEARNING
ELEC 515	MACHINE LEARNING FOR RESOURCE-CONSTRAINED PLATFORMS
ELEC 573	NETWORK SCIENCE AND ANALYTICS
ELEC 575	LEARNING FROM SENSOR DATA
ELEC 576 / COMP 576	A PRACTICAL INTRODUCTION TO DEEP MACHINE LEARNING

Total Credit Hours 9

Area of Specialization: Breadth

Select a minimum of 3 courses (minimum of 9 credit hours) from any of the areas of specialization listed above.

Please Note:

- The course BUSI 711 can only be counted towards the Area of Specialization: Breadth if BUSI 712 is also counted towards the Area of Specialization: Breadth.
- The course BUSI 721 can only be counted towards the Area of Specialization: Breadth if BUSI 722 is also counted towards the Area of Specialization: Breadth.
- The course BUSI 731 can only be counted towards the Area of Specialization: Breadth if BUSI 732 is also counted towards the Area of Specialization: Breadth.

Professional Development

In order to fulfill the Professional Development requirement, students must select up to 1 course (up to 3 credit hours) from the following, **or**

- Complete a relevant internship 10-weeks to 6 months in length. Students are responsible for obtaining and selecting an internship that best aligns with their career goals, **or**
- Complete current or past post-baccalaureate relevant work experience of at least 10 weeks.

Code	Title	Credit Hours
Select up to 1 course from the following: 0-3		
RCEL 501	ENGINEERING MANAGEMENT & LEADERSHIP THEORY AND APPLICATION	
RCEL 502	ENGINEERING PROJECT MANAGEMENT	
RCEL 503	ENGINEERING PRODUCT MANAGEMENT IN INDUSTRY 4.0	
RCEL 504	ETHICAL-TECHNICAL LEADERSHIP	
RCEL 505	ENGINEERING ECONOMICS FOR ENGINEERING LEADERS	

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/2023_24/Computer_Science_Masters_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) (<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 as Rice may apply towards the degree. Transfer coursework 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

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.