

# DATA SCIENCE, M.S.

## Program Description

The Master of Science in Data Science (M.S.D.S.) provides students with technical expertise in computational modeling, data collection and integration, data storage and retrieval, data processing, modeling and analytics, and visualization. Students graduating from this program will be able to handle large data sets (big data), write software to work with these large data sets, and apply the statistical skills to model and analyze sub-data sets of interest. The job opportunities in this field are rapidly growing.

## Admission Requirements

Minimum admission requirement for full admission includes completion of a four-year bachelor's degree in Data Science, Computer Science, Statistics, Mathematics, or related program with GPA of 2.75 or higher on 4.0 scale. Applicants with a baccalaureate degree in a major other than computer science or related program may be admitted to the program and must successfully complete the following three additional bridge courses with a grade of *B* or above in the first two semesters of the program:

- Data Structure and Algorithms (CS 210)
- Data Engineering (CS 410)
- Applied Probability and Statistics (ST A 345)

Whether an applicant meets the above requirements will be based on the information provided in the admission application and transcripts. International students must meet MU English proficiency standards and all other admission criteria prior to registering for the first semester of courses.

## Program Requirements

The M.S.D.S. degree requires 30 credit hours (CR) of graduate work. The 30 CR is composed of the following components:

- Required core courses (18 CR)
- Domain Emphasis (12 CR)

The Domain Emphasis gives students a good understanding of a particular domain. A student is required to take 9 credits hours in one domain emphasis and 3 credit hours of free elective in any of the three domain areas:

- Computing: This domain emphasis tackles computing areas including high performance computing, cloud computing, IoT, Artificial Intelligence, Cybersecurity, bioinformatics, etc.
- Information Systems: This domain emphasizes the use of information technology and their expected utility of their information systems.
- Predictive Analytics: This domain emphasis gives students the opportunity to learn the use of various statistical modelling techniques that are applicable to predictive analytics.

## Thesis Option in Domain Emphasis

Students may choose a thesis option replacing two courses from in the Domain Emphasis. The thesis option (Thesis 1 and 2) offers students an opportunity for in-depth understanding and investigation into an area of interest. Students must summarize their thesis work in the form of

a formal written document and deliver an oral presentation. Thesis work is typically conducted over two semesters. The thesis option can be taken after the completion of 12 credit hours. The 6 CR of the thesis option cannot be combined in a semester. If a student in the thesis option wishes to switch to the non-thesis option, the credit hours for the thesis will not count toward fulfilling the graduation requirement.

## Plan of Study

Code	Title	Credit Hours
<b>Required Core Courses</b>		
CS 511	Advanced Programming	3
CS 630	Machine Learning	3
CS 660	Big Data Systems	3
CS 670	Visual Analytics	3
STA 535	Statistical Data Mining	3
STA 634	Stat Mtds for Researchers	3
<b>Domain Emphasis - choose one</b>		<b>12</b>
Computing (see below)		
Information Systems (see below)		
Predictive Analytics (see below)		
<b>Total Credit Hours</b>		<b>30</b>

Code	Title	Credit Hours
<b>Computing Domain</b>		
Select 9 hours from the following		9
CS 505	Computing for Bioinformatics	
CS 540	Digital Image Processing	
CS 600	Advanced Web Technology	
CS 601	The Internet of Things	
CS 602	Cloud Computing	
CS 620	Applied Algorithms	
CS 645	Advanced Topics Bioinformatics	
CS 681	Thesis	
Free elective from any of the domain areas		3
<b>Total Credit Hours</b>		<b>12</b>

Code	Title	Credit Hours
<b>Information Systems Domain</b>		
Select 9 hours from the following:		9
IS 600	Management Information Systems	
MIS 624	Data Warehousing	
MIS 610	Systems Quality Assurance	
MIS 610	Systems Quality Assurance	
IS 621	Information Structures I	
MIS 622	Emerging Tech in Info Systems	
IS 623		
HIN 535	Applied Healthcare DB	
IS 665	Health Care Enterpr Info Syst	
MIS 681	Thesis	

One free elective from any of the domain areas	3
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<b>Total Credit Hours</b>	<b>12</b>
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Code	Title	Credit Hours
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**Predictive Analytics Domain**

Select 9 hours from the following:	9
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STA 512	Regression Analysis
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STA 513	Experimental Designs
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STA 520	Nonparametric Statistics
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STA 564	Statistical Computing
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STA 570	Applied Survival Analysis
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STA 662	Appl Multivariate Stat Methods
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STA 663	Time Series Forecasting
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STA 664	Bayesian Statistics
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STA 665	Advanced Stat Learning
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STA 681	Thesis
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One free elective from any of the domain areas	3
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<b>Total Credit Hours</b>	<b>12</b>
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