

# DATA SCIENCE, MS

## REQUIREMENTS

### MINIMUM GRADUATE SCHOOL REQUIREMENTS

Review the Graduate School minimum degree requirements (<https://guide.wisc.edu/graduate/#requirements>) and policies (<https://guide.wisc.edu/graduate/#policies>), in addition to the program requirements listed below.

### MAJOR REQUIREMENTS

#### MODE OF INSTRUCTION

Face to Face	Evening/ Weekend	Online	Hybrid	Accelerated
Yes	No	No	No	Yes

#### Mode of Instruction Definitions

**Accelerated:** Accelerated programs are offered at a fast pace that condenses the time to completion. Students typically take enough credits aimed at completing the program in a year or two.

**Evening/Weekend:** Courses meet on the UW–Madison campus only in evenings and/or on weekends to accommodate typical business schedules. Students have the advantages of face-to-face courses with the flexibility to keep work and other life commitments.

**Face-to-Face:** Courses typically meet during weekdays on the UW–Madison Campus.

**Hybrid:** These programs combine face-to-face and online learning formats. Contact the program for more specific information.

**Online:** These programs are offered 100% online. Some programs may require an on-campus orientation or residency experience, but the courses will be facilitated in an online format.

### CURRICULAR REQUIREMENTS

#### Requirement Detail

Minimum Credit Requirement	30 credits
Minimum Residence Credit Requirement	16 credits
Minimum Graduate Coursework Requirement	15 credits must be graduate-level coursework. Refer to the Graduate School: Minimum Graduate Coursework (50%) Requirement policy: <a href="https://policy.wisc.edu/library/UW-1244">https://policy.wisc.edu/library/UW-1244</a> ( <a href="https://policy.wisc.edu/library/UW-1244/">https://policy.wisc.edu/library/UW-1244/</a> ).
Overall Graduate GPA Requirement	3.00 GPA required. Refer to the Graduate School: Grade Point Average (GPA) Requirement policy: <a href="https://policy.wisc.edu/library/UW-1203">https://policy.wisc.edu/library/UW-1203</a> ( <a href="https://policy.wisc.edu/library/UW-1203/">https://policy.wisc.edu/library/UW-1203/</a> ).
Other Grade Requirements	None.

Assessments and Examinations None.

Language Requirements No language requirements.

### REQUIRED COURSES

Code	Title	Credits
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#### Statistics Core

STAT 611	Statistical Models for Data Science	3
STAT 612	Statistical Inference for Data Science	3
STAT 613	Statistical Methods for Data Science	3

#### Computer Sciences Core

Complete 1 course from each category for a total of 9 credits		9
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#### Algorithms

COMP SCI/E C E/ I SY E 524	Introduction to Optimization	
COMP SCI 577	Introduction to Algorithms	
COMP SCI/I SY E/ MATH/STAT 726	Nonlinear Optimization I	

#### Systems

COMP SCI 537	Introduction to Operating Systems	
COMP SCI 544	Introduction to Big Data Systems	
COMP SCI 564	Database Management Systems: Design and Implementation	
COMP SCI 640	Introduction to Computer Networks	
COMP SCI 642	Introduction to Information Security	
COMP SCI 739	Distributed Systems	
COMP SCI 744	Big Data Systems	
COMP SCI 764	Topics in Database Management Systems	

#### Humans and Data

COMP SCI 765	Data Visualization	
COMP SCI/ ED PSYCH/ PSYCH 770	Human-Computer Interaction	

#### Machine Learning Core

Complete 2 courses from the list below for a total of 6 credits		6
COMP SCI 540	Introduction to Artificial Intelligence	
COMP SCI/ E C E 760	Machine Learning	
COMP SCI/ E C E 761	Mathematical Foundations of Machine Learning	
COMP SCI 762	Advanced Deep Learning	
STAT 451	Introduction to Machine Learning and Statistical Pattern Classification	
STAT 453	Introduction to Deep Learning and Generative Models	
STAT 615	Statistical Learning	

#### Data Science Electives

Complete 6 credits from the courses below <sup>1</sup>		6
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COMP SCI/E C E/ I SY E 524	Introduction to Optimization	STAT/ COMP SCI 471	Introduction to Computational Statistics
COMP SCI 537	Introduction to Operating Systems	STAT 575	Statistical Methods for Spatial Data
COMP SCI 544	Introduction to Big Data Systems	STAT/B M I 620	Statistics in Human Genetics
COMP SCI 564	Database Management Systems: Design and Implementation	STAT 699	Directed Study (3 credits maximum of STAT 699 and/or COMP SCI 799 allowed)
COMP SCI/ B M I 576	Introduction to Bioinformatics	STAT 701	Applied Time Series Analysis, Forecasting and Control I
COMP SCI 577	Introduction to Algorithms	STAT 760	Multivariate Analysis I
COMP SCI 640	Introduction to Computer Networks	STAT 761	Decision Trees for Multivariate Analysis
COMP SCI 642	Introduction to Information Security	STAT 771	Computational Statistics
COMP SCI 702	Graduate Cooperative Education	STAT/ECON/ GEN BUS 775	Bayesian Statistics
COMP SCI/I SY E/ MATH/STAT 726	Nonlinear Optimization I	I SY E 620	Simulation Modeling and Analysis
COMP SCI 736	Advanced Operating Systems	I SY E 624	Stochastic Modeling Techniques
COMP SCI 739	Distributed Systems	I SY E/ COMP SCI 719	Stochastic Programming
COMP SCI 744	Big Data Systems	I SY E/ COMP SCI 723	Dynamic Programming and Associated Topics
COMP SCI/ E C E 763	Trustworthy Artificial Intelligence	I SY E/COMP SCI/ MATH 728	Integer Optimization
COMP SCI 764	Topics in Database Management Systems	MATH 616	Data-Driven Dynamical Systems, Stochastic Modeling and Prediction
COMP SCI 765	Data Visualization		
COMP SCI/ E C E 766	Computer Vision		
COMP SCI 769	Advanced Natural Language Processing		
COMP SCI/ ED PSYCH/ PSYCH 770	Human-Computer Interaction		
COMP SCI 774	Data Exploration, Cleaning, and Integration for Data Science		
COMP SCI 784	Foundations of Data Management		
COMP SCI 799	Master's Research (3 credits maximum of COMP SCI 799 and/or STAT 699 allowed)		
COMP SCI/E C E/ STAT 861	Theoretical Foundations of Machine Learning		
L I S 461	Data and Algorithms: Ethics and Policy		
STAT 303 & STAT 304 & STAT 305	R for Statistics I and R for Statistics II and R for Statistics III		
STAT 349	Introduction to Time Series		
STAT 351	Introductory Nonparametric Statistics		
STAT/ COMP SCI 403	Internship Course in Comp Sci and Data Science		
STAT 411	An Introduction to Sample Survey Theory and Methods		
STAT 421	Applied Categorical Data Analysis		
STAT 433	Data Science with R		
STAT 443	Classification and Regression Trees		
STAT 456	Applied Multivariate Analysis		
STAT 461	Financial Statistics		
<b>Total Credits</b>			<b>30</b>

<sup>1</sup> Courses listed both as core course and as an elective may satisfy either requirement, but not both.

Students in this program may not take courses outside the prescribed curriculum without faculty advisor and program director approval. Students in this program cannot enroll concurrently in other undergraduate or graduate degree programs.