

DATA SCIENCE

Master of Science Data Science

The non-thesis M.S. in Data Science curriculum is designed to give students an interdisciplinary educational experience that provides a solid foundation in computer science, mathematics, and statistics. The curriculum prepares students to solve challenging data-driven problems across a variety of application areas. Students pursuing the non-thesis M.S. in Data Science must select a primary focus area, namely Computational Learning or Statistical Learning. Courses within the focus area provide more advanced discipline-specific content. Students must take a minimum of 12 total credit hours of COMP SCI courses and 12 total hours of STAT or MATH courses.

In accordance with campus requirements, this M.S. non-thesis degree requires a minimum of thirty hours of graduate credit. The plan of study must include a minimum of twenty-four credit hours of 4000-, 5000-, and 6000- level lecture courses (1000/2000-level courses cannot be included).

A minimum of nine credit hours of the required coursework must come from the group of 6000-level lecture courses. Additionally, no credit hours of graduate research may be applied toward the plan of study.

Required courses:

COMP SCI 5206	Probability and Its Applications in Computing	3
or STAT 5643	Probability And Statistics	
COMP SCI 5420	Introduction to Machine Learning	3
or MATH 5680	Mathematics of Machine Learning	
COMP SCI 5400	Introduction To Artificial Intelligence	3
COMP SCI 5480	Deep Learning	3
STAT 5346	Regression Analysis	3
or COMP SCI 5204	Regression Analysis	
STAT 5364	Causal Data Science	3
Primary focus area electives		6
Secondary focus area elective		3
Additional elective ¹		3

¹ The additional elective can be chosen from the primary focus area, the secondary focus area, or the additional course options

Computational Learning Focus Area Electives

COMP SCI 5402	Introduction to Data Mining	3
COMP SCI 5409	Applied Social Network Analysis	3
COMP SCI 5411	Natural Language Processing	3
COMP SCI 5480	Deep Learning	3
COMP SCI 5700	Bioinformatics	3
COMP SCI 6202	Markov Decision Processes	3
COMP SCI 6400	Advanced Topics In Artificial Intelligence	3
COMP SCI 6401	Advanced Evolutionary Computing	3
COMP SCI 6402	Advanced Topics in Data Mining	3
COMP SCI 6406	Machine Learning in Computer Vision	3
COMP SCI 6407	Internet of Things with Data Science	3

Statistical Learning Focus Area Electives

STAT 5210	Statistical Data Analysis Using R	3
STAT 5270	Foundations of Statistical Learning	3
STAT 5290	Computational Bayesian Methods using Python	3
STAT 5353	Statistical Data Analysis	3
STAT 5814	Applied Time Series Analysis	3
STAT 6239	Clustering Algorithms	3

STAT 6342	Categorical Data Analysis	3
STAT 6343	Nonparametric Statistical Methods	3
STAT 6344	Design And Analysis Of Experiments	3
STAT 6545	Multivariate Statistical Methods	3

Additional Course Options

COMP ENG 5310	Computational Intelligence	
COMP SCI 5200	Analysis Of Algorithms	3
COMP SCI 5201	Object-Oriented Numerical Modeling I	3
COMP SCI 5408	Game Theory for Computing	3
COMP SCI 5802	Introduction to Parallel Programming and Algorithms	3
COMP SCI 6204	Applied Graph Theory for Computer Science	3
COMP SCI 6304	Cloud Computing and Big Data Management	3
COMP SCI 6601	Privacy Preserving Data Integration and Analysis	3
ECON 5360	Data Driven Strategic Insights	3
ECON 5380	Data Intelligence using Case Studies	3
ENG MGT 5414	Introduction To Operations Research	3
ENG MGT 6412	Mathematical Programming	3
ENG MGT 6415	Optimization under Uncertainty	3
IS&T 5420	Business Analytics and Data Science	3
MATH 5601	Introduction to Numerical Analysis	3
MATH 5670	Scientific Programming with Python	3
MATH 5762	Marketing Revolution with Machine Learning	3
MATH 6490	Nonlinear Optimization in Machine Learning	3
STAT 5644	Mathematical Statistics	3
STAT 6553	Linear Statistical Models I	3
STAT 6841	Stochastic Processes	3
SYS ENG 5212	Introduction to Neural Networks and Applications	3
SYS ENG 6102	Information Based Design	3
SYS ENG 6213	Deep Learning	3
SYS ENG 6215	Adaptive Dynamic Programming	3