Degree Requirements

Students in the Master in Data Science (MSDS) program must successfully complete 30 credits based on any of the following options:

- Courses (30 credits)
- Courses (27 credits) + MS Project (3 credits)
- Courses (24 credits) + MS Thesis (6 credits)

Independent of the chosen option, all core courses in the respective tracks are required.

At most two courses can be chosen from outside the respective track with approval of the respective Program Co-Directors. Computational track students are allowed at most three electives that are non-Computer Science courses. Statistics track students are allowed at most three electives that are non-Math courses.

If a student chooses the MS project or MS thesis option, the project or thesis must be related to data science and requires approval from one of the Program Co-Directors.

The MSDS program has computational and statistics tracks that students must choose from at admission time. These tracks have different core courses but share the same admission requirements and electives.

Students may choose an elective outside the list after approval of their respective advisor.

M.S. in Data Science

Code	Title	Credits
Core Course Requirements for Computational Track		
CS 675	Machine Learning	3
CS 644	Big Data	3
CS 636	Data Analytics with R Programming	3
CS 677	Deep Learning	3
Math 661	Applied Statistics	3
Core Course Requirements for Statistics Track		
Math 660	Introduction to Statistical Computing with SAS and R	3
Math 661	Applied Statistics	3
Math 678	Statistical Methods in Data Science	3
CS 644	Big Data	3
CS 675 OR Math 680	Machine Learning OR Advanced Statistical Learning	3
Electives and Foundation Courses		**15**
Computer Science Electives		
CS 610	Data Structures and Algorithms	
CS 631	Data Management System Design	
CS 632	Advance Database System Design	
CS 634	Data Mining	

CS 636	Data Analytics with R Programming (available only to students in the Math core)
CS 639	Electronic Medical Records
CS 643	Cloud Computing
CS 645	Security and Privacy in Computer Systems
CS 656	Internet and Higher Layer Protocols
CS 659	Image Processing and Analysis
CS 661	Systems Simulation
CS 670	Artificial Intelligence
CS 676	Cognitive Computing
CS 677	Deep Learning (available only to students in statistics track)
CS 683	Software Project Management
CS 684	Software Testing and Reliability
CS 681	Computer Vision
CS 708	Advance Data Security and Privacy
CS 731	Application of Database Systems
CS 732	Advance Machine Learning
CS 735	High Performance Analytics for Data Science
CS 744	Data Mining and Management in Bioinformatics
CS 782	Pattern Recognition
Math Electives	
Math 630	Linear Algebra and Applications
Math 631	Linear Algebra
Math 644	Regression Analysis Methods
Math 660	Introduction to Statistical Computing with SAS and R (available only to students in computational track)
Math 662	Probability Distributions
Math 664	Methods for Statistical Computing
Math 665	Statistical Inference
Math 678	Statistical Methods in Data Science (available only to students in computational track)
Math 680	Advanced Statistical Learning (available only to students in computational track)
Math 683	High dimensional Statistical Inference
Math 699	Design and Analysis of Experiments
Math 717	Inverse Problems and Global Optimization
Math 786	Large Sample Theory and Inference
Math 787	Non-parametric statistics
Other Electives	
BIOL 638	Computational Ecology

BME 698	Auditory Signal Processing	
MGMT 635	Data Mining and Analytics for Managers	
MGMT 630	Decision Analysis	
FIN 600	Corporate Finance I	
FIN 641	Derivatives Markets	
FIN 642	Derivatives and Structured Finance	
MRKT 613	Market Planning and Analysis	
MRKT 630	Models of Consumer Behavior	
IS 631	Enterprise Database Management	
IS 665	Data Analytics for Information Systems	
IS 687	Transaction Mining and Fraud Detection	
IS 688	Web Mining	
BNFO 601	Foundations of Bioinformatics I	
BNFO 602	Foundations of Bioinformatics II	
BNFO 615	Machine Learning for Bioinformatics	
BNFO 620	Genomic Data Analysis	
Total Credits		**30**

Recommended course sequence M.S. in Data Science for Computational Track

	Fall	**Spring**
Year 1	CS 675 Machine Learning Math 661 Applied Statistics CS 636 R for Data Science	CS 631 Data Management and System Design CS 644 Big Data CS 677 Deep Learning
Year 2	Free elective or Master thesis course Free elective or Master project course Free elective	Free elective or Masters thesis course

Recommended course sequence for M.S. in Data Science for Statistics Track

	Fall	**Spring**
Year 1	Math 660 Intro to Statistical Computing with R and SAS Math 661 Applied Statistics Free elective	Math 678 Statistics Methods in Data Science CS 644 Big Data Math 630 Linear Algebra and Applications
Year 2	CS 675 Machine Learning or Math 680 Advanced Statistical Learning Free elective or Master thesis for thesis Free elective or Master project course	Free elective or Masters thesis course