

Degree Requirements

The Master in Data Science (MSDS) program has two tracks: a Computational track and a Statistics track. Students can choose either of these two tracks and 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 (Computational or Statistics) 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 698 | Current topics in data science | 3 |
| Math 661 | Applied Statistics | 3 |
| Core Course Requirements for Statistics Track | | |
| Math 660 | Introduction to statistical Computing with SAS and R | 3 |
| Math 662 | Probability Distributions | 3 |
| Math 665 | Statistical Inference | 3 |
| CS 644 | Big Data | 3 |
| CS 675 | Machine Learning | 3 |
| Electives and Foundation Courses | | 15 |
| <u>Computer Science Electives</u> | | |
| CS 610 | Data Structures and Algorithms | |
| CS 631 | Data Management System Design | |
| CS 632 | Advance Database System Design | |

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| CS 636 | Data Analytics with R Programming (only available to students in the Math core) |
| CS 639 | Electronic Medical Records |
| CS 643 | Cloud Computing |
| CS 645 | Security and Privacy in Computer Systems |
| CS 659 | Image Processing and Analysis |
| CS 661 | Systems Simulation |
| CS 670 | Artificial Intelligence |
| 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 |
| <u>Math Electives</u> | |
| 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 (only available to students in computational track) |
| Math 662 | Probability Distributions (only available to students in computational track) |
| Math 664 | Methods for Statistical Computing |
| Math 665 | Statistical Inference (only available to students in computational track) |
| Math 678 | Introduction to Statistical Methods in Data Science |
| 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 |
| <u>Other Electives</u> | |
| BIOL 638 | Computational Ecology |
| 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 |

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| 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 631 Data Management and System Design | CS 636 R for Data Science CS 644 Big Data CS 698 Current topics in Data Science |
| 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 | CS 675 Machine Learning Math 660 Intro to Statistical Computing with R and SAS Math 662 Probability Distributions | Math 665 Statistics Inference CS 644 Big Data Math 630 Linear Algebra and Applications |
| Year 2 | Free elective or Master thesis course Free elective or Master project course Free elective | Free elective or Masters thesis course |