DATA SCIENCE, MS ARTIFICIAL INTELLIGENCE SPECIALIZATION

Advances in machine learning algorithms, growth in computer processing power, and access to large volumes of data make artificial intelligence possible. Recent advances flow from the development of deep learning methods, which are neural networks with many hidden layers. Artificial intelligence builds on machine learning, with computer programs performing many tasks formerly associated with human intelligence. Students in this specialization learn how to move from the traditional models of applied statistics to contemporary data-adaptive models employing machine learning. Students learn how to implement solutions in computer vision, natural language processing, and software robotics.

Curriculum
Core Courses (8 units)

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
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<tbody>
<tr>
<td>MSDS 400-DL</td>
<td>Math For Data Scientists</td>
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<tr>
<td>MSDS 401-DL</td>
<td>Applied Statistics with R</td>
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<tr>
<td>MSDS 402-DL</td>
<td>Data Science and Research Practice</td>
</tr>
<tr>
<td>or MSDS 403-DL</td>
<td>Data Science and Digital Transformation</td>
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<tr>
<td>MSDS 420-DL</td>
<td>Database Systems and Data Preparation</td>
</tr>
<tr>
<td>MSDS 422-DL</td>
<td>Practical Machine Learning</td>
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<tr>
<td>MSDS 460-DL</td>
<td>Decision Analytics</td>
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<tr>
<td>MSDS 475-DL</td>
<td>Project Management</td>
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<tr>
<td>or MSDS 480-DL</td>
<td>Business Leadership and Communications</td>
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<tr>
<td>or MSDS 485-DL</td>
<td>Data Governance, Ethics, and Law</td>
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<tr>
<td>MSDS 498-DL</td>
<td>Capstone Class</td>
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<tr>
<td>or MSDS 590-DL</td>
<td>Thesis Research</td>
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1 Which course should students take?
- Students without a background in data science should select MSDS 402-DL Data Science and Research Practice.
- Students with a background in data science should select MSDS 403-DL Data Science and Digital Transformation. Students who have at least two years' experience in the field and have or had a title, such as data scientist, data analyst, statistician, data engineer, business analyst, etc. should select this course.

Specialization Courses (4 units)

<table>
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<tr>
<th>Course</th>
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<tr>
<td>MSDS 453-DL</td>
<td>Natural Language Processing</td>
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<tr>
<td>MSDS 458-DL</td>
<td>Artificial Intelligence and Deep Learning</td>
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Any two electives
- MSDS 410-DL Supervised Learning Methods
- MSDS 411-DL Unsupervised Learning Methods
- MSDS 413-DL Time Series Analysis and Forecasting
- MSDS 430-DL Python for Data Analysis
- MSDS 431-DL Data Engineering with Go
- MSDS 432-DL Foundations for Data Engineering
- MSDS 434-DL Analytics Application Engineering
- MSDS 436-DL Analytics Systems Engineering
- MSDS 440-DL Real-Time Interactive Processing and Analytics
- MSDS 442-DL Real-Time Stream Processing and Analytics
- MSDS 450-DL Marketing Analytics
- MSDS 451-DL Financial Machine Learning
- MSDS 452-DL Web and Network Data Science
- MSDS 454-DL Applied Probability and Simulation Modeling
- MSDS 455-DL Data Visualization
- MSDS 456-DL Sports Performance Analytics
- MSDS 457-DL Sports Management Analytics
- MSDS 459-DL Knowledge Engineering
- MSDS 462-DL Computer Vision
- MSDS 464-DL Intelligent Systems and Robotics
- MSDS 470-DL Technology Entrepreneurship
- MSDS 472-DL Management Consulting
- MSDS 474-DL Accounting and Finance for Technology Managers
- MSDS 475-DL Project Management
- MSDS 476-DL Business Process Analytics
- MSDS 485-DL Data Governance, Ethics, and Law
- MSDS 490-DL Special Topics in Data Science
- MSDS 499-DL Independent Study

About the Final Project
As their final course in the program, students take either a master’s thesis project in an independent study format or a classroom final project class in which students integrate the knowledge they have gained in the core curriculum in a team project approved by the instructor. In both cases, students are guided by faculty in exploring the body of knowledge of data science. The master’s thesis or capstone class project count as one unit of credit.

Course
Choose one
Title
- MSDS 498-DL Capstone Class
- MSDS 590-DL Thesis Research