DATA SCIENCE, ADVANCED GRADUATE CERTIFICATE

Prior to applying to this program, students must have completed MSDS 420-DL Database Systems and Data Preparation and MSDS 422-DL Practical Machine Learning or are expected to possess equivalent knowledge and skills.

Curriculum

To earn a certificate, students must complete any four of the MSDS electives:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
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<tbody>
<tr>
<td>MSDS 410-DL</td>
<td>Supervised Learning Methods</td>
</tr>
<tr>
<td>MSDS 411-DL</td>
<td>Unsupervised Learning Methods</td>
</tr>
<tr>
<td>MSDS 413-DL</td>
<td>Times Series Analysis and Forecasting</td>
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<tr>
<td>MSDS 431-DL</td>
<td>Data Engineering with Go</td>
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<tr>
<td>MSDS 432-DL</td>
<td>Foundations for Data Engineering</td>
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<tr>
<td>MSDS 434-DL</td>
<td>Analytics Application Engineering</td>
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<tr>
<td>MSDS 436-DL</td>
<td>Analytics Systems Engineering</td>
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<tr>
<td>MSDS 440-DL</td>
<td>Real-Time Interactive Processing and Analytics</td>
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<tr>
<td>MSDS 442-DL</td>
<td>Real-Time Stream Processing and Analytics</td>
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<tr>
<td>MSDS 450-DL</td>
<td>Marketing Analytics</td>
</tr>
<tr>
<td>MSDS 451-DL</td>
<td>Financial Machine Learning</td>
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<tr>
<td>MSDS 452-DL</td>
<td>Web and Network Data Science</td>
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<tr>
<td>MSDS 453-DL</td>
<td>Natural Language Processing</td>
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<tr>
<td>MSDS 454-DL</td>
<td>Applied Probability and Simulation Modeling</td>
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<tr>
<td>MSDS 455-DL</td>
<td>Data Visualization</td>
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<tr>
<td>MSDS 456-DL</td>
<td>Sports Performance Analytics</td>
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<tr>
<td>MSDS 457-DL</td>
<td>Sports Management Analytics</td>
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<tr>
<td>MSDS 458-DL</td>
<td>Artificial Intelligence and Deep Learning</td>
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<td>MSDS 459-DL</td>
<td>Knowledge Engineering</td>
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<td>MSDS 460-DL</td>
<td>Decision Analytics</td>
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<tr>
<td>MSDS 462-DL</td>
<td>Computer Vision</td>
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<tr>
<td>MSDS 464-DL</td>
<td>Intelligent Systems and Robotics</td>
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<tr>
<td>MSDS 470-DL</td>
<td>Technology Entrepreneurship</td>
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<tr>
<td>MSDS 472-DL</td>
<td>Management Consulting</td>
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<tr>
<td>MSDS 474-DL</td>
<td>Accounting and Finance for Technology Managers</td>
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<td>MSDS 475-DL</td>
<td>Project Management</td>
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<tr>
<td>MSDS 476-DL</td>
<td>Business Process Analytics</td>
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<tr>
<td>MSDS 480-DL</td>
<td>Business Leadership and Communications</td>
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<tr>
<td>MSDS 485-DL</td>
<td>Data Governance, Ethics, and Law</td>
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In some cases, students who have completed equivalent coursework previously may be allowed to replace the required course with another course in the field.

Please note that courses completed in the certificate program cannot be transferred to the corresponding graduate degree.