COMPUTER SCIENCE (M.S.)

Requirements

Background courses

Students with insufficient background for graduate-level computer science courses may need to take background coursework. Credits do not apply toward the M.S. program. Students entering the program without an undergraduate degree in computer science may need to take one or more of the following, depending on their background:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>CISC 5002</td>
<td>Discrete Structures</td>
<td>3</td>
</tr>
<tr>
<td>CISC 5004</td>
<td>Computer Programming C++</td>
<td>3</td>
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<tr>
<td>CISC 5006</td>
<td>Data Structures</td>
<td>3</td>
</tr>
<tr>
<td>CISC 5008</td>
<td>Computer Organization</td>
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</table>

Degree Requirements

The master's degree requires 30 credits of coursework beyond the bachelor's degree, which includes 24 credits of coursework and six credits of a culminating project. It can be completed by a full-time student in three or four semesters. Students are required to choose a concentrations based on their interests. A B-average (3.000) must be maintained in courses taken for the master's degree.

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>CISC 5325</td>
<td>Database</td>
<td>3</td>
</tr>
<tr>
<td>CISC 5595</td>
<td>Operating Systems</td>
<td>3</td>
</tr>
<tr>
<td>CISC 5825</td>
<td>Computer Algorithms</td>
<td>3</td>
</tr>
<tr>
<td>CISC 5200</td>
<td>Computer Language Theory</td>
<td>3</td>
</tr>
<tr>
<td>One Advanced Software course (any additional class in the Software concentration)</td>
<td>3</td>
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</tr>
</tbody>
</table>

Two courses from any of the following concentrations: 1

Software
Cybersecurity
Data Analytics
Networks and Systems

One additional course from any concentration area. 3

One of the following options: 6

Thesis Paper & Research
CISC 6098 M.S. Computer Science Thesis I
CISC 6099 M.S. Computer Science Thesis II

Course and Capstone
One additional elective course 2
CISC 6597 Capstone Project in Computer Science

Total Credits 30

1 A list of courses for each concentration can be found on the Concentrations page (p. 1).
2 Any additional graduate-level CISC course may apply, except for those listed under Background Courses above.

Concentrations

Software concentration courses

Courses in this group have the CSSO attribute.

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
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<tbody>
<tr>
<td>CISC 5030</td>
<td>Internet and Web Programming</td>
<td>3</td>
</tr>
<tr>
<td>CISC 5040</td>
<td>JavaScript</td>
<td>3</td>
</tr>
<tr>
<td>CISC 5350</td>
<td>Financial Programming</td>
<td>3</td>
</tr>
<tr>
<td>CISC 5352</td>
<td>Financial Programming and Applications</td>
<td>3</td>
</tr>
<tr>
<td>CISC 5380</td>
<td>Programming with Python</td>
<td>3</td>
</tr>
<tr>
<td>CISC 5410</td>
<td>Mobile Device Programming</td>
<td>3</td>
</tr>
<tr>
<td>CISC 5500</td>
<td>Data Analytics Tools and Scripting</td>
<td>3</td>
</tr>
<tr>
<td>CISC 5520</td>
<td>Programming Languages</td>
<td>3</td>
</tr>
<tr>
<td>CISC 5550</td>
<td>Cloud Computing</td>
<td>3</td>
</tr>
<tr>
<td>CISC 5597</td>
<td>Distributed Systems</td>
<td>3</td>
</tr>
<tr>
<td>CISC 5640</td>
<td>Nosql Database Systems</td>
<td>3</td>
</tr>
<tr>
<td>CISC 5835</td>
<td>Algorithms for Data Science</td>
<td>3</td>
</tr>
<tr>
<td>CISC 5850</td>
<td>The Social Network</td>
<td>3</td>
</tr>
<tr>
<td>CISC 5950</td>
<td>Big Data Programming</td>
<td>3</td>
</tr>
<tr>
<td>CISC 6100</td>
<td>Software Engineering</td>
<td>3</td>
</tr>
<tr>
<td>CISC 6300</td>
<td>Computational Finance</td>
<td>3</td>
</tr>
<tr>
<td>CISC 6350</td>
<td>Advanced Financial Programming</td>
<td>3</td>
</tr>
<tr>
<td>CISC 6352</td>
<td>Advanced Computational Finance</td>
<td>3</td>
</tr>
<tr>
<td>CISC 6375</td>
<td>Object Software Design</td>
<td>3</td>
</tr>
<tr>
<td>CISC 6400</td>
<td>Robotics and Animation</td>
<td>3</td>
</tr>
<tr>
<td>CISC 6795</td>
<td>Java Programming</td>
<td>3</td>
</tr>
<tr>
<td>CISC 6875</td>
<td>Parallel Computations</td>
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</tbody>
</table>

Artificial Intelligence concentration courses

Courses in this group have the CSAI attribute.

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CISC 5109</td>
<td>Big Data Analytics</td>
<td>3</td>
</tr>
<tr>
<td>CISC 5700</td>
<td>Cognitive Computing</td>
<td>3</td>
</tr>
<tr>
<td>CISC 5800</td>
<td>Machine Learning</td>
<td>3</td>
</tr>
<tr>
<td>CISC 5900</td>
<td>Information Fusion</td>
<td>3</td>
</tr>
<tr>
<td>CISC 6000</td>
<td>Deep Learning</td>
<td>3</td>
</tr>
<tr>
<td>CISC 6210</td>
<td>Natural Language Processing</td>
<td>3</td>
</tr>
<tr>
<td>CISC 6400</td>
<td>Robotics and Animation</td>
<td>3</td>
</tr>
<tr>
<td>CISC 6525</td>
<td>Artificial Intelligence</td>
<td>3</td>
</tr>
<tr>
<td>CISC 6550</td>
<td>Systems Neuroscience</td>
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Cybersecurity concentration courses

Courses in this group have the CSCY attribute.

<table>
<thead>
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<th>Title</th>
<th>Credits</th>
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<td>CISC 5009</td>
<td>Network Essentials</td>
<td>3</td>
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<tr>
<td>CISC 5650</td>
<td>Cybersecurity Essentials</td>
<td>3</td>
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<tr>
<td>CISC 5660</td>
<td>Data Science for Cybersecurity</td>
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<tr>
<td>CISC 5725</td>
<td>Network Administration</td>
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<tr>
<td>CISC 5728</td>
<td>Security of e-Systems and Networks</td>
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### Computer Science (M.S.)

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<td>CISC 5750</td>
<td>Information Security and Ethics</td>
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<td>CISC 6070</td>
<td>Red Teaming</td>
<td>3</td>
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<td>CISC 6600</td>
<td>Cloud Computing Security</td>
<td>3</td>
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<td>CISC 6630</td>
<td>Wireless Security</td>
<td>3</td>
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<tr>
<td>CISC 6640</td>
<td>Privacy and Security in Big Data</td>
<td>3</td>
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<tr>
<td>CISC 6650</td>
<td>Forensic Computing</td>
<td>3</td>
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<tr>
<td>CISC 6660</td>
<td>Applied Cryptography</td>
<td>3</td>
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<tr>
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<td>Intrusion Detection and Network Forensics</td>
<td>3</td>
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<td>CISC 6690</td>
<td>Cybersecurity in Business</td>
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<td>CISC 6750</td>
<td>IOT Forensics and Security</td>
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<tr>
<td>CISC 6800</td>
<td>Malware Analytics and Software Security</td>
<td>3</td>
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<tr>
<td>CISC 6920</td>
<td>Incident Response and Risk Management</td>
<td>3</td>
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<tr>
<td>CISC 7050</td>
<td>Penetration Testing</td>
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</table>

### Data Analytics concentration courses

*Courses in this group have the CSDA attribute.*

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<tr>
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<td>CISC 5109</td>
<td>Big Data Analytics</td>
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<tr>
<td>CISC 5450</td>
<td>Mathematics for Data Science</td>
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<tr>
<td>CISC 5500</td>
<td>Data Analytics Tools and Scripting</td>
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<td>CISC 5640</td>
<td>Nosql Database Systems</td>
<td>3</td>
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<td>CISC 5700</td>
<td>Cognitive Computing</td>
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<td>CISC 5790</td>
<td>Data Mining</td>
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<tr>
<td>CISC 5800</td>
<td>Machine Learning</td>
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<td>Algorithms for Data Science</td>
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<td>Deep Learning</td>
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<tr>
<td>CISC 6550</td>
<td>Systems Neuroscience</td>
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<tr>
<td>CISC 6700</td>
<td>Medical Informatics</td>
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</tr>
<tr>
<td>CISC 6745</td>
<td>Data Visualization</td>
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</table>

### Networks and Systems concentration courses

*Courses in this group have the CSNS attribute.*

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<tr>
<th>Course</th>
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<tbody>
<tr>
<td>CISC 5009</td>
<td>Network Essentials</td>
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<td>Internet and Web Programming</td>
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<tr>
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<td>Bioinformatics</td>
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<td>Wireless Security</td>
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<tr>
<td>CISC 6680</td>
<td>Intrusion Detection and Network Forensics</td>
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<td>CISC 6735</td>
<td>Wireless Networks</td>
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<tr>
<td>CISC 6750</td>
<td>IOT Forensics and Security</td>
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