Cybersecurity BS, Information Systems Emphasis

Bachelor of Science (B.S.) in Cybersecurity

Degree Requirements

Students must choose one of the following emphasis areas at the time of application for admission.

- Computer Science (CS) Emphasis (total 120 credit hours)
- Information Systems (IS) Emphasis (total 123 credit hours)

Degree requirements vary depending on the chosen emphasis area (see common and emphasis area required courses and credit hours below).

General Education Requirements

Students must satisfy the university general education requirements (http://bulletin.umsl.edu/generaleducationrequirements/). Many of the courses for the degree may be used to fulfill general education requirements. There is no foreign language requirement for this degree.

Satisfactory/Unsatisfactory Option

Courses required for the major may not be taken on a satisfactory/unsatisfactory basis.

Required Courses

The degree requires 33 credit hours of core coursework applicable to both emphasis areas. Emphasis specific required courses are listed below. Please see 4-year degree plans for recommend course sequences within each emphasis.

**Required Core Courses**

- ENGL 3120 Business Writing 3
- CMP SCI 1250 Introduction to Computing 3
- CMP SCI 2250 Programming and Data Structures 3
- CMP SCI 2261 Object-Oriented Programming 3
- CMP SCI 2700 Computer Organization and Architecture 3
- CMP SCI 2750 Linux Environment and Programming 3
- INFSYS 3848 Introduction to Information Security 3
- INFSYS 3868 Secure Software Development 3
- INFSYS 3878 Information Security Risk Management and Business Continuity 3
- CMP SCI 4700 Computer Forensics 3
- CMP SCI 4732 Introduction to Cryptography for Computer Security 3

**Computer Science Emphasis**

In addition to the 33 credit hours of core required coursework, the B.S. Cybersecurity degree with Computer Science emphasis requires 42-44 credit hours of emphasis specific course work. Thus, candidates for the B.S. in Cybersecurity degree with Computer Science emphasis must complete a major program of 75-77 (33 core + 42-44 emphasis specific) credit hours of required courses.

For the Computer Science emphasis all general degree requirements from the College of Arts and Science apply.

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 1320</td>
<td>Introduction to Probability and Statistics</td>
<td>3</td>
</tr>
<tr>
<td>MATH 1100</td>
<td>Basic Calculus</td>
<td>3-5</td>
</tr>
<tr>
<td>or MATH 1800</td>
<td>Analytic Geometry and Calculus I</td>
<td></td>
</tr>
<tr>
<td>MATH 3000</td>
<td>Discrete Structures</td>
<td>3</td>
</tr>
<tr>
<td>CMP SCI 3010</td>
<td>Web Programming</td>
<td>3</td>
</tr>
<tr>
<td>CMP SCI 3130</td>
<td>Design and Analysis of Algorithms</td>
<td>3</td>
</tr>
<tr>
<td>CMP SCI 3780</td>
<td>Software Security</td>
<td>3</td>
</tr>
<tr>
<td>CMP SCI 4730</td>
<td>Computer Networks and Communications</td>
<td>3</td>
</tr>
<tr>
<td>CMP SCI 4750</td>
<td>Introduction to Cloud Computing</td>
<td>3</td>
</tr>
<tr>
<td>CMP SCI 4760</td>
<td>Operating Systems</td>
<td>3</td>
</tr>
<tr>
<td>CMP SCI 4782</td>
<td>Information Security</td>
<td>3</td>
</tr>
<tr>
<td>CMP SCI 4794</td>
<td>Introduction to Security of IoT Systems</td>
<td>3</td>
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</table>

**Electives (choose 3 from following)**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHIL 1160</td>
<td>Critical Thinking (MOTR PHIL 101)</td>
<td></td>
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<tr>
<td>PHIL 2254</td>
<td>Business Ethics</td>
<td></td>
</tr>
<tr>
<td>CRIMIN 1100</td>
<td>Introduction to Criminology and Criminal Justice</td>
<td></td>
</tr>
<tr>
<td>CRIMIN 3310</td>
<td>Computers in Criminal Justice</td>
<td></td>
</tr>
<tr>
<td>CMP SCI 3990</td>
<td>Undergraduate Internship</td>
<td></td>
</tr>
<tr>
<td>CMP SCI 4020</td>
<td>Introduction to Android Apps: Android Fundamentals</td>
<td></td>
</tr>
<tr>
<td>CMP SCI 4220</td>
<td>Introduction to iOS Programming and Apps</td>
<td></td>
</tr>
<tr>
<td>CMP SCI 4222</td>
<td>iOS Apps</td>
<td></td>
</tr>
<tr>
<td>CMP SCI 4300</td>
<td>Introduction to Artificial Intelligence</td>
<td></td>
</tr>
<tr>
<td>CMP SCI 4500</td>
<td>Introduction to the Software Profession</td>
<td></td>
</tr>
<tr>
<td>CMP SCI 4610</td>
<td>Database Management Systems</td>
<td></td>
</tr>
<tr>
<td>CMP SCI 4792</td>
<td>Introduction to Mobile Computing, Networking, and Security</td>
<td></td>
</tr>
<tr>
<td>INFSYS 3858</td>
<td>Advanced Security and Information Systems</td>
<td></td>
</tr>
<tr>
<td>INFSYS 3898</td>
<td>Seminar in Information Systems</td>
<td></td>
</tr>
<tr>
<td>Other electives upon approval of Computer Science department chair</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Total Hours**

33

**Information Systems Emphasis**

In addition to the 33 credit hours of core required coursework, the B.S. Cybersecurity degree with Information Systems emphasis requires 75 credit hours of emphasis specific coursework (48 general business + 27 program specific). Thus, candidates for the B.S. in Cybersecurity degree
with Information Systems emphasis must complete a program of 108 (33 core + 75 emphasis specific) credit hours of required courses.

For the Information Systems emphasis all general degree requirements from the College of Business Administration apply.

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>INFSYS 3820</td>
<td>Introduction to Systems Administration</td>
<td>3</td>
</tr>
<tr>
<td>INFSYS 3842</td>
<td>Data Networks and Security</td>
<td>3</td>
</tr>
<tr>
<td>INFSYS 3806</td>
<td>Managerial Applications of Object-Oriented Programming I</td>
<td>3</td>
</tr>
<tr>
<td>INFSYS 3815</td>
<td>Object-Oriented Applications in Business</td>
<td>3</td>
</tr>
<tr>
<td>INFSYS 3845</td>
<td>Database Management Systems</td>
<td>3</td>
</tr>
<tr>
<td>INFSYS 3858</td>
<td>Advanced Security and Information Systems</td>
<td>3</td>
</tr>
<tr>
<td>SCMA 4347</td>
<td>Introduction to Project Management</td>
<td>3</td>
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</table>

**Major Specific Electives (choose 2 from following)**

<table>
<thead>
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<th>Course Code</th>
<th>Course Name</th>
<th>Hours</th>
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<tbody>
<tr>
<td>BUS AD 3090</td>
<td>Internship in Business Administration</td>
<td>3</td>
</tr>
<tr>
<td>INFSYS 3830</td>
<td>Data Programming</td>
<td>3</td>
</tr>
<tr>
<td>INFSYS 3862</td>
<td>Artificial Intelligence Applications for Business</td>
<td>3</td>
</tr>
<tr>
<td>INFSYS 3864</td>
<td>Applied Cryptography for Business</td>
<td>3</td>
</tr>
<tr>
<td>INFSYS 3898</td>
<td>Seminar in Information Systems</td>
<td>3</td>
</tr>
<tr>
<td>CMP SCI 4782</td>
<td>Information Security</td>
<td>3</td>
</tr>
<tr>
<td>CMP SCI 4750</td>
<td>Introduction to Cloud Computing</td>
<td>3</td>
</tr>
<tr>
<td>SCMA 3345</td>
<td>Predictive Analytics and Data Mining</td>
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<td>SCMA 4350</td>
<td>Prescriptive Analytics and Optimization</td>
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<tr>
<td>SCMA 3376/MKTG 3776</td>
<td>Transportation Security and Risk</td>
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</table>

Other electives upon approval of Information Systems department chair

Total Hours: 27

1 If course is offered and topic is approved by the Information Systems department chair

**Learning Outcomes**

Upon completion of the program, graduates will be able to:

- Analyze a complex cybersecurity problem and apply principles of cybersecurity and business decision making to identify potential solutions.
- Design, implement, and evaluate a cybersecurity-based solution to meet a given set of cybersecurity and business requirements.
- Communicate cybersecurity issues effectively in a variety of professional contexts.
- Recognize professional responsibilities and make informed judgments in cybersecurity practice based on legal and ethical principles.
- Function effectively as a member of a team engaged in activities appropriate to the cybersecurity discipline.
- Apply security principles and practices to maintain business operations in the presence of risks and threats.

**Sample Four Year Plan**

<table>
<thead>
<tr>
<th>Year</th>
<th>Fall</th>
<th>Hours</th>
<th>Spring</th>
<th>Hours</th>
<th>Summer</th>
<th>Hours</th>
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<tbody>
<tr>
<td>First Year</td>
<td>INTDSC 1003</td>
<td>3</td>
<td>MATH 1100</td>
<td>3</td>
<td>MATH 1105</td>
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<td></td>
<td>MATH 1030</td>
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<td>ECON 1001</td>
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<td></td>
<td>ENGL 1100</td>
<td>3</td>
<td>PHIL 1160</td>
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<td></td>
<td>CRIM 1100</td>
<td>3</td>
<td>EXPLORE - Humanities and Fine Arts (non-Philosophy course)</td>
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<tr>
<td></td>
<td>INFSYS 2800</td>
<td>3</td>
<td>CMP SCI 1250</td>
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<td></td>
<td>16</td>
<td>15</td>
<td>3</td>
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<tr>
<td>Second Year</td>
<td>ACCTNG 2400</td>
<td>3</td>
<td>ACCTNG 2410</td>
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<td>ENGL 3120</td>
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<td></td>
<td>ECON 1002</td>
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<td>BUS AD 2900</td>
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<tr>
<td>Third Year</td>
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<td>FINANCE 3500</td>
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<td>MGMT 3600</td>
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<td>MKTG 3700</td>
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<tr>
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<td>MATH 3000</td>
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<td>INFSYS 3842</td>
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<td>INFSYS 3848</td>
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<td>Fourth Year</td>
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<td>MGMT 4219</td>
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<td>SCMA 4347</td>
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<td>INFSYS 3858</td>
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<td>INFSYS 3878</td>
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<td>Cybersecurity elective</td>
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<td></td>
<td>15</td>
<td>15</td>
<td>3</td>
<td></td>
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</tr>
</tbody>
</table>

Total Hours: 127

1 INTDSC 1003 is required only for first-time freshmen and transfer students with less than 24 college credits.

Please Note: This is an example of what a four year plan could look like for a typical student. Placement exam scores in math as well as the completion of coursework may change the plan. It should not be used in the place of regular academic advising appointments. All students are encouraged to meet with their advisor each semester. All requirements are subject to change.