College of Arts and Letters
Interdisciplinary Studies

Program Guide

Cybersecurity Major

Version 4 May 2016

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www.odu.edu/ccser
OLD DOMINION UNIVERSITY
Bachelor of Science Degree – Interdisciplinary Studies (IDS) Major

Cybersecurity

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Program Description

This IDS Bachelor of Science degree with a concentration in Cybersecurity is offered through the College of Arts & Letters at Old Dominion University. The program offers a four-year, 120-hour curriculum focused on the subject of cybersecurity and provides opportunities for students to integrate education and training with the application of problem-solving skills in the lab environment. Courses are drawn from the disciplines of philosophy, computer science, computer engineering, information technology, and criminal justice to examine the multi-faceted nature of cybersecurity. ODU students admitted to the program have a variety of credit options including portfolio review, CLEP, DANTES, and departmental exams. For more information about the cybersecurity interdisciplinary program, contact the Program Director: Professor Tamer Nadeem, Computer Science (tnadeem@odu.edu).

Course requirements are as follows:

**Lower Division General Education**

<table>
<thead>
<tr>
<th>Category</th>
<th>Requirement</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>W - Written Communication</td>
<td></td>
<td>6</td>
</tr>
<tr>
<td>R - Oral Communication</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>M – Mathematics (MATH 211 and 212 required and satisfies this M requirement.)</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>F - Language and Culture (If not met thru high school course work, this requirement will entail an additional 6 hours.)</td>
<td>0-6</td>
<td></td>
</tr>
<tr>
<td>G - Information Literacy and Research</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>A - Human Creativity</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>H - Interpreting the Past</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>L - Literature</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>P - Philosophy and Ethics (PHIL 230E or 250E)</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>N - Nature of Science</td>
<td></td>
<td>8</td>
</tr>
<tr>
<td>T - Impact of Technology</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>S - Human Behavior (CRJS 215S or SOC 201S)</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td><strong>Total Hours</strong></td>
<td></td>
<td>38-44</td>
</tr>
</tbody>
</table>
1 – Grade of C or better required in both courses and in ENGL 110C and before declaring major.

### Interdisciplinary Studies Core (9 hours)

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>IDS 300W</td>
<td>Interdisciplinary Theory and Concepts*</td>
</tr>
</tbody>
</table>

*Choose 2 of the following:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>IDS 307T</td>
<td>Digital Writing</td>
</tr>
<tr>
<td>IDS 368</td>
<td>Internship</td>
</tr>
<tr>
<td>IDS 493</td>
<td>Electronic Portfolio Project</td>
</tr>
</tbody>
</table>

**Total Hours** 9

4 – Grade of C or better required.

### Law and Ethics (Choose 1)

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHIL 355E</td>
<td>Computer Ethics</td>
</tr>
<tr>
<td>CRJS 405</td>
<td>Cyber Crime and Cybersecurity</td>
</tr>
</tbody>
</table>

**Total Hours** 3

### Cybersecurity Foundations (Choose 4)

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>CS 462</td>
<td>Cybersecurity Fundamentals*</td>
</tr>
<tr>
<td>ECE/ENMA/MSIM 470</td>
<td>Foundations of Cyber Security*</td>
</tr>
<tr>
<td>CS 464</td>
<td>Networked Systems Security**</td>
</tr>
<tr>
<td>ECE/ENMA/MSIM 411</td>
<td>Networked System Security**</td>
</tr>
<tr>
<td>CS 465</td>
<td>Information Assurance</td>
</tr>
<tr>
<td>CS 463</td>
<td>Cryptography for Cybersecurity</td>
</tr>
<tr>
<td>IT 417</td>
<td>Management of Information Security</td>
</tr>
<tr>
<td>ECE/ENMA/MSIM 416</td>
<td>Cyber-Defense Fundamentals</td>
</tr>
<tr>
<td>ECE/ENMA/MSIM 419</td>
<td>Cyber Physical Systems Security</td>
</tr>
</tbody>
</table>

**Total Hours** 12

*Choose either CS 462 or ECE/ENMA/MSIM 470

**Choose either CS 464 or ECE/ENMA/MSIM 411

### Cybersecurity Applications+ (Choose 4)

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>CS 495</td>
<td>Wireless Networking and Mobile Computing</td>
</tr>
<tr>
<td>CS 471</td>
<td>Operating System Concepts</td>
</tr>
<tr>
<td>IT 410</td>
<td>Business Intelligence</td>
</tr>
<tr>
<td>IT 415</td>
<td>Business Telecommunications and Networks</td>
</tr>
<tr>
<td>IT 461</td>
<td>Implementing Internet Applications</td>
</tr>
<tr>
<td>ECE 455</td>
<td>Network Engineering and Design</td>
</tr>
<tr>
<td>ECE/ENMA/MSIM 417</td>
<td>Secure and Trusted OS</td>
</tr>
<tr>
<td>ECE 452</td>
<td>Intro to Wireless Communications Networks</td>
</tr>
</tbody>
</table>

**Total Hours** 12

* Other courses may be substituted with the approval of the program coordinator
## 2015-2016 Old Dominion University Catalog

**Bachelor of Science-Interdisciplinary Studies: Cyber Security**

*This is an Interdisciplinary Studies Bachelor of Science degree with a Major in Cybersecurity, not an Engineering degree.*

**NOTE:** This is a *sample* four year curriculum with a suggested ordering of courses. Students have the flexibility of re-ordering as needed.

### YEAR 1 - FRESHMAN (30-31 CREDITS)

**FALL SEMESTER (16 credits)**
- **Lower Division General Education Coursework:**
  - Written Communication I (ENGL 110C) 3 credits
  - Oral Communication (COMM 101R) 3 credits
  - Info. Literacy and Research 3 credits
  - Human Behavior (CRJS 215S or SOC 201S) 3 credits
- **Major Coursework:**
  - MATH 211: Calculus I (Satisfies Mathematics) 4 credits

**SPRING SEMESTER (14-15 credits)**
- **Lower Division General Education Coursework:**
  - Written Communication II (ENGL 231C) 3 credits
  - Nature of Science I (must be in sequence) 4 credits
- **Major Coursework:**
  - MATH 212: Calculus II 4 credits

**SUMMER SEMESTER**
- **Choose One:**
  - IT 210: Business Applications w/C++ OR CS 150: Problem Solving & Programming 3 or 4 credits

### YEAR 2 - SOPHOMORE (30-31 CREDITS)

**FALL SEMESTER (15-16 credits)**
- **Lower Division General Education Coursework:**
  - Literature 3 credits
  - Nature of Science II (must be in sequence) 4 credits
- **Major Coursework:**
  - CS 361: Advanced Data Structures & Algorithms 3 credits
- **CS 252 Intro Unix for Programmers** 1 credit
- **Choose One:**
  - CS 250: Problem Solving & Programming
  - IT 310: GUI Programming C++

**SPRING SEMESTER (15 credits)**
- **Lower Division General Education Coursework:**
  - Interpreting the Past 3 credits
- **Major Coursework:**
  - CS 381: Discrete Math 3 credits
  - Choose One:
    - CS 270: Comp Architecture
    - 341: Digital System Design
    - IT 317: Princ of Technology Architecture

**SUMMER SEMESTER**
- **Choose One:**
  - STAT 330: Intro. to Prob/Stat
  - ECE 304: Prob/Stat/Reliability
  - BNAL 206: Probability, Decision Analysis, & Business

### YEAR 3 - JUNIOR (30 CREDITS)

**FALL SEMESTER (15 credits)**
- **Lower Division General Education Coursework:**
  - ENGL/IDS 307T: Digital Writing (must be in sequence) 3 credits
  - IDS 300W: Interdisciplinary Theory & Concepts (IDS Core Course required) 3 credits
- **Major Coursework:**
  - Choose One (Low and Ethics):
    - CRJS 405: Cyber Crime and Cybersecurity*
    - PHIL 355E: Computer Ethics
  - IT 361: Systems Analysis 3 credits
- **Choose One:**
  - ECE 355: Intro Networks & Data Comms
  - CS 455: Intro Networks & Comms

**SPRING SEMESTER (15 credits)**
- **Lower Division General Education Coursework:**
  - Philosophy and Ethics (PHIL 230E, 250E, 355E or ENMA 480) 3 credits
  - Human Creativity 3 credits
- **Major Coursework:**
  - Choose One:
    - IT 450 Database Concepts
    - ECE 346 Microcontrollers
- **Choose One:**
  - Cyber Core** 3 credits

**SUMMER SEMESTER**
- **Choose One:**
  - Approved 300-/400-level course 3 credits

### YEAR 4 - SENIOR (30 CREDITS)

**FALL SEMESTER (15 credits)**
- **Major Coursework:**
  - Cyber Core** 3 credits
  - Cyber Core** 3 credits
  - Cyber Core** 3 credits
  - Cyber Applications** 3 credits
  - IDS Core Course (either 368 or 493) 3 credits
- **Upper Division Gen. Ed. Coursework***:
  - Approved 300-/400-level course 3 credits

**SPRING SEMESTER (15 credits)**
- **Major Coursework:**
  - Cyber Applications** 3 credits
  - Cyber Applications** 3 credits
  - Cyber Applications** 3 credits
  - IDS Core Course (either 368 or 493) 3 credits
- **Upper Division Gen. Ed. Coursework***:
  - Approved 300-/400-level course 3 credits

**Total Credit hours: 120-122**

*Please Note:* This curriculum sheet does not include the University's General Education Language and Culture requirement which will entail an additional six credit hours if it has not been met through high school coursework.

* If CRJS 405 is taken, the Lower Division General Education requirement for the E course must still be completed (PHIL 230E, 250E or 355E).

** From approved list -- please see list in catalog and consult with advisor.

***Upper Division General Education requirement can be met thru Option A- Minor in Computer Science IF the student chooses the following CS courses:
Pre-Requisites for Cybersecurity Foundations and Applications Courses

Strome College of Business – Information Technology
IT 201 → BNAL 306 → IT 317 → IT 410
IT 201 → IT 317 → BNAL 306 → IT 410
IT 201 → IT 210 → IT 361 → IT 415
IT 201 → IT 317 → IT 417
IT 201 → IT 317 → IT 450
IT 210 → IT 310 → IT 461

College of Sciences – Computer Science
Math 162 → CS 462
Math 162 → CS 463
Math 162 → CS 464
Math 162 → CS 465

Batten College of Engineering – Cross-listed courses
CS 150+Junior Standing or Permission of the Instructor → ECE/ENMA/MSIM 411
ECE 355 or MSIM 470 → ECE/ENMA/MSIM 416
MSIM 470 → ECE/ENMA/MSIM 417
CS 150 → ECE/ENMA/MSIM 419
MSIM 410 (MSIM 205, 320, 382, 201, MATH 307, PHYS 227) or permission of instructor →
MSIM 470

Old vs Revised Pre-Requisites for IT courses:
IT361:
Old Prerequisites: ACCT 201, IT 201 and IT 210, each with C or better
New: IT 201 and IT 210, each with a C or better
IT415:
Old Prerequisites: IT 317 with C or better; IT 310 and IT 361.
New: IT 361 with a C or better.
IT417:
Old Prerequisites: IT 415.
New: IT 317 with a C or better.
IT450:
Old Prerequisites: IT 317 with a C or better; IT 310 and 361
New: IT 317 with a C or better
IT410:
Old Prerequisites: BNAL306 and IT450
New: BNAL206.

The IT/CS equivalencies include: IT201~CS170, IT317~CS270, IT210~CS150, IT310~CS250. Also, BNAL206 is equivalent to ECE304.