Bachelor of Science

Cybersecurity with a Major in Cyber Operations (BS)

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Cybersecurity with a major in Cyber Operations is an interdisciplinary major encompassing the entire scope of cyberspace and related operations that are both technical and non-technical (i.e., ethical, legal, human-centered, etc.) in nature. Cyber Operations is a complementary discipline to Cybersecurity. Cyber Operations places a particular emphasis on technologies and techniques applicable to all operational and system levels. Coursework in Cyber Operations balances theory, practice and hands-on labs inspired by real-life scenarios. Skills and competencies emphasized are in system attack, infiltration, exploitation, defense, mitigation, and recovery.

Graduates of the Bachelor of Science degree in Cybersecurity with the Cyber Operations major will have the skills and proficiencies that are critical to intelligence, military and law enforcement organizations authorized to perform these specialized operations. Therefore, they will play a role in the enhancement of the national security posture of the nation.

Requirements

Lower-Division General Education

Written Communication (http://catalog.odu.edu/undergraduate/requirements-undergraduate-degrees/#written)	6
Oral Communication (http://catalog.odu.edu/undergraduate/requirements-undergraduate-degrees/#oral)	3
Mathematics (http://catalog.odu.edu/undergraduate/requirements-undergraduate-degrees/#math)	3
Language and Culture (http://catalog.odu.edu/undergraduate/requirements-undergraduate-degrees/#language)	0-6
Information Literacy and Research (http://catalog.odu.edu/undergraduate/requirements-undergraduate-degrees/#information)	3
Human Behavior (http://catalog.odu.edu/undergraduate/requirements-undergraduate-degrees/#behavior)	3
Human Creativity (http://catalog.odu.edu/undergraduate/requirements-undergraduate-degrees/#creativity)	3
Interpreting the Past (http://catalog.odu.edu/undergraduate/requirements-undergraduate-degrees/#interpret)	3
Literature (http://catalog.odu.edu/undergraduate/requirements-undergraduate-degrees/#literature)	3
Philosophy and Ethics (http://catalog.odu.edu/undergraduate/requirements-undergraduate-degrees/#philosophy)	3
The Nature of Science (http://catalog.odu.edu/undergraduate/requirements-undergraduate-degrees/#nature)	8
Impact of Technology (http://catalog.odu.edu/undergraduate/requirements-undergraduate-degrees/#impact)	3

Written Communication: Grade of C or better required in both written communication courses and in ENGL 110C before declaring major.

Mathematics: MATH 211 and MATH 212 required

Philosophy and Ethics: met in the major by PHIL 355E

Impact of Technology: met in the major by CYSE 200T

Human Behavior: CRJS 215S or DASC 205S/SOC 205S required

Upper-Division General Education

Met through 300/400-level prerequisite courses required for the major.

Requirements for Graduation

Requirements for graduation include the following:

- Minimum of 120 credit hours.
- Minimum of 30 credit hours overall and 12 credit hours of upper-level courses in the major program from Old Dominion University.
- Minimum overall cumulative grade point average of C (2.00) in all courses taken.
- Minimum overall cumulative grade point average of C (2.00) in all courses taken toward the major.
- Minimum overall cumulative grade point average of C (2.00) in all courses taken toward a minor.
- Completion of ENGL 110C, ENGL 211C or ENGL 231C, and the writing intensive (W) course in the major with a grade of C or better. The W course must be taken at Old Dominion University.
- Completion of Senior Assessment.

Cyber Operations Major

General Education		
Complete lower-division requirements		40-46
Complete upper-division requirements (met through prerequisite courses required for the major)		
Prerequisites		
CS 150	Introduction to Programming with C++	4
or CS 151	Introduction to Programming with Java	
or CS 153	Introduction to Programming with Python	
CS 170	Introduction to Computer Architecture I	3
CS 250	Programming with C++ *	4
or CS 251	Programming with Java	
CS 252	Introduction to Unix for Programmers	1
CS 260	C++ for Programmers *	1
or CS 261	Java for Programmers	
CS 270	Introduction to Computer Architecture II	3
CS 381	Introduction to Discrete Structures	3
ECE 241	Fundamentals of Computer Engineering	4
ECE 304	Probability, Statistics, and Reliability	3
Core Courses		
CYSE 200T	Cybersecurity, Technology, and Society	3
CYSE 301	Cybersecurity Techniques and Operations	3
CYSE 425W	Cybersecurity Strategy and Policy	3
CYSE/CRJS 406	Cyber Law	3
Major Coursework		
CS 361	Data Structures and Algorithms	3
CS 390	Introduction to Theoretical Computer Science	3
CS 466	Principles and Practice of Cyber Defense	3
CS 467	Introduction to Reverse Software Engineering	3
CS 471	Operating Systems	3
CYSE 368	Cybersecurity Internship	3
or IDS 493	IDS Electronic Portfolio Project	
ECE 346	Microcontrollers	3
ECE 355	Introduction to Networks and Data Communications	3
ECE 416	Cyber Defense Fundamentals	3
ECE 419	Cyber Physical System Security	3
ECE 455	Network Engineering and Design	3
MSIM 470	Foundations of Cyber Security	3
PHIL 355E	Cybersecurity Ethics	3
Approved Program Elective		
Select one of the following:		3

CS 476	Systems Programming	
CYSE 407	Digital Forensics	
ECE 483	Embedded Systems	
IT 417	Management of Information Security	
Total Credit Hours		**120-126**

* Students who take CS 250 Programming with C++ need to select CS 261 Java for Programmers as the required lab course. Students who take CS 251 Programming with Java need to select CS 260 C++ for Programmers as the required lab course.

No more than two classes, or six credits, may be counted for both the major and a minor. Some minors may allow fewer credits to share.

Elective credit may be needed to meet the 120 hour requirement for graduation.

Degree Program Guide

The Degree Program Guide is a suggested curriculum to complete this degree program in four years. It is just one of several plans that will work and is presented only as broad guidance to students. Each student is strongly encouraged to develop a customized plan in consultation with their academic advisor. Additional information can also be found in Degree Works.

Course	Title	Credit Hours
Freshman		
Fall		
ENGL 110C	English Composition (Grade of C or better required)	3
MATH 211	Calculus I	4
Oral Communication		3
Information Literacy and Research		3
Human Behavior (CRJS 215S or DASC 205S/SOC 205S required)		3
	Credit Hours	**16**
Spring		
ENGL 211C or ENGL 231C	Writing, Rhetoric, and Research (Grade of C or better required) or Writing, Rhetoric, and Research: Special Topics	3
CS 150 or CS 151 or CS 153	Introduction to Programming with C++ or Introduction to Programming with Java or Introduction to Programming with Python	4
CYSE 200T	Cybersecurity, Technology, and Society (meets Impact of Technology)	3
MATH 212	Calculus II	4
	Credit Hours	**14**
Sophomore		
Fall		
Nature of Science I		4
CS 170	Introduction to Computer Architecture I	3
CS 250 or CS 251	Programming with C++ * or Programming with Java	4
CS 252	Introduction to Unix for Programmers	1
ECE 241	Fundamentals of Computer Engineering	4
	Credit Hours	**16**
Spring		
Nature of Science II		4
CS 260 or CS 261	C++ for Programmers * or Java for Programmers	1
CS 270	Introduction to Computer Architecture II	3
CS 361	Data Structures and Algorithms	3
CYSE 406/CRJS 406		3
ECE 304	Probability, Statistics, and Reliability	3
	Credit Hours	**17**
Junior		
Fall		
PHIL 355E	Cybersecurity Ethics (meets Philosophy and Ethics)	3
CS 466	Principles and Practice of Cyber Defense	3
CS 381	Introduction to Discrete Structures	3
ECE 355	Introduction to Networks and Data Communications	3
Interpreting the Past		3
	Credit Hours	**15**
Spring		
CYSE 425W	Cybersecurity Strategy and Policy (C or better required)	3
CYSE 301	Cybersecurity Techniques and Operations	3
CS 390	Introduction to Theoretical Computer Science	3
CS 467	Introduction to Reverse Software Engineering	3
ECE 346	Microcontrollers	3
	Credit Hours	**15**
Senior		
Fall		
Literature		3
CS 471	Operating Systems	3
ECE 416	Cyber Defense Fundamentals	3
MSIM 470	Foundations of Cyber Security	3
Approved Program Elective		3
	Credit Hours	**15**
Spring		
Human Creativity		3
CYSE 368 or IDS 493	Cybersecurity Internship or IDS Electronic Portfolio Project	3
ECE 419	Cyber Physical System Security	3
ECE 455	Network Engineering and Design	3
	Credit Hours	**12**
	Total Credit Hours	**120**

* Students who take CS 250 Programming with C++ need to select CS 261 Java for Programmers as the required lab course. Students who take CS 251 Programming with Java need to select CS 260 C++ for Programmers as the required lab course.

Language and Culture I & II may be met in high school and are not included in this four-year plan. Please see requirement details.