Bachelor of Science Degree in Interdisciplinary Studies - Cyber Operations Major

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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 Interdisciplinary Studies 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.

Lower Division General Education

Written Communication * 6
Oral Communication 3
Mathematics (MATH 211 and MATH 212 required) 8
Language and Culture 0-6
Information Literacy and Research 3
Human Creativity 3
Interpreting the Past 3
Literature 3
Philosophy and Ethics 3
The Nature of Science 8
Impact of Technology (can be met by ENGL 307T or IDS 307T) 0-3
Human Behavior (CRJS 215S or SOC 201S required) 3

Prerequisites 18

CS 170 Introduction to Computer Architecture I
CS 250 Problem Solving and Programming II
CS 252 Introduction to Unix for Programmers
CS 381 Introduction to Discrete Structures
ECE 241 Fundamentals of Computer Engineering
ECE 304 Probability, Statistics, and Reliability

Technical Base 25

CS 150 Problem Solving and Programming I
CS 270 Introduction to Computer Architecture II
CS 361 Advanced Data Structures and Algorithms
CS 390 Introduction to Theoretical Computer Science
ECE 346 Microcontrollers
ECE 355 Introduction to Networks and Data Communications
ECE 483 Embedded Systems
PSYC 344 Human Factors

Interdisciplinary Studies Core 9

Bachelor of Science Degree in Interdisciplinary Studies - Cyber Explorers and University Orientation 1 Credit

This course provides an introduction to cyber hygiene and orientation to university life.

CYBERSECURITY Courses

CYSE 100. Cyber Explorers and University Orientation. 1 Credit.
This course provides an introduction to cyber hygiene and orientation to university life.

CYSE 300. Introduction to Cybersecurity. 3 Credits.
This course provides an overview of the field of cybersecurity. It covers core cybersecurity topics including computer system architectures, critical infrastructures, cyber threats and vulnerabilities, cryptography, information assurance, network security, and risk assessment and management. Students are expected to become familiar with fundamental security concepts, technologies and practices, and develop a foundation for further study in cybersecurity. Prerequisite: MATH 162M or permission of the instructor.

CYSE 301. Cybersecurity Techniques and Operations. 3 Credits.
This course introduces tools and techniques used to secure and analyze large computer networks and systems. Students will explore and map networks using a variety of diagnostic software tools, learn advanced packet analysis, configure firewalls, write intrusion detection rules, perform forensic investigation, and practice techniques for penetration testing. Prerequisite: MATH 162M or permission of the instructor.

CYSE 368. Cybersecurity Internship. 1-6 Credits.
This course allows students to volunteer to work in an agency related to cybersecurity. Students must volunteer for 50 hours per course credit and complete course assignments. Prerequisite: approval by the Director of the Center for Cybersecurity Education and Research.

Requirements for Graduation

Requirements for graduation include a minimum cumulative grade point average of 2.00 overall and in the major, 120 credit hours, which must include both a minimum of 30 credit hours overall and 12 credit hours of upper-level courses in the major program from Old Dominion University, completion of ENGL 110C, ENGL 211C or ENGL 221C or ENGL 231C, and the writing intensive (W) course in the major with a grade of C or better, and completion of Senior Assessment.

Total Hours 122-131

* Grade of C or better required in both written communication courses and in ENGL 110C before declaring major. ENGL 231C is recommended as the second written communication course.
** Junior standing and completion of IDS 300W are required for enrollment in CYSE 368 and IDS 493.
+ Other courses may be substituted with the approval of the program coordinator.
CYSE 406. Cyber Law. 3 Credits.
This course tackles two major cyber law subjects. The first part of the course examines various U.S. laws and legal considerations that impact the digital and cyberspace worlds from traditional civil, and to a lesser extent, traditional criminal perspectives. The second part will familiarize cyber operations professionals about the extent of and limitations on their authorities to ensure operations in cyberspace are in compliance with U.S. law, regulations, directives and policies. The course will also introduce students to miscellaneous cybersecurity topics such as the Federal Acquisition Requirements. Prerequisite: junior standing.

CYSE 407. Digital Forensics. 3 Credits.
This course introduces the basic concepts and technologies of digital forensics. Students will learn the fundamental techniques and tools utilized for collecting, processing, and preserving digital evidence on computers, mobile devices, networks, and cloud computing environments. Students will also engage in oral and written communication to report digital forensic findings and prepare court presentation materials. Prerequisites: declared major and junior standing.

CYSE 495/595. Topics in Cybersecurity. 1-3 Credits.
The advanced study of selected cybersecurity topics designed to permit small groups of qualified students to work on subjects of mutual interest. These courses will appear in the course schedule, and will be more fully described in information distributed to academic advisors. Prerequisite: permission of the instructor.

CYSE 496/596. Topics in Cybersecurity. 1-3 Credits.
The advanced study of selected cybersecurity topics designed to permit small groups of qualified students to work on subjects of mutual interest. These courses will appear in the course schedule, and will be more fully described in information distributed to academic advisors. Prerequisite: permission of the instructor.

CYSE 497/597. Tutorial Work in Special Topics in Cybersecurity. 1-3 Credits.
Independent reading and study on a topic to be selected under the direction of an instructor. Conferences and papers as appropriate. Prerequisites: senior standing and approval of the Director of the Center for Cybersecurity Education and Research.

CYSE 498/598. Tutorial Work in Special Topics in Cybersecurity. 1-3 Credits.
Independent reading and study on a topic to be selected under the direction of an instructor. Conferences and papers as appropriate. Prerequisites: senior standing and approval of the Director of the Center for Cybersecurity Education and Research.

INTERDISCIPLINARY STUDIES Courses

IDS 300W. Interdisciplinary Theory and Concepts. 3 Credits.
An examination of the history, concepts and application of interdisciplinary study. This course includes an analysis of similarities and differences in academic disciplines and the application of interdisciplinary approaches to a specific topic of study. (This is a writing intensive course.) Prerequisite: a grade of C or better in ENGL 211C, ENGL 221C or ENGL 231C.

IDS 307T. Digital Writing. 3 Credits.
This course introduces students to issues of writing in various digital environments like web pages, email, blogs, wikis, and discussion boards. It also introduces fundamentals of hypertext authoring, digital and visual rhetoric, and image manipulation. Prerequisites: ENGL 110C and ENGL 211C or ENGL 221C or ENGL 231C.

IDS 368. Internship in Interdisciplinary Studies. 1-6 Credits.
An opportunity to integrate service and applied learning experience with interdisciplinary perspectives. Prerequisite: junior standing and permission of individualized interdisciplinary studies program coordinator.