Bachelor of Science Degree in Interdisciplinary Studies - Cybersecurity Major

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This IDS Bachelor of Science degree with a major 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. 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: Tamer Nadeem, Department of Computer Science (tnadeem@odu.edu).

Topics courses, such as ENGL 395/ENGL 495, COMM 395/COMM 396, etc., must be approved by the student’s advisor to ensure that the topic is appropriate for the major. No more than two classes, or six credits, may be counted for both the major and a minor.

Lower Division General Education

Written Communication * 6
Oral Communication 3
Mathematics (MATH 162M required)** 3
Language and Culture 0-6
Information Literacy and Research 3
Human Creativity 3
Interpreting the Past 3
Literature 3
Philosophy and Ethics (can be met by PHIL 355E) 0-3
The Nature of Science 8
Impact of Technology (can be met by ENGL 307T or IDS 307T) 0-3
Human Behavior 3

Prerequisite Courses 15-36

Students must complete 15-36 hours of prerequisite courses depending on which Cyber Foundations and Cyber Applications courses they select.

Interdisciplinary Studies Core 9

IDS 300W Interdisciplinary Theory and Concepts (grade of C or higher required) ***
CYSE 368 Cybersecurity Internship ***
Select one of the following:
ENGL/IDS 307T Digital Writing
IDS 493 IDS Electronic Portfolio Project ***

Law and Ethics 3

Select one of the following:
CRJS 405 Cybercrime and Cybersecurity
CRJS/CYSE/CPS Cyber Law

Cybersecurity Foundations * 12

Select four from the following:
CS 462 Cybersecurity Fundamentals
or ECE/ENMA/MSIM 470 Foundations of Cyber Security
CS 463 Cryptography for Cybersecurity
CS 464 Networked Systems Security
or ECE/ENMA/MSIM 411 Networked System Security
CS 465 Information Assurance
CYSE 300 Introduction to Cybersecurity
CYSE 301 Cybersecurity Techniques and Operations
IT 315 Introduction to Networking and Security
IT 417 Management of Information Security
ECE 416 Cyber Defense Fundamentals
or ENMA/MSIM 416 Cyber Defense Fundamentals
ECE 419 Cyber Physical System Security
or ENMA/MSIM 419 Cyber Physical Systems Security

Cybersecurity Applications * 12

Select four from the following:
CS 471 Operating Systems
CS 495 Topics in Computer Science (Wireless Networking and Mobile Computing)
CYSE 407/CRJS 395 Digital Forensics
ECE 417 Secure and Trusted Operating Systems
or ENMA/MSIM 417 Secure and Trusted Operating Systems
ECE 452 Introduction to Wireless Communication Networks
ECE 455 Network Engineering and Design
IT 410 Business Intelligence
IT 416 Network Server Configuration and Administration
IT 418 Information Assurance
IT 419 Enterprise Cyber Defense
IT 461 Implementing Internet Applications

Total Hours 86-119

* 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.

** MATH 211 and MATH 212 are required as prerequisites for selected upper-division ECE, ENMA and MSIM courses.

*** Junior standing and completion of IDS 300W are required for enrollment in CYSE 368, IDS 493 or IDS 497.

Electives

Elective courses may be taken for the remainder of the minimum 120 credits required for the degree.

Upper Division General Education

Met in the major.
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.

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.

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 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.

IDS 397. Independent Study. 1-6 Credits.
IDS 398. Independent Study. 1-6 Credits.
IDS 400/500. Study Abroad. 0 Credits.

IDS 466W. Introduction to Mitigation and Adaptation Studies. 3 Credits.
Students will be introduced to the science underpinning mitigation of human-induced changes in the Earth system, including but not limited to climate change and sea level rise, and adaptation to the impacts of these changes. The course will cover the environmental hazards and the opportunities and limitations for conservation, mitigation and adaptation. Cross listed with BIOL 466W and OEAS 466W. Prerequisite: BIOL 291 or permission of instructor.

IDS 467. Sustainability Leadership. 3 Credits.
In this class, students will discover what makes a leader for sustainability. They will consider a range of global and local crises from a leadership point of view in the context of sustainability science, which addresses the development of communities in a rapidly changing social, economic, and environmental system-of-systems environment. The course will be based on taking a problem-motivated and solution-focused approach to the challenges considered. The course includes a service learning project focusing on a leadership experience in solving a real-world environmental problem. Prerequisite: BIOL 466W or OEAS 466W or IDS 466W.

IDS 493. IDS Electronic Portfolio Project. 3 Credits.
The preparation of an electronic portfolio integrating the student's academic study, work experiences, skill identification and work products. Alternative formats are used for varying uses of the portfolio. Prerequisites: IDS 300W and senior standing.

IDS 495. Topics in Integrative Studies. 3 Credits.
Focused study of selected topics linking perspectives, research and applications from a variety of disciplines. Emphasis is on disciplinary synthesis. Prerequisite: IDS 300W.
IDS 497. IDS Individualized Senior Project. 3 Credits.
This course is a vehicle for the execution of the senior project requirement of the Interdisciplinary Studies Program. The project will be negotiated between the student, faculty sponsors, and the program. Open only to individualized integrative studies majors. Prerequisites: IDS 300W, permission of the instructor and an approved individualized integrative studies curriculum plan.