

CYBERSECURITY (CYB)

CYB 110 Cybersecurity and Privacy

3 credits

An introductory survey of the issues and complexity of cybersecurity and privacy in the digital age. Cybersecurity and privacy foundational concepts, case studies of cybersecurity breaches, application of cybersecurity for business, and social media and the general populace. Survey of common threats, threat actors, and responses. Survey of applicable laws.

CYB 210 Cybersecurity Architectures and Management

3 credits

Introduces the components in an information technology system and their roles in system operation. Teaches students how to use these components to develop plans and processes for a holistic approach to cybersecurity for an organization.

Prereq: CYB 110

CYB 220 Secure Coding and Analysis

3 credits

Describes the characteristics of secure programs and the ability to implement programs that are free from vulnerabilities. Practice evaluating software, including adding security mechanisms into software and testing software for vulnerabilities. Two lectures and one 2-hour lab per week.

Prereq: CS 121

CYB 310 Cybersecurity Technical Foundations

3 credits

Provides students with basic information about the various threats that may be present in the cyber realm and introduces architectural mitigation strategies including cryptography.

Prereq: CYB 110, CS 240

CYB 330 Networking and Control Systems

3 credits

Covers common network protocols, how network components interact, and how networks evolve over time. Students expand their familiarity with network vulnerabilities.

Prereq: CYB 210, CS 240

CYB 331 Control System Fundamentals

2 credits

Introduces the basics of industrial control systems, where they are likely to be found, and vulnerabilities they are likely to have.

CYB 340 Network Defense

3 credits

Covers concepts used in defending a network and the basic tools and techniques that can be taken to protect a network and communication assets from cyber threats. Provides students with knowledge and skills related to detecting and analyzing vulnerabilities and threats and taking steps to mitigate associated risks.

Prereq: CYB 310, CYB 330

CYB 350 Operating System Defense

3 credits

This course provides fundamentals of secure operating system administration and hardening. Provides students with an understanding of the authorities, roles, and steps associated with cyber operations.

Prereq: CYB 310

CYB 380 Cybersecurity Lab I

3 credits

This hands-on laboratory class allows students to get practical experience related to the cybersecurity threats, mitigations, and scenarios they have been introduced to in other courses. This includes classic buffer overflow and SQL injection style vulnerabilities, network monitoring, as well as Windows and Linux security configurations. 6 hours of lab per week.

Prereq: CS 240

Coreq: CYB 310, CYB 330

CYB 381 Cybersecurity Lab II

3 credits

This hands-on laboratory class allows students to get practical experience related to cybersecurity threats, mitigations, and scenarios they have been introduced to in other courses. This course builds on CYB 380 by focusing on more advanced threats and mitigations. 6 hours of lab per week.

Prereq: CYB 310, CYB 380

Coreq: CYB 340, CYB 350

CYB 401 Cybersecurity as a Profession

1 credit

Ethical, legal, social, and intellectual property issues; current research topics; and other issues of importance to the professional cybersecurity researcher. Graded P/F.

Prereq: Senior Standing in Computer Science

CYB 420 Computer and Network Forensics

3 credits

Provide students with the skills to apply forensics techniques throughout an investigation life cycle with a focus on complying with legal requirements. Provide students with the ability to apply forensics techniques to investigate and analyze network traffic.

Prereq: CYB 310

CYB 440 Software Vulnerability Analysis

3 credits

Provide students with a thorough understanding of system vulnerabilities, to include what they are, how they can be found/identified, the different types of vulnerabilities, how to determine the root cause of a vulnerability, and how to mitigate their effect on an operational system. Provide students with the ability to describe why software assurance is important to the development of secure systems and describe the methods and techniques that lead to secure software.

Prereq: CYB 220, CYB 310

CYB 480 Cybersecurity Senior Capstone Design I

3 credits

Capstone design sequence for cybersecurity science majors. Formal development techniques applied to definition, design, coding, testing, and documentation of a comprehensive cybersecurity. Projects are customer-specified, include real-world design constraints, and usually encompass two semesters. Students work in teams. Significant lab work required.

Prereq: CS 383, CYB 381, ENGL 317, Senior Standing

CYB 481 Cybersecurity Senior Capstone Design II

3 credits

Continuation of CYB 480. Application of formal design techniques to development of a large cybersecurity science project performed by students working in teams. Significant lab work required.

Prereq: CS 383, CYB 381, CYB 480, ENGL 317