

CYBERSECURITY (CYB)

CYB 2840 Introduction to Cybersecurity 3 Credits

The course will provide a comprehensive introduction to the foundational concepts and principles of cybersecurity. Students will gain a broad understanding of the evolving cyber threat landscape, covering key topics such as the CIA triad, authentication, authorization, malicious software, and cyber-attacks. They will explore security challenges and countermeasures across networks, operating systems, cloud environments, and IoT devices. The course will also introduce students to forensic analysis, secure programming, and the role of ethics and artificial intelligence applications in cybersecurity.

Components: Class

Prereqs/Coreqs: P. C- or better in COMPUTER 1430

CYB 3340 Ethical Hacking 3 Credits

This course empowers students to identify, assess, and mitigate security vulnerabilities in computer systems, networks, and applications using ethical hacking techniques. Through hands-on labs, students will plan and execute ethical hacking processes to assess vulnerabilities and threats, analyze malware, and gain practical experience in defensive technologies. They will evaluate security controls and provide recommendations for enhancement, all the while understanding the ethical and legal aspects of hacking.

Components: Class

Prereqs/Coreqs: P. C- or better in CYB 2840 (formerly 3840) and COMPUTER 3830

CYB 3850 Cryptography 3 Credits

An introduction to the fundamentals of applied cryptography. Topics include encryption and decryption, symmetric and asymmetric algorithms, pseudorandom functions, block ciphers, hash functions, digital signatures, key exchange, message authentication, and public-key certification. This course also covers common attacks and suggested countermeasures with appropriate cryptographic protocols and techniques. Hands-on labs will provide students with real-world experiences.

Components: Discussion, Class, Laboratory

Prereqs/Coreqs: P. C- or better in CYB 2840 (formerly 3840) and COMPUTER 3830

CYB 3910 Introduction to Network Security 3 Credits

An introduction to network security principles and applications. Topics include security protocols and services, authentication applications, network management security, web security, wireless network security, mobile security, and system security. This course will examine different network architectures, threats and attack surfaces exploited by these threats.

Components: Laboratory, Class, Discussion

Prereqs/Coreqs: P. C- or better in CYB 2840 (formerly 3840) and COMPUTER 3830

CYB 3930 IT Security Management 3 Credits

An introduction to the formal process used to develop and maintain appropriate security levels for an organization with a focus on risk management. The process of risk management ensures that an organization protects itself from unexpected financial and reputation losses and discerns appropriate controls. Topics include security program, planning, strategies, controls, auditing, risk assessment and analysis models, risk measurement, business continuity and incident management, security awareness, and legal and ethical issues.

Components: Class, Discussion, Laboratory

Prereqs/Coreqs: P. C- or better in CYB 2840 (formerly 3840) and COMPUTER 3830

CYB 3960 Software Security 3 Credits

This course introduces the fundamental security principles in software development lifecycle to minimize the vulnerabilities and threats in software development. Students will be exposed to the security techniques in designing, developing, and testing software. Hands-on labs allow students to experiment with threats/attacks and defenses in software development.

Components: Discussion, Laboratory, Class

Prereqs/Coreqs: P. C- or better in CYB 2840 (formerly 3840) and SOFTWARE 2730 and COMPUTER 3230 and COMPUTER 3830

CYB 4110 Cybersecurity Seminar 1 Credit

The course consists of lectures/discussions presented by both cybersecurity faculty and students enrolled in the class.

Components: Class, Discussion

Prereqs/Coreqs: P. Junior/senior standing

CYB 4330 Cybersecurity Project I 3 Credits

This course builds on the concepts of computer science and cybersecurity with an emphasis on applying skills and knowledge learned in previous courses to a large, team-based, capstone project that spans two semesters. The capstone project integrates problem-solving techniques and the development of viable solutions to meet an identified technology or design need in a business or institutional environment.

Components: Practicum

Prereqs/Coreqs: P. Senior standing and (C- or better in CYB 3930 or department consent)

CYB 4730 Cybersecurity Project II 3 Credits

This course is a continuation of CYB 4330 Capstone Project I, where the project will be continued and carried to completion. The capstone project integrates problem-solving techniques and the development of viable solutions to meet an identified technology or design need in a business or institutional environment. The course will also introduce current research issues in cybersecurity/computer science.

Components: Class, Laboratory, Field Studies

Prereqs/Coreqs: P. C- or better in CYB 4330