CYBERSECURITY (CYBER)

Courses

CYBER 701   SYSTEMS FUNDAMENTALS FOR CYBERSECURITY   3 Units
A survey of fundamental knowledge for cybersecurity professionals about computer systems and the mathematical principles that they are based on. This course includes an overview of logic, Boolean algebra, and proof techniques; a brief introduction to computer organization and assembly programming; and a tutorial on the Linux operating system.
PREREQ: ADMISSION TO CYBERSECURITY GRADUATE PROGRAM, OR ADMISSION TO A COBE GRADUATE PROGRAM OR CERTIFICATE

CYBER 730   FUNDAMENTALS OF ETHICAL HACKING   3 Units
This course provides a baseline for students to obtain knowledge of assessing the security of computer systems by looking for weaknesses and vulnerabilities in target systems and networks, using the same knowledge and tools as a malicious hacker, but in a lawful and legitimate manner to assess the security posture of a target system.
PREREQ: ADMISSION TO CYBERSECURTIY GRADUATE PROGRAM, OR ADMISSION TO COMPUTER SCIENCE GRADUATE PROGRAM, OR ADMISSION TO COBE GRADUATE DEGREE OR CERTIFICATE PROGRAM

CYBER 731   MANAGEMENT OF INFORMATION ASSURANCE AND SECURITY   3 Units
This course offers an applied guide that includes the practical steps institutions can take to achieve digital resilience and protect against cyber-attacks while creating value from technology investments and innovation. Cybersecurity must move up the corporate and political agenda if organizations are to remain safe and realize the full potential value of innovation.
PREREQ: ADMISSION TO CYBERSECURTIY GRADUATE PROGRAM, OR ADMISSION TO COMPUTER SCIENCE GRADUATE PROGRAM, OR ADMISSION TO COBE GRADUATE DEGREE OR CERTIFICATE PROGRAM

CYBER 732   DATA DRIVEN SECURITY   3 Units
This course focuses on the collection and use of data for security intelligence, incident prediction and response, and protection of today's business environment. Topics covered include how to acquire and prepare security data for intelligence and analysis, security data visualization and presentation, and use of statistical and data mining methods to detect and predict security threats.
PREREQ: BASIC STATISTICS; ADMISSION TO CYBERSECURITY GRADUATE PROGRAM, OR ADMISSION TO COMPUTER SCIENCE GRADUATE PROGRAM, OR ADMISSION TO COBE GRADUATE DEGREE OR CERTIFICATE PROGRAM

CYBER 733   INDUSTRIAL AND CRITICAL INFRASTRUCTURE SECURITY   3 Units
This course guides the student through understanding the basics of cybersecurity and industrial protocols necessary for building robust industrial control systems (ICSs). Through real world scenarios, the student will learn the risks and vulnerabilities the ICSs are facing, and be equipped with knowledge and techniques to ward off all kinds cyber threats and attacks.
PREREQ: ADMISSION TO CYBERSECURTIY GRADUATE PROGRAM, OR ADMISSION TO COMPUTER SCIENCE GRADUATE PROGRAM, OR ADMISSION TO COBE GRADUATE DEGREE OR CERTIFICATE PROGRAM

CYBER 734   CYBER INCIDENT RESPONSE, BUSINESS CONTINUITY, AND RISK MANAGEMENT   3 Units
The course covers business continuity planning and implementation, a systematic approach used to create and validate a plan for maintaining continuous business operations before, during, and after disasters or disruptive events. It also covers disaster recovery, which is aimed at assessing the risks and stopping the effects of disasters as quickly as possible, and addressing the immediate aftermath.
PREREQ: ADMISSION TO CYBERSECURTIY GRADUATE PROGRAM, OR ADMISSION TO COMPUTER SCIENCE GRADUATE PROGRAM, OR ADMISSION TO COBE GRADUATE DEGREE OR CERTIFICATE PROGRAM

CYBER 740   CYBERSECURITY AND PRIVACY LAW   3 Units
This course examines law and policy for cybersecurity and privacy. Students are expected to understand the legal frameworks, evaluate existing policy and law, and make improvement recommendations. The detailed contents include punishing and deterring the attackers; encouraging and enforcing security and privacy protection among private and public sectors; and protecting or privacy in emerging technological fields.
PREREQ: ADMISSION TO CYBERSECURTIY GRADUATE PROGRAM, OR ADMISSION TO COMPUTER SCIENCE GRADUATE PROGRAM, OR ADMISSION TO COBE GRADUATE DEGREE OR CERTIFICATE PROGRAM

CYBER 742   COMPUTER FORENSICS   3 Units
Computer forensics involves the preservation, identification, extraction and documentation of evidence stored on a computer. This course covers both the principles and practices of computer forensics that include data acquisition and data recovery; volume analysis; file system analysis; network forensics; evidence hiding and steganography; tools and techniques for investigating computer intrusions; scripting for forensics; and the legal and ethical implications.
PREREQ: CYBER 701 OR ADMISSION TO MASTER OF COMPUTER SCIENCE PROGRAM

CYBER 747   EMBEDDED SYSTEM SECURITY   3 Units
This course studies the security issue related to hardware, especially embedded systems. It covers basic knowledge about microcontrollers, includes its architecture, peripherals, and commands. Then different security related schemes will be introduced, such as encryption (MD5), side channel analysis, hardware trojans, and physical layer identifications. This course will also focus on hardware/software project implementations on a simple ARM development kit.
PREREQ: CYBER 701 OR ADMISSION TO MASTER OF COMPUTER SCIENCE PROGRAM

CYBER 752   MALWARE REVERSE ENGINEERING   3 Units
Being able to detect, analyze, understand, control, and eradicate malicious software is important for economic and national security. This course introduces modern malware analysis techniques through theoretical studies and hands-on analysis of real-world samples. The main contents include static and dynamic analysis; malware behavior and countermeasures; disassembly and related industry standard tools; anti-analysis, code injection, hooking and their countermeasures.
PREREQ: CYBER 701 OR ADMISSION TO MASTER OF COMPUTER SCIENCE PROGRAM

CYBER 754   INTRUSION PREVENTION AND DETECTION   3 Units
This course studies security issues arising primarily from computer networks that cover internet protocol attacks, intrusion prevention, and intrusion detection and responses. Topics include TCP/IP protocol attacks and countermeasures, denial of service attacks, firewalls, cryptography, virtual private networks, web security, mathematical foundations for intrusion detection, network-based and host-based intrusion detection, automated and manual response to attacks, and legal/organizational issues.
PREREQ: CYBER 701 OR ADMISSION TO MASTER OF COMPUTER SCIENCE PROGRAM

CYBER 758   CLOUD SECURITY   3 Units
This course offers both broad and in-depth study of cloud security issues related to data and computation outsourcing from perspectives of operation, management, and design. Topics include identity and access management, vulnerability assessment, intrusion detection, forensics, and incident handling on cloud; security policies, management, and regulatory compliance in cloud; and cloud security architecture design and implementation.
PREREQ: COMPSCI 750 AND COMPSCI 755

CYBER 759   TOPICS IN CYBERSECURITY   *Repeatable*   3 Units
This course covers emerging topics in cybersecurity. The topics could include new developments in general areas like privacy, cryptography, and cybersecurity law or in recently developed areas like cloud security, wireless security, Internet of things security, blockchain and anonymous computing, and hardware security. It will cover both technological developments and their impacts on information and infrastructure security across organizations. Repeatable.
PREREQ: CYBER 701 OR ADMISSION TO MASTER OF COMPUTER SCIENCE PROGRAM

CYBER 789   CYBERSECURITY CAPSTONE PROJECT   3 Units
This course provides a platform for integrating and applying the knowledge learned in Cybersecurity. Students will work as a group to design and build a secure software system, find flaws in other groups' systems, and enhance their system's design by removing vulnerabilities. Pass/Fail grade basis only.
PREREQ: COMPSCI 750 AND COMPSCI 755 AND AT LEAST 18 CREDITS IN MASTER OF CYBERSECURITY PROGRAM OR MASTER OF COMPUTER SCIENCE PROGRAM

CYBER 798   INDEPENDENT STUDIES   *Repeatable*   1-3 Units
INDEPENDENT STUDIES
PREREQ: MUST BE ADMITTED TO A COBE GRADUATE PROGRAM; HAVE DEPARTMENT CONSENT

CYBER 799   THESIS RESEARCH   *Repeatable*   1-6 Units
Guided investigation of an approved thesis topic. Students may receive credit for research activities planned in conjunction with their advisers and leading to completing a master's degree.