

CYBR - CYBERSECURITY

CYBR 601/CSCE 701 Foundations of Cybersecurity

Credits 3. 3 Lecture Hours. Foundational concepts and principles of cybersecurity; cryptographic algorithms; hash functions; introduction to cyber-physical systems security; authentication, firewalls, and intrusion detection systems; social constructs and domains of cybersecurity.

Prerequisites: Graduate classification or approval of instructor. **Cross Listing:** CSCE 701/CYBR 601.

CYBR 602 Law and Policy in Cybersecurity

Credits 3. 3 Lecture Hours. Law and policy issues related to cybersecurity including procurement, operations, maintenance, governance, oversight, protection, defense; analyze law, policies, and regulations domestically and globally. **Prerequisite:** Graduate classification. **Cross Listing:** CSCE 702 and MARA 647.

CYBR 603 Cybersecurity Risk

Credits 3. 3 Lecture Hours. Risks in cybersecurity; avoidance, acceptance, mitigation or transference strategies; developing reliable cybersecurity risk assessments to include analysis, categorization and evaluation; cybersecurity risk audit frameworks. **Prerequisites:** Graduate classification. **Cross Listing:** CSCE 703 and MARA 655.

CYBR 604/CSCE 704 Data Analytics for Cybersecurity

Credits 3. 3 Lecture Hours. Introduction to the theoretical foundations, algorithms and methods of data analytics for cybersecurity; societally-critical topic with impacts across computing systems and networks, social and web-based communities, industrial control systems and personal devices, among many others; study and application of data analytics including cluster analysis, supervised machine learning, anomaly detection and visualization; addresses a suite of cybersecurity topics including cyber attacks, anomaly detection, vulnerability analysis, strategic manipulation and propaganda. **Prerequisite:** Graduate classification. **Cross Listing:** CSCE 704/CYBR 604.

CYBR 630/ECEN 759 Hardware Security

Credits 3. 3 Lecture Hours. Cryptography and cryptographic algorithms such as AES, DES etc.; techniques to optimize hardware implementation of cryptographic systems; different types of side-channel attacks and countermeasures; supply-chain vulnerabilities – hardware Trojans, IP piracy, and reverse engineering; security modules for system-on-chip; physical unclonable function. **Prerequisites:** ECEN 350/CSCE 350 or approval of instructor. **Cross Listing:** ECEN 759/CYBR 630.

CYBR 660/INTA 690 Cybersecurity Literacy for the Global Arena

Credits 3. 3 Lecture Hours. Research technical literacy in cybersecurity; exploration of cybersecurity in applied settings to include private and public sector; use of cybersecurity literacy to develop policy guidelines; examination of intent of cyber-actors; technical and policy risk-mitigation strategies. **Prerequisite:** Graduate classification or approval of instructor. **Cross Listing:** INTA 690/CYBR 660.

CYBR 661/PSAA 608 Cybersecurity Policy, Issues and Operations - A Manager's Guide

Credits 3. 3 Lecture Hours. Overview related to U.S. homeland defense and homeland security; includes cyber threats; cyberwar; securing cyberspace in public and private sector; protecting data, systems and networks that are connected to the Internet and the Internet of Things.

Prerequisite: Graduate classification. **Cross Listing:** PSAA 608/CYBR 661.

CYBR 684 Professional Internship

Credits 0 to 6. 0 to 6 Other Hours. Directed internship in an organization to provide students with a learning experience supervised by professionals in organizational settings appropriate to the student's professional objectives.

CYBR 685 Directed Studies

Credits 0 to 12. 0 Lecture Hours. 0 Lab Hours. 0 to 12 Other Hours. Directed individual study in cybersecurity. May be repeated for credit.

CYBR 689 Special Topics in...

Credits 0 to 4. 0 Lecture Hours. 0 Lab Hours. 0 to 4 Other Hours. Selected topics in an identified area of cybersecurity. May be repeated for credit.

CYBR 691 Research

Credits 0 to 12. 0 Lecture Hours. 0 Lab Hours. 0 to 12 Other Hours. Research conducted under the direction of faculty member in cybersecurity topics. May be repeated for credit.

CYBR 711/CSCE 711 Foundation of Modern Cryptography

Credits 3. 3 Lecture Hours. Perfectly secret encryption; one-time pad; pseudorandom generators, functions and permutations; security definitions; block ciphers; stream ciphers; cryptanalysis; message authentication codes; hash functions; factoring, discrete log and the Diffie-Hellman problem; trapdoor functions and permutations; public-key encryption; El Gamal and RSA encryption schemes; digital signatures; DSA and RSA signature schemes; identification schemes; the Fiat-Shamir transform; advanced topics include secret sharing, oblivious transfer, zero-knowledge proofs, secure multi-party computation.

Prerequisite: STAT 211 and CSCE 411; graduate classification. **Cross Listing:** CSCE 711/CYBR 711.