**CSCI 3800 Secure Network and Systems Programming**

This course provides a deep understanding of operating system and TCP/IP networking architecture, and the low-level interfaces that are required to build secure system-level, multithreaded, and network applications, including file and process operations, inter-process communications, creating and implementing networking protocols and sockets-based programming. Students will learn how to design secure applications, write secure code that can withstand attacks, and conduct security testing and auditing and apply it to real world problems.

*Undergrad Pre-req: CSCI 3761 with a C- or higher*

**CSCI 4800/5800 Computer Vision**

An introduction to computer vision (no prior background in vision required). Topics include camera models, multi-view geometry, image processing, feature detection, motion estimation, shape reconstruction and applications of deep learning.

*Undergrad Pre-req: CSCI 3412 with a C- or higher*

*MS Foundational Courses: CSCI 2312, 2421, 2511, 3412 & 3453*

**CSCI 5800 Advanced Topics in Cybersecurity**

This course covers advanced concepts in threats to the security of computer systems, networks, and infrastructures, as well as the state-of-the-art defense paradigms and mechanisms to protect them. Students in this course are exposed to the latest research in offensive and defensive cybersecurity through the study of recent publications in top journals and conferences. Topics include recent advances in data-driven and AI-driven cybersecurity, proactive cyber defense, intrusion detection, blockchain, Internet-of-Things, and cyber-physical systems security, and software-defined networks. Students will be expected to research the latest threats, technologies, and trends while exchanging ideas with other students.

*MS Foundational Courses: CSCI 2312, 2421, 2511, 3412, 3453 & 4591*

**CSCI 5800 Graph Neural Networks**

Graph is a data structure that can be used to represent a network of objects and their relationships. Such networks are a fundamental tool for modeling social, technological, and biological systems, enabling applications such as molecular analysis, drug discovery and repurposing, social network analysis, predicting stock market developments, thermodynamics, and even modeling human brain connectomes. This course focuses on the computational, algorithmic, and modeling challenges specific to the analysis of massive graphs. By means of studying the underlying graph structure and its features, students are introduced to machine learning and deep learning techniques specially designed to reveal insights on a variety of networks. In particular, we will focus on learning about a specific family of tools dubbed Graph Neural Networks (GNN), which is a class of artificial neural networks that generalizes convolutional neural networks (CNNs) and is designed to process data that can be represented as graphs. This course covers both fundamental knowledge as well as hands-on activities for anyone who wants to use GNN as a graph analysis tool, and you will learn the basic concepts, implementations, and applications of graph neural networks.

*MS Foundational Courses: CSCI 2312, 2421, 2511, 3412, & 3453*