

Special Topics Descriptions

CSCY/CSCI 3800 - Data Storage Systems Security

Focuses on one particular security problem -keeping data safe and consistent- while exploring a broad ecosystem of storage systems.

This course discusses the applications of security policies to data storage systems, including relational databases and non-relational storage systems (like document stores, column-base storage, and in-memory storage systems). We discuss the main characteristics of these systems and the mechanisms each uses to implement different levels of security. We analyze this from the perspective of confidentiality and integrity in both data-centric deployments and cloud deployments.

Pre-requisites: CSCI 3287 and CSCY 3740 or CSCI-3740

CSCI 3810 - Concepts of Microcontrollers.

This course provides students with the understanding of how computers are build and programmed. It introduces key notions of algorithms, computer architecture, operating systems, compilers, and software engineering using a constructionist approach, by building a general-purpose computer system from the ground up. Starting from the foundational components of logic design (gates) as the building blocks into microcontrollers (a basic CPU). We will explore the use of clock signals, synchronization of events, reading and writing to memory chips, analyzing memory content, and processing of basic instructions. Students will analyze the components via simulation and prototyping using simple components (chips).

Pre-requisites: CSCI 1510 and CSCI 2421

CSCI 4800/5800 - Shader and GPU for AI applications

Graphics Processing Unit (GPU) programming is a cutting-edge field that combines graphics and computation to create stunning visuals and powerful applications. This course will introduce how to use GPU programming for various applications, from graphics and visualization to AI and machine learning. Students will learn the basics of graphics shaders, which are programs that run on the GPU and control how objects are rendered on the screen. Another main topic will be OpenCL and CUDA, which are frameworks that allow you to write general purpose programs that run on the GPU and leverage its parallel processing power. Emphasis will be on how GPUs are used for AI and machine learning tasks.

Pre-requisites: CSCI 3412

CSCI 5800-001 Battery Management Systems, He

With the advancement of Zero Emission Vehicles, the technology required to design and maintain their complex battery systems is needed not only by the vehicle designers, but by those who will provide recharging and maintenance services, as well as utility infrastructure providers. Battery management systems are electronic systems that monitor and maintain the battery systems. This course prepares for the era of Zero Emission Vehicles by introducing the core functions of battery management systems and the common practices on how these functions are implemented. Hands-on labs on each of the main functions of battery management systems are designed and integrated in this course.