**Spring 2024 CSCI Tech Electives**

*Schedule and course listings subject to change*

- **CSCI 3740 Computer Security**, Pastorino
  - Pre-requisite: CSCI 2421
- **CSCI 3762 Network Programming**, Ogle
  - Pre-requisite: CSCI 3761
- **CSCI 3800 Data Storage Systems Security**, Pastorino
  - Pre-requisites: CSCI 3287 & 3740
- **CSCI 3916 Web API**, McCarthy
  - Pre-requisite: CSI 2421
- **CSCI 4203 Simulation**, Williams
  - Pre-requisite: CSCI 3412
- **CSCI 4211 Mobile Comp. & Prog.,** Lakhani
  - Pre-requisite: CSCI 3412
- **CSCI 4407 Cryptography & Security**, Gethner
  - Pre-requisite: CSCI 3412
- **CSCI 4773 Introduction to Emerging System Security**, Li
  - Pre-requisites: CSCI 3761 & 3453
- **CSCI 4800 Shader & GPU for AI applications**, Choi
  - Pre-requisite: CSCI 3412

**BACS Only**

Please meet with your advisor for additional selections

- **CSCI 3751 Unix Systems Programming**, Nam
  - Pre-requisite: CSCI 2421
- **CSCI 3761-002 Intro to Networks**, Ogle
  - Pre-requisite: CSCI 2421
- **CSCI 3810 Concepts of Microcontrollers**, Pastorino
  - Pre-requisites: CSCI 1510 & 2421
  - Build a general-purpose computer system from the ground up

**BACS Free Electives**

- **CSCI 1510 Logic Design**
- **CSCI 2525 Assembly Language**
- **CSCY 2930 Practical System Administration**
- **CSCI 2980 Foundations of Data Science**

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**Spring 2024 BSCS Breadth Courses**

Additional courses beyond breadth area requirements will count toward as CS electives.

**Secure Computing:**

- **CSCI 4743 Cyber & Infrastructure Defense**, Jafarian
  - Pre-requisite: CSCI 3761
  - Required for the Cybersecurity & Secure Comp. Cert>

**Data Science:**

- **CSCI 4455 Data Mining**, Banaei-Kashani
  - Pre-requisites: CSCI 3287, CSCI 3412 & MATH 3195

**Scientific Computing:**

- **CSCI 4110 Applied Number Theory**, Gethner
  - Pre-requisite: CSCI 2511 or MATH 3000

**System Software:**

- **CSCI 4287 Embedded Systems Prog.,** Lakhani
  - Pre-requisite: CSCI 3453
- **CSCI 4565 Intro to Computer Graphics**, Choi
  - Pre-requisite: CSCI 3412 & MATH 3191 or 3195

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**Spring 2024 BSCY Tech Electives**

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  - Pre-requisite: CSCI 2421
- **CSCI 3761-002 Intro to Networks**, Ogle
  - Pre-requisite: CSCI 2421
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  - Pre-requisites: CSCI 1510 & 2421
  - Building a general-purpose computer system from the ground up

**BACS Free Electives**

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  - Build a general-purpose computer system from the ground up

**BACS Free Electives**

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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 - 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