

## Spring 2023 BSCS Undergraduate Electives

\*Schedule and course listings subject to change\*

- **CSCI 3762-001 Network Programming**, Ogle
  - Pre-requisite: CSCI 3761
- **CSCI 3800-H01 Next-Gen CyberThreats & GANs**, Pastorino
  - Pre-requisites: CSCI 3287 & 3412
- **CSCI 3916-001 Web API**, McCarthy
  - Pre-requisite: CSI 2421
- **CSCI 3920 Adv. Programming w/Java & Python**, Pastorino
  - Pre-requisite: CSCI 2421
- **CSCI 4408 Applied Graph Theory**, Gethner
  - Pre-requisite: CSCI 2511 or MATH 3000
- **CSCI 4773 Introduction to Emerging System Security**, Li
  - Pre-requisites: CSCI 3761 & 3453
- **CSCI 4620 Computational Motor Control**, Al Borno
  - Pre-requisites: CSCI 3412 & familiarity with linear algebra and probability
- **CSCI 4939 Internship – please meet with your advisor.**
  - Pre-requisites: CSCI 3415, 2.75 GPA & approval through ELC

## Spring 2023 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 and Secure Computing (CSSC) Certificate

**Data Science:** **CSCI 4580, Data Science**, 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

**CSCI 4650, Numerical Analysis**, Math Dept

Pre-requisites: MATH 2411 & 3195

**System Software:** **CSCI 4287, Embedded Systems Programming**, Lakhani

Pre-requisite: CSCI 3453

**CSCI 3800-H01 Next-Gen CyberThreats & GANs**,

Description: Machine Learning and Deep Learning provide with many useful tools when it comes to cybersecurity, allowing for advanced detection and protection mechanisms for securing our data. However, the same tools used to protect our data can be used to

exploit security issues. In the last years, Deepfake and Generative Adversarial Networks (GAN) positioned an important security risk by allowing a person to generate videos with the image of someone else. Recently, researchers have demonstrated the versatility of these networks by creating the first AI-generated painting. With all these tools available, are we sure we can trust our eyes? Are we sure that we are buying an original piece of art and not an AI-generated counterfeit? Are we sure that our contacts in social media are who they say they are?

This course introduces Generative Adversarial Networks and navigate deeper in the uses of these networks with a strong focus on cybersecurity applications. We will learn how to create and apply these networks by means Python libraries like TensorFlow, Theano and Pytorch and developing applications capable of leveraging GPU-based environments.