All courses are remote unless indicated and require attendance via Zoom during class time.

**Spring 2021 BSCS Undergraduate Electives**

- **CSCI 3515 Internet of Things: Sensing, Communication & Control**, He – Online  
  - Pre-requisite: CSCI 2312 & 2421
- **CSCI 3800-001 Network Programming**, Ogle – Hybrid MW 11:00-12:25  
  - Pre-requisites: CSCI 3761  
  - Will meet on campus Wednesdays week 1 and the last 2 weeks
- **CSCI 3916 Web API**, McCarthy – MW 3:30-4:45  
  - Pre-requisite: CSCI 2312 & 2421
- **CSCI 4408 Applied Graph Theory**, Gethner – TTH 2:00-3:15  
  - Pre-requisite: CSCI 2511 or MATH 3000
- **CSCI 4800-001 Security & Cryptography**, Gethner – TTH 12:30-1:45  
  - Pre-requisites: CSCI 3412
- **CSCI 4800-002 Computational Modeling of Animal Movement**, Al Borno – TTH 9:30-10:45  
  - Pre-requisite: CSCI 4930
- **CSCI 4800-E01 Web Application Development**, Jafarian – Online  
  - Pre-requisite: CSCI 3287

**Spring 2021 BSCS Breadth Courses**  
Additional courses beyond breadth area requirements will count toward as CS electives.

- **Secure Computing: CSCI 4741, Principles of Cybersecurity**, Debnath – MW 2:00-3:15  
  - Pre-requisite: CSCI 3287 & 3761  
  - Required for the Cybersecurity and Secure Computing (CSSC) Certificate
- **Data Science: CSCI 4931, Deep Learning**, Biswas - MW 11:00-12:15  
  - Pre-requisites: CSCI 3412 & MATH 3195
- **Scientific Computing: CSCI 3560, Probability and Computing**, Lakhani – Online  
  - Pre-requisites: CSCI 2511 and MATH 2411  
  - **CSCI 4650, Numerical Analysis**, Math Dept – MW 5:00-6:15  
  - Pre-requisites: MATH 2411 & 3195
- **System Software: CSCI 4287, Embedded Systems Programming**, Lakhani – Online  
  - Pre-requisite: CSCI 3453  
  - Pre-requisites: CSCI 3412 & MATH 3195 or 3191
Spring 2021 Special Topics Course Descriptions

CSCI 3800-001 Network Programming, Ogle

Students get an introduction to networking in CSCI 3761 and they get to write a couple of simple socket applications. But in those cases, they control both the client and the server portion of the project AND they get to define the protocols. In this course, we will explore how to create network applications. Over the course of the semester, using tic-tac-toe as the distributed application, the class will define, develop, and test protocols that iteratively add reliability to the game. The protocols will be defined by the class, and interoperability amongst the student projects is essential (just like in the real world!). The applications will be written in the C programming language, so students should have some familiarity with that language. Students in the course will implement a robust distributed application that can withstand outages that are typical in networked environments. Additionally, the students will get to explore the tradeoffs between single threaded and multi-threaded server implementations. Prerequisite: CSCI 3761

CSCI 4800-001 Security & Cryptography, Gethner

A broad overview of cryptography and its relation to computer security. Topics include basic standard cryptographic techniques, a history of codes and ciphers, RSA, DES, AES, Elliptic Curve Cryptography, ElGamal, and applications to current and future technologies. Prerequisite: CSCI 3412

CSCI 4800-002 Computational Modeling of Animal Movement, Al Borno

This course introduces techniques for the modeling and simulation of animal movement. These techniques come from computer graphics, robotics and reinforcement learning. The topics that we will cover include biomechanics modeling, trajectory optimization, feedback control, deep reinforcement learning, and the neuroscience of motor control. At the end of the course, students will learn how to train control policies for virtual agents in computer animation or robotics applications. Student evaluation will be based on a course project. Prerequisite: CSCI 4930

CSCI 4800-E01 Web Application Development, Jafarian

This project-oriented course introduces fundamentals of full-stack web application development, using MERN stack (MongoDB, Express.js, React, and Node.js). Major topics include handling HTTP requests and responses, tracking sessions and cookies, accessing and manipulating the data securely, authentication and authorization, and separating content from presentation through the use of the MVC architectural pattern. Particular attention will be paid to methods for making Web applications user-friendly, platform-aware, efficient, maintainable, and flexible. Additional topics include quick overview of HTML5, CSS3, Bootstrap library, and introduction to secure coding for Web applications. At the end of this course, students will be able to build their own browser-based applications for e-commerce and other applications that require Web access to server-based resources. Prerequisite: CSCI 3287