CSCE 317- Computer System Engineering

- **Credit Hours:** 3 hours
- **Contact Hours:** 75 lecture minutes and 75 lab minutes
- **Instructor:** Dr. Jason D. Bakos
- **Required Textbooks:** Marilyn Wolf. Embedded System Interfacing. Elsevier, ISBN: 978-0-12-817402-9, **to be replaced in Spring 2024 with:** Jason D. Bakos. Integrative Design and Programming of Internet-of-Things and Cyberphysical Platforms. Cognella. 2024.
- **Bulletin Description:** Design and deployment of cyberphysical systems, with emphasis on design constraints, meeting performance and efficiency objectives, low-level programming, interfacing, control theory, and real-time systems.
- **Prerequisite:** CSCE 212, CSCE 240
- **Required Course** in CE
- **Course Outcomes:** Students will be able to:
  1. Learn industry standard chip-to-chip interface protocols
  2. Learn methods for deploying, testing, and characterizing cyberphysical systems in a laboratory environment
  3. Learn the concepts of control theory
  4. Learn the concepts of real-time systems

- **Student Outcomes addressed by course**

Program	Student Outcomes Addressed
Computer Engineering	1, 2, 6, 7

- **Topics Covered**
  1. Various interface protocols and properties governing their operation, e.g. synchronous vs asynchronous, serial vs parallel, single-master vs multi-master, push-pull vs open-drain, arbitrated vs non-arbitrated, etc.
  2. Hardware-software interfacing, e.g. programmed I/O , interrupts, and direct memory access, use of GPIO and pulse width modulation
  3. Deploying and debugging code on embedded processor and field programmable gate array platforms
  4. Control theory, e.g. continuous and discrete transfer functions, physical system modeling, open- and closed-loop control, S-transform, Z-transform, state-space models
  5. Real-time systems, including scheduling algorithms, schedulability tests, single- and multi-processor real-time scheduling
  6. CMOS design, semiconductors, semiconductor device models, switch models, RC delay models, CMOS fabrication, parasitics