CSCE 491- Capstone Computer Engineering Project

- **Credit Hours:** 3 hours
- **Contact Hours:** 75 lecture minutes and 75 lab minutes
- **Instructor:** Dr. Jason D Bakos
- **Required Textbooks:** None
- **Bulletin Description:** Advanced computer systems engineering. Team projects. Written reports and oral presentations in a technical setting.
- **Prerequisite:** CSCE 240, 313, 611
- **Prerequisite or Corequisite:**
- **Required Course** in CE
- **Course Outcomes:** Students will be able to:
  1. Identify, formulate, and solve complex computer engineering problems.
  2. Apply the techniques, skills, and tools of modern computer engineering practice to design a system consisting of both hardware and software components.
  3. Design a system that meets specified needs with consideration of multiple constraints.
  4. Communicate effectively with a range of audiences.
  5. Function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.

- **Student Outcomes addressed by course**

<table>
<thead>
<tr>
<th>Program</th>
<th>Student Outcomes Addressed</th>
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<tbody>
<tr>
<td>Computer Engineering</td>
<td>1,2,3,5,7</td>
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- **Topics Covered and Timeline**
  1. Embedded general purpose communication protocols (SPI, I2C, UART, etc.) [[4 Weeks]]
  2. Platform Field Programmable Gate Arrays (FPGA) and SystemVerilog [[5 Weeks]]
  3. Applied Control Theory [[2 week]]
  4. Real-time Systems [[2 week]]
  5. CMOS Design [[2 week]]

- **Course Assignments and Assessments:** The course consists of several homeworks and a final project presentation.
  - Project 1: Bus protocol decoder
  - Project 2: Bare metal programming and software-defined Pulse Width Modulation
  - Project 3: Peripheral design
  - Project 4: Closed-loop control of DC Motor

- **Grading Scheme and Weights:** The final grade is calculated using the following weights: projects are 41.2%, midterm exam is 17.65%, quizzes are 17.65%, and final exam is 23.5%. The final grade is calculated using the standard curve A ≥ 90 > B+ ≥ 85 > B ≥ 80 > C+ ≥ 75 > C ≥ 70 > D ≥ 65 > F.