CSCE 313 - Embedded Systems

- **Credit Hours:** 3 hours
- **Contact Hours:** 3 lecture hours
- **Instructor:** Dr. Jason Bakos
- **Bulletin Description:** Fundamentals of embedded systems: hardware components, software components, hardware/software interface design, and hardware/software co-design.
- **Prerequisites:** CSCE 211, 212
- **Required Course in CE**
- **Course Outcomes:** Students will be able to:
  1. Perform hardware/software co-design for a programmable embedded system;
  2. Write software that directly interfaces with I/O peripherals such as LEDs, LCD panels, buttons, monitors, and remote consoles;
  3. Write software that performs real-time processing of audio and video data;
  4. Use high-level synthesis tools to develop coprocessor architectures in an embedded environment.

**Student Outcomes addressed by course**

<table>
<thead>
<tr>
<th>Program</th>
<th>Student Outcomes Addressed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Computer Engineering</td>
<td>1, 2, 6</td>
</tr>
<tr>
<td>Computer Information Systems</td>
<td>N/A</td>
</tr>
<tr>
<td>Computer Science</td>
<td>N/A</td>
</tr>
</tbody>
</table>

**Topics covered**

1. Design constraints for embedded systems (3 hours)
2. Platform FPGA design methodology for programmable system-on-a-chip (6 hours)
3. Image processing (9 hours)
4. Audio processing (9 hours)
5. Video processing (9 hours)
6. Embedded application acceleration using special-purpose logic (6 hours)