CSCE 611: Advanced Digital Design

- **Credit Hours:** 3 hours
- **Contact Hours:** 3 lecture hours
- **Instructor:** Dr. Jason Bakos
- **Required Textbooks:** None.
- **Bulletin Description:** Design techniques for logic systems; emphasis on higher-level CAD tools such as hardware description languages and functional modeling.
- **Prerequisites:** CSCE 212
- **Required Course in CE and Selected Elective in CIS, CS
- **Course Outcomes:** Students will be able to:
  1. HDL design: Design large-scale digital systems using VHDL
  2. Simulation and verification: Perform behavioral verification using test benches and simulation
  3. Microarchitecture design: Design a pipelined microprocessor that implements the MIPS instruction set
  4. Interconnect design: Design a system bus architecture with CPU, memory, and I/O interfaces
  5. Logic synthesis: Synthesize, place-and-route, and implement a computer system on a programmable hardware platform

**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. VHDL digital design flow
2. Design methodologies and techniques
3. Microarchitecture design
4. Test bench design
5. Memory models
6. Bus and interface design