Introduction to Digital Logic Lab for Transfer Students

ECE 2067

Credit Hours:
0.50

Course Coordinator:

Course Length:
14 weeks (autumn or spring)
12 weeks (summer only)

Representative Textbooks and Other Course Materials:

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<tr>
<th>Title</th>
<th>Author</th>
<th>Year</th>
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<tr>
<td>Fundamentals of Logic Design</td>
<td>Roth, Jr. and Kinney</td>
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Course Description:
Laboratory-only component of ECE 2060 for transfer students. Laboratory practice with and application of the theory of combinational and clocked sequential networks.

Prerequisites and Co-requisites:
Prereq: 2061, and CPHR 2.00 or above.

Designation:
Elective
Required

Course Goals / Objectives:
Be competent in synthesizing networks of combinational, digital logic elements
Be competent to design and synthesize digital clocked sequential circuits
Be familiar with modern computer tools for digital design, verification and simulation
Be familiar with how to implement their design schematics to hardware using modern FPGAs
Be competent in working in teams for lab experiments
Be familiar with digital circuit design methods
Be competent in reporting standards
Be competent in using laboratory instruments and laboratory methodology
Exposure to methodology for critical troubleshooting skills
### Course Topics:

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<tr>
<td>Introduction to lab Equipment: Signal Generator and Oscilloscope</td>
<td>How to measure digital signals using the oscilloscope and the motivation for using digital signals</td>
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<tr>
<td>Introduction to Quartus and the DE2 Board: HDL files</td>
<td>Basic RTL components for simulation. Quartus’s on-chip debugging tools, Signal Tap II and the In-System Memory Content Editor.</td>
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<td>Using the CODEC:</td>
<td>Students are shown how to use the DE2’s audio CODEC chip to perform conversions between analog and digital signals.</td>
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<td>Introduction to the Synthesizer: build a synthesizer</td>
<td>Students also learn how to use Matlab to create memory contents for ROM look-up tables. Finally students are introduced to bit shifting as a means of scaling signed and unsigned numbers.</td>
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<td>Electronic Keyboard:</td>
<td>Students build a circuit that takes signals from PS2 keyboard and converts them into musical tones by applying the concepts and skills they have learned in the previous 5 labs.</td>
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<td>Demo Player Feature for an Electronic Keyboard:</td>
<td>Students add an auto play feature to the electronic keyboard that automatically plays a short tune. Emphasizes the use of sequential components, testing of large Quartus project.</td>
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