ECE 2067 (Proposed): Introduction to Digital Logic Lab for Transfer Students

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.

Transcript Abbreviation: IntDigitalLogicLab
Grading Plan: Letter Grade
Course Deliveries: Classroom
Course Levels: Undergrad
Student Ranks: Sophomore
Course Offerings: Autumn, Spring
Flex Scheduled Course: Never
Course Frequency: Every Year
Course Length: 14 Week
Credits: 0.5
Repeatable: No
Time Distribution: 3.0 hr Lab
Expected out-of-class hours per week: -1.5
Graded Component: Laboratory
Credit by Examination: No
Admission Condition: No
Off Campus: Never
Campus Locations: Columbus
Prerequisites and Co-requisites: Prereq: ECE 2061 and CPHR 2.00 or above.
Exclusions: Not open to students with credit for 2000, 2000.02, 2000.07, 2017, 2060, 270, 290, or 294.01.
Cross-Listings:

Course Rationale: For transfer students with prior course comparable to lecture content of ECE 2060, but not comparable laboratory.

The course is required for this unit's degrees, majors, and/or minors: Yes
The course is a GEC: No
The course is an elective (for this or other units) or is a service course for other units: Yes

Subject/CIP Code: 14.1001
Subsidy Level: Baccalaureate Course

Programs

Abbreviation	Description
CpE	Computer Engineering
EE	Electrical Engineering

General Information

To be scheduled at same time as ECE 2060 laboratory sessions. There are actually seven 3-hour labs rather than fourteen 1.5 hour labs, but the labs are not synchronized with 7-week sessions.

Course Goals

Be competent in synthesizing networks of combinatorial, 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

Topic	Lec	Rec	Lab	Cli	IS	Sem	FE	Wor
Introduction to lab Equipment: Signal Generator and Oscilloscope, how to measure digital signals using the oscilloscope and the motivation for using digital signals			3.0					
Introduction to Quartus and the DE2 Board: HDL files, basic RTL components for simulation. Quartuss on-chip debugging tools, Signal Tap II and the In-System Memory Content Editor.			6.0					
Using the CODEC: Students are shown how to use the DE2s audio CODEC chip to perform conversions between analog and digital signals.			3.0					
Introduction to the Synthesizer: build a synthesizer, 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.			3.0					
Electronic Keyboard: 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.			3.0					
Demo Player Feature for an Electronic Keyboard: 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.			3.0					

Representative Assignments

Lab Reports

Grades

Aspect	Percent
Lab Reports	100%

Representative Textbooks and Other Course Materials

Title	Author
Fundamentals of Logic Design	Roth, Jr. and Kinney

ABET-EAC Criterion 3 Outcomes

Course Contribution		College Outcome
***	a	An ability to apply knowledge of mathematics, science, and engineering.
***	b	An ability to design and conduct experiments, as well as to analyze and interpret data.
*	c	An ability to design a system, component, or process to meet desired needs.
**	d	An ability to function on multi-disciplinary teams.
***	e	An ability to identify, formulate, and solve engineering problems.
	f	An understanding of professional and ethical responsibility.
	g	An ability to communicate effectively.
	h	The broad education necessary to understand the impact of engineering solutions in a global and societal context.
	i	A recognition of the need for, and an ability to engage in life-long learning.
	j	A knowledge of contemporary issues.
***	k	An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

Additional Notes or Comments

Adapted from ECE 2060 10/6/2015 - gjv

Made lab graded component to agree with university tool BLA 11/17/15

Edited text info, 5/9/17, CED

Prepared by: Carol Duhigg