**ECE 260: Digital Electronics II**

Course Syllabus – Spring, 2015

Dept. of Electrical and Computer Engineering, Digipen Institute of Technology

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**Office Hours:**

Tuesdays 10:00 AM – 11:00 AM

Friday 10:00 AM – 11:00 AM

and other times by appointment

**Location and class times:**

Archimedes, Tuesday 11:00 AM– 12:50 PM, Friday 11:00 AM – 1:50 PM

**Summary:**

As a continuation of Digital Electronics I, this course prepares the student-engineer for hardware design and troubleshooting, with an emphasis on programmable logic and reconfigurable computing. Topics include finite state machines, computer arithmetic, microprogramming and an introduction to a hardware description language named Verilog.

**Teaching methods:**

Classes will alternate between instruction and working on problems, assignments and labs. Besides programming assignments and homework, instruction will rely on teaching by example. Students will be graded on individual accomplishments. At the end of the course, students will complete a project of their choice using FPGA technology. Students will be expected to give weekly progress reports as well as occasional presentations and written reports.

**Course objectives:**

* Know and understand common digital circuit structures
* Learn Verilog
* Independently design and develop digital hardware using Verilog
* Understand the high level design and verification methodology
* Perform pre-implementation verification using simulation and static timing analysis
* Effectively use logic synthesis and device fitting software to implement hardware on an FPGA
* Deliver oral as well as written reports

**Prerequisites:**

CS 120 High Level Programming I

ECE 210 Digital electronics I

**Topics Outline (subject to change):**

* Designing hardware using Verilog, a hardware description language
* Combinational logic, decoders, encoders, multiplexors, parity
* Digital arithmetic, comparators, adders, multipliers
* Finite state machines, state diagrams, counters, shift registers, clocking
* Microprogramming design of microprocessors
* Hardware implementation using Field Programmable Gate Arrays (FPGAs)
* Verilog hardware simulation and test bench development
* Static timing analysis
* Analog-to-digital and digital-to-analog conversion

**Required Textbooks:**

Digital Design: Principles and Practices Package, 4th Edition, John F. Wakerly, 2005.

**Calendar**

Jan 6 Start of class

Feb 3 Assignment 1 due

Feb 17 Assignment 2 due

Feb 20 Midterm exam

Mar 2-6 Break

Mar 17 Assignment 3 due

Mar 20 Project proposal due

Apr 10 Draft of final report due

Apr 17 Final report due

Apr 21 Final presentations

*No final exam*

**Grades:**

Coursework 70%:

Homework 10%

Labs and Quizzes 10%

Attendance 10%

Assignments 3x10%

Midterm exam 10%

*Note that quizzes may or may not be announced.*

Project 30%:

Project proposal 5%

Final project report 10%

Project technical grade 10%

Final presentation 5%

**Late Assignments:**

Late assignment will only be accepted due to an excused absence (e.g., documented medical emergency).

**Disabled Student Services:**

Students with physical, psychological, or learning disabilities that affect their ability to perform major life activities associated with this class may be eligible for reasonable accommodations under the Americans with Disabilities Act. If you have a documented disability please contact the Disability Support Services office to arrange for accommodations for this class.

**Academic Integrity Policy:**

Copying or plagiarizing code, papers, or presentations; cheating; and/or academic dishonesty in any form will not be tolerated in this course. Penalties for such behaviors may include receiving no credit for an assignment, a failing grade in the course, or even expulsion from the institution (DigiPen). For further details please consult the DigiPen Academic Integrity Policy.

*This syllabus may be adjusted or changed at any time by the instructor.*