University of Jordan
Department of Computer Engineering

COURSE OUTLINE

http://www1.ju.edu.jo/ecourse/dlcourse/dlindex.html

I. Course Description

0907231 Digital Logic [3 Credit Hours]

Number Systems and digital waveforms. Basic gates and logic functions. Boolean algebra, Boolean expressions. Logic minimization techniques. VHDL basics. Design, simulation and synthesis tools for programmable logic devices. Combinational logic building blocks including decoders, encoders, multiplexers, demultiplexers, magnitude comparators. VHDL for combinational circuits. Digital arithmetic, adders, subtractors. VHDL for arithmetic circuits. Basics of sequential circuits. Basic latches and flip-flops. Timing parameters and diagrams. Counters, shift registers. Basic PLDs, CPLDs and FPGAs architectures. VHDL for binary counters and shift registers. State machines. System design with state machines using VHDL. Memory devices and systems including RAM, ROM, FIFO, LIFO and dynamic RAM

II. Required Background or Experience

Prerequisites by course:

1900100 Computer Skills

Prerequisites by topic:

1. Introduction to Computers
2. Introduction to Computer Skills

Post-requisites:

1. 0907234 Logic Lab ***(Co-requisite***)
2. 1900100 Assembly Language and Microprocessors
3. 0907333 Embedded Systems
4. 0907335 Computer Organization

III. Course Objectives

This course is required for undergraduates in electrical engineering, computer engineering, and mechatronics engineering curricula. The overall objectives of the course are:

1. To design and analyze combinational and sequential logic networks.
2. To develop the skills required to solve engineering problems.

IV. Expected Outcomes

It's expected that by the end of the course, students are able to design basic digital hardware.

V. Textbook(s) and Readings

Logic and Computer Design Fundamentals, M. Morris Mano and Charles R. Kime (4th edition, 2008). Prentice Hall.

VI. Student Materials

Text book, class handouts, lecture notes, power point slides, and other resources posted regularly on website of the course.

VII. College Facilities

Classroom with black and white boards and projection facilities; library; and computer facilities.

VIII. Course Outline

Below are the course outline and a tentative calendar. An updated calendar will be posted on the web.

Week	Starting Date	Topic	Read by Class Time	Assignment/ Remarks
1	27/9	Introduction: Number Systems; Codes	Chapter 1: Sections 1-2 through 1-7	
2	4/10	Combinational Logic Circuits: Gates, Boolean Algebra, Standard Forms	Chapter 2: Sections 2-1, 2-2, 2-3, 2-8, 2-9, 2-10	
3	11/10	Combinational Logic Circuits: Two-Level Optimization	Chapter 2: Sections 2-4 through 2-5	Homework1
4	18/10	Combinational Logic Design: Procedure, Functional Blocks	Chapter 3: Sections 3-1 through 3-6	Homework1 Due/Quiz 1
5	25/10	Combinational Logic Design Using Building Blocks: Decoders, Encoders, Multiplexers, Demultiplexers	Chapter 3: Sections 3-7 through 3-9	
6	1/11	Arithmetic Functions: Adders-Subtractors, Signed Binary Numbers, Signed Addition/Subtraction, Overflow	Chapter 4: Sections 4-1 through Section 4-5)	Homework2

Week	Starting Date	Topic	Read by Class Time	Assignment/ Remarks
7	8/11	Arithmetic Functions (continued): Binary Multiplication, Contraction, Incrementing, Decrementing, Multiply/Divide by Constant		Homework2 Due/Quiz 2
8	15/11	Sequential Circuits: Basic Latches and Flip-Flops.	Chapter 5: Sections 5-1, 5-2, 5-3, 5-6	
Midterm; Saturday, November 21; 12-13:15				
9	22/11	Finite State Machines: Analysis	Chapter 5: Section 5-4	
10	29/11	Finite State Machines: Design	Chapter 5: Section 5-5, 5-7;	Homework 3
11	6/12	Finite State Machines: Design (continued)		Homework3 Due/Quiz 3
12	13/12	Registers and Counters	Chapter 7: Sections 7-1, 7-2, 7-3, 7-5, 7-6	
13	20/12	Registers and Counters (continued)	Chapter 7: Sections 7-8, 7-9	Homework4
14	27/12	Building Blocks (continued); Programmable Implementation of Functions: ROM, PLA, PAL	Section 6-8	Homework4 Due/Quiz 4
15	3/1	Memory Basics	Chapter 9	
Classes end; Thursday, 7/1/2010				
Final Exam: Monday, January 11, 2010; 2:00 - 4:00 PM				

IX. Instructional Methods

1. Lectures.
2. Homework and Quizzes.

The course has the web site: http://www1.ju.edu.jo/ecourse/dlcourse/dlindex.html
At the course web site you can access course material including lecture notes and class announcements. ***You are responsible for checking the course web site. If you make an***

error because you did not check the Web, you will still be held fully responsible.
Grades will also be posted.

X. Evaluation of Outcomes

1. **Quizzes:** 16%
2. **Homeworks:** 4%
3. **Midterm Exam**: 30%; Date: Saturday, November 21; 12-13:15
4. **Final Exam**: 50%; Date: Monday, January 11, 2010; 2:00 - 4:00 PM

Class Policies

- **Homework and Quizzes:** Four sets of homework problems will be assigned. Unless otherwise announced in class, for each section, the solutions of the homework are due at the beginning of the first lecture in the weeks indicated in the course calendar below. One quiz will be given at the beginning of the same lecture when each of the four homeworks is collected. The quiz will be based on the homework. For each student, the lowest of the 4 grades of quizzes/homeworks will be dropped. ***As a result, there will be no make-up quizzes for any reason.***
- **Exams:** All exams (including the final exam) will be closed book exams. The final exam will be comprehensive, covering material from the entire course, although the last third of the course will be emphasized.
- **Makeup Midterm*: There will be no make-up for the midterm***. In case of medical/ or other disabling emergencies, the instructor should be notified ***before*** the midterm and his approval for missing the midterm should be obtained before the midterm. If for any reason the instructor could not be reached, the department secretary should be notified before the midterm. The phone number is 535-5000 Extension 23000.
- **Grading Corrections**: Ask the instructor for any grading correction requests ***within a week of returning the exam/quiz papers***. After that, your grade will not be adjusted. If you find any mistake in grading, please let the instructor know. Your grade will not be lowered.
- **Class Attendance:** Class attendance will be taken. ***University regulations regarding attendance will be strictly enforced.*** If you miss class, you must obtain the covered material from a willing classmate and or the course web site. The instructor will not be available (during office hours or other times) to repeat material covered in class.

Course Instructors

Instructor	Room	Time	Days	Section
م. موسى اليمن	حاسوب □□□	□□□□-□□□□	ح ث خ	□
د.غيث عبندة	مدني تدريس□□□	□□□□-□□□□	ح ث خ	□
د.وليد صوفه	مدني تدريس□□□	□□□□-□□□□	ح ث خ	□
د.وليد صوفه	مدني□□□	□□□□-□□□□	ن ر	□