

King Saud University
College of Engineering
Electrical Engineering Department



EE208: Logic Design

First Semester 1426/1427 (2005/2006)

Academic Course Description

- Instructors:** (1) **Prof. Adnan NOUH**
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Text Books:

1. Morris M. Mano, "Digital Design", Prentice Hall, 2001.

Support References : Web sites educational material is also provided.

Pre-requisites: -- -- -- --

Co-requisites : -- -- -- --

Course Objectives: This course aims to familiarize the student with the basic concepts in digital logic design. Two basic categories are emphasized: combinational and sequential logic circuits. The teaching material helps the student solve many practical hardware problems and to be able to understand the principles of digital hardware design.

Topics Covered: Number systems, Boolean Algebra & Logic Gates, Boolean Functions, simplification techniques, Combinational logic circuits design, Applications, MSI (decoders and multiplexers), LSI (PLAs and ROMs), Flip-flops, Sequential Circuits design, Registers, Counters & Memory Units.

Class / Tutorial Schedule: Three lectures are assigned per week with 50 minute for each lecture session. There is also a 50 minute weekly tutorial session associated with this course.

Professional Component Contribution: Students can learn the analysis and design of different problems with special emphasis on concepts and design creativity. They acquire the basic skills of how to approach and deal with different requirements and solve simple design and practical problems. Students must also utilize knowledge of circuits and basic engineering sciences in order to effectively analyze a diverse set of fundamental problems in hardware design and its applications.

Relationship to Program Objectives(a - k): This course contributes to the general objectives listed for an Electrical Engineering Department.

Objective A: By teaching the student how to understand the physical problem, this course support the objective of producing graduate with science to electrical engineering.

Objective B: By teaching students how to deal with and to analyze the problem. The student is able to the necessary partial phases of design, this course support the objective of producing graduate with science to electrical engineering.

Objective C: By motivating and encouraging students in discussions during lectures and tutorials to get basic information and skills. Students also encouraged expressing their individual opinions or alternative solutions to the design and operating problem related to hardware design; this course supports the objective of producing graduate with good communication skills.

Objective D: By encouraging the students to learn pertinent ethical and professional standards in dealing with alternative methods of hardware analysis and design, this course

supports the objective of providing graduates with a broad based education so that they can appreciate diversity of opinion, better understand ethical issues and develop a more global perspective of the profession.

Objective E: By teaching how to design simple applications and how to integrate different components, this course supports the objective of producing graduates with relevant engineering design experience.

Objective F: By teaching how to communicate with others and how to express their ideas, this course supports the objective of producing graduates with relevant engineering design experience.

Objective G: By teaching how to access related references (books, web sites) for life-long learning term.

Objective H: By teaching how to standard techniques, how to handle different components, how to address components data sheets; this course supports the objective of producing graduate with good communication skills.

Objective I: Moderated mathematical skills are required at this level; this course supports the objective of producing graduates with relevant engineering design experience.

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Objective K: By teaching how to interface with basic requirements in system integration and how to be able to accommodate simple designs for the society.

Evaluation: There are graded home works, two 2-hours mid-term exams and a three hour final exam. The grade distribution is as follows:

First Mid-Term Exam	20%
Second Mid-Term Exam	20%
Home Works, Quizzes & Class Participation	20%
Final Exam	<u>40%</u>
Total	100%

Challenges and Actions taken to improve the Course:

- Real life problems are addressed
- Components data sheets are selected (TTL & CMOS).
- Small scale hardware projects will be addressed in the future

Weekly Teaching Plan

Week #	Deliverables
1	Basic Concepts of hardware design & number systems
2	Boolean Algebra & simplification techniques
3	Logic functions and Logic gates
4	SSI design using universal gates
5	TTL families and CMOS data sheets
6	Combinational logic design steps and practical applications
7	MSI design using -Decoders
8	MSI design using Multiplexers
9	LSI design using ROMs
10	LSI design using PLAs
11	Flip-Flops and analysis of clocked sequential circuits
12	State diagram and state assignments
13	Counters -Registers
14	Applications on a complete design phases of clocked sequential circuits
15	General discussions for different skills in hardware design & Final revision

December 20, 2005