جامعة المجمعة
Majmaah University

Course Specifications

Institution:	College of Science at Az Zulfi
Academic Department :	Computer Science and Information
Programme :	Computer Science and Information Program
Course :	Digital Logic Design (CSI-223)
Course Coordinator :	Assoc. Prof. Yosry Azzam
Programme Coordinator :	Assoc. Prof. Yosry Azzam
Course Specification Approved Date :	23 / 12 / 1435 H

A. Course Identification and General Information

1 - Course title : Digital Logic Design	Course Code: CSI-223
2. Credit hours :	3 credit hour ((2 lecture + 2 Lab)
3 - Program(s) in which the course is offered:	Computer Science and Information Program
4 – Course Language :	English
5 - Name of faculty member responsible for the course:	Prof. Yosry Azzam
6 - Level/year at which this course is offered :	4th level – 2013/2014

7 - Pre-requisites for this course (if any) :

- General Physics (PHYS 217)

8 - Co-requisites for this course (if any) :

- **None**

9 - Location if not on main campus :

College of Science at Az Zulfi

10 - Mode of Instruction (mark all that apply)

A - Traditional classroom	√	What percentage?	**80 %**
B - Blended (traditional and online)	√	What percentage?	**10 %**
D - e-learning		What percentage?	**……. %**
E - Correspondence		What percentage?	**……. %**
F - Other	√	What percentage?	**10 %**

Comments :

One-tenth of the course instruction is dedicated to students' self-learning where they are asked to read the course book, solve problems in their homes, and do experimental work using some dedicated SW programs that simulate the real HW kits.

B. Objectives

What is the main purpose for this course?

The course provides students with basic knowledge in: Binary Numbers, Octal and Hexadecimal Numbers, Number Base Conversions, Complements, Signed Binary Numbers, Binary Codes; Boolean Algebra and Logic Gates, Basic Definitions, Axiomatic Definition of Boolean Algebra, Basic Theorems and Properties of Boolean Algebra, Boolean Functions, Canonical and Standard Forms. Digital Logic Gates, Integrated Circuits, Transistor equivalent of Digital Logic Gates; Gate-Level Minimization, The Map Method, Four-Variable Map, Five-Variable Map, Product of

Sums Simplification, Don't-Care Conditions, NAND and NOR Implementation, Exclusive-OR Function; Combinational Logic, Combinational Circuits, Analysis Procedure, Design Procedure, Binary Adder-Subtractor, Decimal Adder, Binary Multiplier, Magnitude Comparator, Decoders, Encoders, Multiplexers; Sequential circuits: Latches and Flip flops, Sequential circuits analysis and design, Finite state machines, Registers and Counters.

As so, the purpose of this course is to:

1- Study number systems and codes and their application to digital systems.
2- Apply Boolean algebra to the design and characterization of digital circuits.
3- Explain the mathematical characteristics of logical gates.
4- Apply truth tables, Boolean algebra, Karnaugh maps.
5- Implement design equations and procedures to design combinational systems consisting of gates.
6- Apply alternative techniques to simplify the design process.
7- Utilize decoders and multiplexers in the design of logic.
8- Design and describe the operation of basic memory elements.
9- Analyze the behavior of sequential synchronous circuits.
10- Use registers and counters in the sequential circuits.

Briefly describe any plans for developing and improving the course that are being implemented :

1. Using group discussion through the internet with course attending students.
2. Updating the materials of the course to cover the new topics of the field.
3. Increasing the ability of the students to implement and do experimental work using some dedicated SW programs that simulate the real HW kits.

C. Course Description

1. Topics to be Covered

List of Topics	No. of Weeks	Contact Hours
Course Introduction Introduction to digital systems and their applications	1	4
Binary systems	2	8
Boolean Algebra and logic gates	3	12
Gate Level Minimization	3	12
Combinational Logic Design	3	12
Synchronous Sequential Logic Design	3	12

2. Course components (total contact hours and credits per semester):

	Lecture	Tutorial	Laboratory	Practical	Other:	Total
Contact Hours	30	-	30	-	-	60
Credit	30	-	15	-	-	45

3. Additional private study/learning hours expected for students per week.

4

The private self-study of my students is crucial for this course. It includes:

- reading carefully the topics in the textbook or reference book,
- solving the exercises that are assigned in each chapter,
- browsing the websites that are concerned with the course,
- discussing the course topics with the instructor in his office hours,
- watching the video lectures of other instructors who presented related topics worldwide.

The total workload of the student in this course is then: 60 + 4 * 15 = 120 work hours.

4. Course Learning Outcomes in NQF Domains of Learning and Alignment with Assessment Methods and Teaching Strategy

	NQF Learning Domains And Course Learning Outcomes	Course Teaching Strategies	Course Assessment Methods
1.0	**Knowledge**		
1.1	Gain knowledge and understand of number systems, Boolean algebra and logic design.	Lectures Lab demonstrations Case studies Individual presentations	Written Exam Homework assignments Lab assignments Class Activities Quizzes

	NQF Learning Domains And Course Learning Outcomes	Course Teaching Strategies	Course Assessment Methods
2.0	**Cognitive Skills**		
2.1	Apply truth tables, Boolean algebra, Karnaugh maps, and other methods to the design and characterization of digital circuits as well as to obtain design equations.	Lectures Lab demonstrations Case studies Individual presentations Brainstorming	Written Exam Homework assignments Lab assignments Class Activities Quizzes
2.2	Apply alternative techniques to simplify the design process yielding innovative designs.		
2.3	Analyze and design synchronous sequential circuits as well as the use of registers and counters in these circuits.		
3.0	**Interpersonal Skills & Responsibility**		
3.1	Submit a group final project at the end of the semester that involves the implementation of design theory, and the use of a simulation package to develop a complex digital circuit.	Small group discussion Whole group discussion Brainstorming Presentation	Written Exam Homework assignments Lab assignments Class Activities Quizzes
4.0	**Communication, Information Technology, Numerical**		
4.1	Perform research and encourage performing team work activity, and prepare reports and improve communication skills and Use the internet to search for related topics.	Small group discussion Whole group discussion Brainstorming Presentation	Written Exam Homework assignments Lab assignments Class Activities Quizzes
5.0	**Psychomotor**		
5.1	**.....**	.....	.....
5.2	**.....**	.....	.....

5. Schedule of Assessment Tasks for Students During the Semester:

	Assessment task	Week Due	Proportion of Total Assessment
1	First written mid-term exam	6	15%
2	Second written mid-term exam	12	15%
3	Presentation, class activities, and group discussion	Every week	5 %

4	Homework assignments	After Every chapter	5 %
5	Final Lab Exam	15	20%
6	Final written exam	16	40%
7	Total		100%

D. Student Academic Counseling and Support

Office hours: Sun – Wed: 12 PM - 2:00 PM.
Office call: Sun – Wed: 12 PM - 2:00 PM.
Email: Y.Azzam@mu.edu.sa

E. Learning Resources

1. List Required Textbooks :

- M. Morris Mano , Michael D. Ciletti , Digital Design: With an Introduction to the Verilog HDL, 5th Edition, Prentice-Hall, 2012.

- M. Morris Mano and Charles R. Kime, Logic and Computer Design Fundamentals, *4th Edition*, Prentice-Hall, 2008.
- C. H. Roth, Fundamentals of Logic Design, Thomson Brooks / Cole, 2004.

3. List Recommended Textbooks and Reference Material :

- M. Morris Mano and Charles R. Kime, Logic and Computer Design Fundamentals, *4th Edition*, Prentice-Hall, 2008
- C. H. Roth, Fundamentals of Logic Design, Thomson Brooks / Cole, 2004

4. List Electronic Materials :

Logic Gate Simulator.

5. Other learning material :

- http://www.youtube.com/watch?v=CeD2L6KbtVM&list=PL018B3BB2E6FE781D
- http://www.youtube.com/watch?v=mMKSKpF103A
- http://www.youtube.com/watch?v=K6cj3NaUqyU

F. Facilities Required

1. Accommodation

- Classroom and Lab, as those that are available at college of science at Az Zulfi.

2. Computing resources

- Smart Board.

3. Other resources

- Hardwired logic gate kits.

G. Course Evaluation and Improvement Processes

1 Strategies for Obtaining Student Feedback on Effectiveness of Teaching:

- Questionnaires (course evaluation) achieved by the students and it is electronically organized by the faculty member on his personal site.
- Student-faculty management meetings.

2 Other Strategies for Evaluation of Teaching by the Program/Department Instructor :

- Discussion within the staff members teaching the course
- Departmental internal review of the course.

3 Processes for Improvement of Teaching :

- Periodical departmental revision of methods of teaching.
- Monitoring of teaching activates by senior faculty members.
- Training course.

4. Processes for Verifying Standards of Student Achievement

- Comparison graphs to indicate student achievements in comparison to other departments.

5. Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement :

- Course evaluation.
- Exam evaluation.
- Improvement plan.

Course Specification Approved
Department Official Meeting No (6) Date 23 / 12 / 1435 *H*

Course's Coordinator		Department Head	
Name :	Dr. Yosry Azzam	***Name :***	Dr. Yosry Azzam
Signature :		***Signature :***	
Date :	23 / 12 / 1435 *H*	***Date :***	…./ … / …… *H*