QFO-AP-FI-MO02	Course Syllabus :اسم النموذج	جامعة فيلادلفيا Philadelphia University
رقم الاصدار : 1 (Revision)	الجهة المصدرة: كلية تكنولوجيا المعلومات	
التاريخ :2017/11/05	الجهة المدققة: عمادة التطوير والجودة	
عدد صفحات النموذج:		

Course Title: Digital Logic Design	**Course code: 750230**
Course Level: 2	**Course prerequisite: 0731110**
Lecture Time:	**Credit hours: 3**

Academic Staff Specifics				
Name	**Rank**	**Office No. and Location**	**Office Hours**	**E-mail Address**

Course Description:
This module introduces the concepts of the design and implementation of digital circuits. Laboratory experiments will be used to reinforce the theoretical concepts discussed in lectures. The lab experiments will involve the design and implementation of digital circuits. Emphasis is on the use computer aided tools in the design, simulation, and testing of digital circuits.

Course Objectives:
The aim of the module is to introduce to the students the topics that include combinational and sequential circuit analysis and design, digital circuit design optimization methods using random logic gates, multiplexers, decoders, registers, counters and programmable logic arrays.

Course Components

- Introduction to Digital logic Design
- Binary Systems and Codes
- Binary Codes: BCD, ASCII and EBCDIC
- Binary Logic and Logic Gates: AND, OR and NOT
- Boolean Algebra and Logic Gates
- Integrated Circuits
- Gate-Level Minimization
- Analysis and Synthesis of Combinational Circuits
- Analysis and Synthesis of Sequential Circuits
- Registers and Counters.
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Textbook:
Title: Digital Logic
Author: Morris Mano
Publisher: Prentice Hall, 2012

In addition to the above, the students will be provided with handouts by the lecturer.

Teaching Methods:
Duration: 16 weeks, 48 hours in total
Lectures: 41 hours (2-3 per week)
Tutorial: 4 hours (1 every 3 weeks)

Learning Outcomes:

A- Knowledge and understanding

A2. Know & understand a wide range of principles and tools available to Minimize functions using any type of minimizing algorithms (Boolean algebra, Karnaugh map the software developer, such as design methodologies, choice of algorithm, language, software libraries and user interface technique:

A4. Know & understand a wide range of hardware used in development of computer systems

A5. Know & understand the professional and ethical responsibilities of the practicing computer professional including understanding the need for quality.

B- *Intellectual skills (thinking and analysis).*

B1. Analyze a wide range of problems and provide solutions through suitable algorithms, structures, diagrams, and other appropriate methods

B4. Practice self learning by using the e-courses

C- *Practical skills*

C3. Work effectively with and for others.

C4. Strike the balance between self-reliance and seeking help when necessary in new situations

C5. Display personal responsibility by working to multiple deadlines in complex activities

D- *Transferable Skills*

D2. Prepare and deliver coherent and structured verbal and written technical reports.

D4. Use the scientific literature effectively and make discriminating use of Web resources

D5. Design, write, and debug computer programs in appropriate languages

Learning outcomes achievement

- Development: A2, A4, and A5 are developed through the lectures and laboratory sessions.
  B1, D5, C3, and C4 are developed trough Tutorials and Lab sessions,
  B4, D2, D4, D5, and C5 are developed through Homework

- Assessment : A2, A4, A5, B1, D5, and C4 and are assessed through Quizzes, written exams, and Practical Works Exams.
  B4, D2, D4, D5, and C5 are assessed through Homework Exam.

Assessment Instruments

Allocation of Marks	
Assessment Instruments	**Mark**
First examination	**20%**
Second examination	**20%**
Final Exam	**40%**
Three Quizzes and Home works.	**20%**
Total	**100%**

** Make-up exams will be offered for valid reasons only with consent of the Dean. Make-up exams may be different from regular exams in content and format.*

Practical Submissions:

The assignments that have work to be assessed will be given to the students in separate documents including the due date and appropriate reading material.

Course Academic Calendar:

Week	Basic and support material to be covered
(1)	**Digital Computers and digital systems** Binary Numbers. Number based conversion. Octal and Hexadecimal Numbers.
(2)	**Signed Binary Numbers** Complements. Arithmetic Operations (Add and Subtract).
(3)	**Logic Gates** NOT, AND, OR, NAND, NOR, Exclusive-OR and Equivalence. Logic Circuits.
(4 & 5)	**Boolean Algebra**. Basic Definition. Basic Theorems. Boolean Functions. Canonical Forms: Minterms & Maxterms. Simplification using SOP and POS.
(6 & 7) **First Exam**	**Simplification Using Map Method** Two- and Three- Variables Maps. Four-Variable Map. NAND and NOR Implementation. Don't Care conditions.
(8& 9)	**Combinational Logic Circuits** Adders and Sub tractors. Multilevel NAND. Multilevel NOR.
(10 & 11)	**Combinational Logic Circuit with MSI and LSI**

	Binary Adders. Binary Sub-tractor. Decoders. Multiplexers.
(12 & 13) **Second Exam**	**Sequential Circuits** Flip-Flops. Analysis of Clocked Sequential Circuits. Flip-Flops: RS, D, JK and T. Flip-Flop Excitation Tables.
(14)	**Design Procedure** Example of Sequential Circuit.
(15)	**Registers and Counters**
(16) **Final Exam**	**Review**

Expected Workload:
On average students need to spend 2 hours of study and preparation for each 50-minute lecture/tutorial.

Attendance Policy:
Absence from lectures and/or tutorials shall not exceed 15%. Students who exceed the 15% limit without a medical or emergency excuse acceptable to and approved by the Dean of the relevant college/faculty shall not be allowed to take the final examination and shall receive a mark of zero for the course. If the excuse is approved by the Dean, the student shall be considered to have withdrawn from the course.

Module References
Students will be expected to give the same attention to these references as given to the Module textbook(s)

1. Morris Mano, Charles R. Kime, Logic and computer design fundamentals, Pearson Prentice Hall, 2004.

2. Basavaraj,B., Digital fundamentals, New Delhi: Vikas Publishing House, 1999.

3. Kandel Langholz, Digital Logic Design, Prentice Hall, 1988.

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4. Rafiquzzaman & Chandra, Modern Computer Architecture, West Pub. Comp., 1988.

Website(s):

- https://www.cs.utexas.edu/~byoung/cs429/slides5-logic.pdf
- https://en.wikiversity.org/wiki/Computer_Logic#Addition
- http://american.cs.ucdavis.edu/academic/ecs154a.sum14/postscript/cosc205.pdf