Philadelphia University

Faculty of Engineering - Department of Computer Engineering
First Semester 2022/2023

Course Details:

Title:	**Logic Circuits (610220)**
Prerequisite:	Programming Language (610263)
Credit Hours:	3 credit hours (16 weeks per semester, approximately 44 contact hours)
Textbook:	"Digital Fundamentals", Thomas L. Floyd 10th ed., Pearson International Edition, 2009.
References:	**Books:** **1)** Introduction to Logic Design, Alan B. Marcovitz, Third Edition, McGraw-Hill, 2010. **2)** Logic and computer design fundamentals, M. Morris Mano, Charles R. Kime , Pearson Prentice Hall, 4th ed., 2008 **3)** Digital Design, 4th Edition, M. Morris Mano and Michael D. Ciletti, Prentice Hall, 2007. **4)** Digital Electronics: Principles and Applications, R. L. Tokheim, 5th Edition, McGraw-Hill, 2000. **5)** Practical Digital Logic Design and Testing, P. K. Lala, Prentice Hall, 1996. **6)** Introduction to Digital Logic Design, J. P. Hayes, Addison-Wesley, 1996. **Web sites:** http://www.digikey.com http://www.edaboard.com/forums.html
Course Description:	This class is an introduction to the basic concepts, analysis, and design of digital systems. This consists of both combinational and sequential logic. Lectures will enable students to experience with several levels of digital systems.
Website:	http://www.philadelphia.edu.jo/academics/qhamarsheh
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Course Outlines:

Week	Topic
1	Course Overview
2	Introduction to Digital Systems. Number Systems and Conversions, Binary Codes.
3	Boolean Algebra and Logic Gates
4	Minimization Methods and Don't care conditions
5	Representation and implementation of Boolean circuits using other logic gates.
6	Tutorials

7	Analysis Procedure of combinational circuits
8	Combinational Circuits design, BCD Display
9	Adder, Subtracter and Magnitude comparators.
10	Multiplexers, Encoders, and Decoders.
11	Tutorials
12	Sequential Circuits: Latches and Flip flops
13	Analyzing Sequential Circuits, Finite State Machine Design Procedure.
14	State Reduction and Assignment
15	Shift Registers, Counters and Timing Analysis.
16	Tutorials, review and study guide of final exam material

Course Learning Outcomes with reference to ABET Student Outcomes:

Upon successful completion of this course, student should:

1)	Explain and understand the main concepts of digital system: Number Systems and Conversions, Binary Codes, Boolean Algebra, basic laws and rules in logic design and DeMorgan's theorem.	[1]
2)	Be able to map and minimize Boolean functions using different **Minimization Methods** like Boolean Algebra and Karnaugh map as well as represent them in various standard forms.	[1, 2]
3)	The ability to understand various combinational "building blocks" such as Adder, decoders, multiplexers, encoders, etc.	[1]
4)	Understand the behavior exhibited by latches and flip-flops.	[1]
5)	Understand various sequential "building blocks" such as counters and shift registers.	[1]
6)	Be able to develop skill to design, implement and analyze combinational and sequential logic circuits.	[1, 2, 6]
7)	Be able for engineering thinking in analyzing the behavior of digital circuits and its design.	[1, 2, 6]

Assessment Guidance:

Evaluation of the student performance during the semester (total final mark) will be conducted according to the following activities:

Sub-Exams: The students will be subjected to a midterm scheduled written exams during the semester.

Quizzes: quizzes of (10-15) minutes will be conducted during thesemester. The materials of the quizzes are set by the lecturer.

Homework and projects: Tutorials sheets will be handed out to the students and homework should be solved individually and submitted before or on a set agreed date. Student may be assigned to present project(s).

Cheating by copying homework from others is strictly forbidden

and punishable by awarding the work with zero mark.

Collective Participation:	Brain storming and collective discussions will be carried out during any lecture. Individual student will be assessed accordingly.
Final Exam:	The students will undergo a scheduled final exam at the end of the semester covering the whole materials taught in the course.

Grading policy:

First Exam	30%
Course work	30%
Final Exam	40%
Total:	100%

Attendance Regulation:

The semester has in total 45 credit hours. Total absence hours from classes and tutorials must not exceed 15% of the total credit hours. Exceeding this limit without a medical or emergency excuse approved by the deanship will prohibit the student from sitting the final exam and a zero mark will be recorded for the course. If the excuse is approved by the deanship the student will be considered withdrawn from the course.

September 2022