Jordan University of Science and Technology

Faculty of Engineering

Electrical Engineering Department

EE345 Introduction To Microcontrollers

Second Semester 2020-2021

Course Catalog
3 Credit Hours. Digital systems and binary numbers. Boolean algebra and logic gates, gate-level minimization, combinational logic, synchronous sequential logic, registers and counters, memory and programmable logic (Equivalent CPE 234 Digital logic design and computer architecture).

Text Book	
Title	Digital Design
Author(s)	M. Mano and M. Ciletti
Edition	5th Edition
Short Name	Main reference
Other Information	

Instructor	
Name	**Prof. Ahmad Abu-El-Haija**
Office Location	E1 L-2
Office Hours	Sun : 10:30 - 12:30 Mon : 08:30 - 10:30 Tue : 08:30 - 10:30 Thu : 11:30 - 12:30
Email	haija@just.edu.jo

Class Schedule & Room
Section 1: Lecture Time: Sun, Tue : 13:00 - 14:30 Room: 150 منصة الكترونية

Tentative List of Topics Covered		
Weeks	**Topic**	**References**
Weeks 1, 2	Digital Systems and Binary Numbers: introduction to digital systems, binary numbers, number-base conversions, octal and hexadecimal numbers, complements, signed binary numbers, binary codes, storage and registers, binary logic	From **Main reference**
Weeks 3, 4	Boolean Algebra and Logic Gates: basic definitions, theorems and properties of Boolean algebra, canonical and standard forms, other logic functions, digital logic gates, integrated circuits	From **Main reference**
Weeks 5, 6	Gate-Level Minimization: the map method, four-variable maps, product-of-cums simplification, don't-care conditions, NAND & NOR implementation, other two-level implementations, exclusive-OR function	From **Main reference**
Weeks 7, 8	Combinational Logic: combinational circuits, analysis and design procedures, binary adder-subtractor, decimal adder, binary multiplier, magnitude comparator, decoders, encoders, multiplexers	
Weeks 9, 10, 11	Sequential and Synchronous Logic: introduction to sequential circuits, latches, flip-flops, analysis of clocked sequential circuits, state reduction and assignment, design procedure of clocked sequential circuits	From **Main reference**
Weeks 12, 13	Registers and Counters: registers, shift registers, ripple counters, binary counters, other counters	
Weeks 14, 15	Memory and Programmable Logic: random access memory, read & write operations, memory types, memory cell, 4 x 4 RAM, decoding & addressing, read-only memory, programmable logic arrays	

Mapping of Course Outcomes to Program Student Outcomes	**Course Outcome Weight (Out of 100%)**	**Assessment method**
Students should be able to express numbers in different radix systems and convert among them, and perform arithmetic using binary numbers and complements	10%	Midterm Exam, Quizzes, Final exam
Express logic functions using Boolean algebra, and analyze simple combinational circuits	15%	Midterm Exam, Quizzes, Final exam
Design simple combinational logic circuits using standard gates and commercially available integrated circuits such as NAND gates, multiplexers, decoders, etc	30%	Midterm Exam, Quizzes, Final exam
Design simple sequential logic circuits using standard gates and commercially available integrated circuits such as flip-flops, registers, counters, etc.	30%	Midterm Exam, Quizzes, Final exam
Understand the design and construction of random access memory, read only memory, and programmable devices, and using these devices to construct combinational circuits	15%	Quizzes, Final exam

Relationship to Program Student Outcomes (Out of 100%)						
ABET1	ABET2	ABET3	ABET4	ABET5	ABET6	ABET7

Evaluation	
Assessment Tool	**Weight**
Midterm Exam	25%
Quizzes	25%
Final exam	50%

Policy	
Course Assessment	Exams: There is one midterm (25 points), 6-8 quizzes (total 25 points) and one final exam (50 points).

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