2023
TP-153

Course Specification

(Bachelor)

Course Title:	Digital Logic Design
Course Code:	503221-4
Program:	Bachelor in Computer Science
Department:	Department of Computer Science
College:	College of Computers and Information Technology
Institution:	Taif University
Version:	V1.2024
Last Revision Date:	01/02/2024

Table of Contents

A. General information about the course:

1. Course Identification

1. Credit hours: (4)					
2. Course type					
A.	☐University	☐College	☒ Department	☐Track	☐Others
B.	☒ Required		☐Elective		
3. Level/year at which this course is offered: (4/2)					
4. Course general Description:					
This course covers many basic topics such as numbering systems, Boolean algebra, simplification using Boolean algebra and Karnaugh maps, and different logic gates. The course also deals with analysis and synthesis of combinational circuits, e.g., adders, encoders, decoders, multiplexers and demultiplexers. Flip-flops and Sequential circuits such as registers, counters, and other basic also presented. The course prepares the students to apply the above basic skills to design, implement, and test digital logic circuits in the laboratory.					
5. Pre-requirements for this course (if any)**:**					
501215-3					
6. Co-requisites for this course (if any)**:**					
None					
7. Course Main Objective(s):					
This course prepares student to deal with logic circuits and give them the skills to design and implement both combinational and sequential circuits					

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	5	100%
2	E-learning		
3	Hybrid • Traditional classroom • E-learning		
4	Distance learning		

3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	**Lectures**	45
2.	**Laboratory/Studio**	30
3.	**Field**	
4.	**Tutorial**	
5.	**Others (specify)**	
Total		75

B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Code of PLOs aligned with program	Teaching Strategies	Assessment Methods
1.0	**Knowledge and understanding**			
1.1	Represent numbers using different number systems, and to perform basic binary operations.	K1	Lecture Discussion Problem Solving Mini project	Written Exams Quizzes Assignments Practical Test
1.2	Apply the different switching algebra theorems for the minimization of logic functions.	K1	Lecture Discussion Problem Solving Mini project	Written Exams Quizzes Assignments Practical Test
1.3	Apply Karnaugh map for minimization of logic functions.	K1	Lecture Discussion Problem Solving Mini project	Written Exams Quizzes Assignments Practical Test
1.4				
...				
2.0	**Skills**			
2.1	Analyze and design different	S1	Lecture Discussion Problem Solving	Written Exams Quizzes Assignments

Code	Course Learning Outcomes	Code of PLOs aligned with program	Teaching Strategies	Assessment Methods
	combinational circuits.		Mini project	Practical Test
2.2	Analyze and design different sequential circuits.	S1	Lecture Discussion Problem Solving Mini project	Written Exams Quizzes Assignments Practical Test
2.3				
2.4				
...				
3.0	**Values, autonomy, and responsibility**			
3.1				
3.2				
3.3				
3.4				
...				

C. Course Content

No	List of Topics	Contact Hours
1.	Introductory Digital Concepts	3
2.	Number systems, Binary addition, subtraction, Representation of negative numbers, 2's complement addition/subtraction, Binary codes.	3
3.	Switching algebra, Theorems, Standard representation of logic functions	8
4.	Truth table, Minimization techniques.	8
5.	Simplification of three and four variable using Karnaugh maps and Don't care.	3
6.	Combinational circuits building blocks Half and Full adders, Encoders/Decoders. Mux/Dmux/XOR circuits.	8
7.	Programmable Logic Devices. Design examples with MSI. ALU and PLD circuits	8
8.	Sequential Circuits. Bistable elements. Latches and Flip Flops. Flip Flops and Related Devices	8
9.	Theoretical design Shift registers serial and parallel	8
10.	Design examples of Shift registers serial and parallel	8
11.	Finite State machine; design analysis and synthesis.	7
12.	Counters serial and parallel, Design examples.	3
13.		

Total		**75**

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Lab Exam	15	15%
2.	Midterm Exam	7	20%
3.	Assignments	Continues	5%
4.	Quizzes	Continues	10%
5.	Project	Continues	10%
6.	Final Exam	16	40%
...			

*Assessment Activities (i.e., Written test, oral test, oral presentation, group project, essay, etc.).

E. Learning Resources and Facilities

1. References and Learning Resources

Essential References	M. Mano, "Digital Design", third edition, Prentice Hall, 2002.
Supportive References	T. L. Floyd, "Fundamentals of Digital Design", 6 th edition, Prentice-Hall, 2006.
Electronic Materials	
Other Learning Materials	

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Traditional Classrooms Laboratories
Technology equipment (projector, smart board, software)	White Board. Datashow.
Other equipment (depending on the nature of the specialty)	

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Students	Indirect (Surveys)
Effectiveness of Students assessment	Students	Indirect (Surveys)
Quality of learning resources	Students	Indirect (Surveys)
The extent to which CLOs have been achieved	Faculty	Direct (Course Report)
Other		

Assessors (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify)

Assessment Methods (Direct, Indirect)

G. Specification Approval

COUNCIL /COMMITTEE	**CS COUNCIL**
REFERENCE NO.	**MEETING #11**
DATE	**07/03/2024**